Collaboration for Electronic Preservation

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Abstract

Resource-sharing and knowledge dissemination have been the driving forces behind late twentieth century preservation collaboration. But with the challenge of digital preservation that emerged at the turn of the twenty-first century, collaboration for the discovery of new ways of doing things took on increased importance. Collaborative projects tackled problems like developing new methodologies, establishing standards and best practices, and developing procedures and tools for areas such as emulation and data recovery. This article explains the different driving forces behind collaboration for preservation of electronic material[1] and situates them within recent U.S. preservation and library collaboration history. It then provides two case studies of collaborative electronic preservation projects that the author participated in. Finally, it uses the experiences of those studies to identify a modest set of predictors for success in such future projects.

Background

The rise of automation and standards for libraries in the last third of the twentieth century enabled a variety of collaborative activities. The development of the MARC Standard in 1965 and the publication of the Anglo-American Cataloging Rules in 1967[2] enabled the formation of the OCLC and BALLOTS systems for collaborative cataloging in the late 1960s, and led to their phenomenal growth over the following two decades. By the 1990s, few American libraries would have considered not belonging to a consortium that provided a variety of services based on collaborative contributions from many libraries, particularly shared cataloging services.

Though initially based upon copy cataloging (and often with business models that rewarded contributions of original cataloging), these "bibliographic utilities" morphed into more generalized services that pooled and leveraged the knowledge and resources of their members. BALLOTS became part of the Research Libraries Group (RLG) in the 1970s, and for approximately thirty years OCLC and RLG continued to separately build new services that relied on continued interactions among their respective members—with a variety of interlibrary loan services (extending into faxing and digital delivery of document copies), collaboration around cultural materials, union catalogs of digital images, etc. And it is safe to say that the 2006 merger of the two organizations holds the promise of further cross-institutional coordination and collaboration, as well as continuation of collaborative development of guidelines, standards, and best practices (such as the joint RLG/OCLC PREservation Metadata Implementation Strategies project—PREMIS) (OCLC, 2006).

In the last third of the twentieth century, librarians began to see collaboration as essential to large-scale preservation projects employing technology. In the 1960s, groups such as the Association of Research Libraries (ARL) and the Library of Congress (LC) endorsed a proposal to create a centralized national preservation repository, but they soon concluded that such a proposal was unworkable (Field, 2003, p. 60). In the 1970s ARL proposed that the goal of national preservation instead be realized by coordinating the efforts of individual research libraries. In 1983 the National Endowment for the Humanities (NEH) gave a grant to RLG for collaborative preservation microfilming, and in 1985 the Council on Library Resources issued a report showing the feasibility of a collaborative national microfilming project to preserve brittle books. In 1985 NEH established an Office of Preservation to support "a sustained and coherent attack on the preservation problem" (Field, 2003, pp. 60–61).

Since 1982, the National Endowment for the Humanities (NEH) has funded the highly successful United States Newspaper Program to create bibliographic records and do preservation microfilming in a coordinated effort involving institutions in all fifty states. And since 1989, NEH has run a highly successful cooperative preservation microfilming project. These and other NEH preservation projects involve coordination and collaboration among a large number of individual libraries. Each library is responsible for a small amount of the total effort, but all libraries share in the results of that effort. Electronic resources have played a key enabling role in these projects, from the planning stage (employing union catalogs that help in determining which works have not yet been preserved), to the preservation stage (using holdings listings that help locate replacements for damaged or missing pages), to the use stage (connecting users to preserved works).

Though enabled by technology, almost all of the various collaborative

projects outlined thus far were driven by resource sharing. They came about because one library could realize cost savings by relying upon something contributed by another library— from copy cataloging (when original cataloging became too expensive for each library to do completely on its own) to interlibrary loan (where most libraries did not have the resources to expand their collections every time one of their users wanted material that the library did not own) to collaborative microfilming (where libraries found it difficult to justify the expense of microfilming a newspaper that another library had already filmed). In most cases, the primary motivation for collaboration has been to avoid duplication of effort, and therefore conserve resources. This is not uncommon. As observed in a recent issue of *Library Trends*:

> Libraries and their partners traditionally work together for "selfish" but positive reasons: to leverage shrinking budgets, to learn from each other, to build better tools together and, most importantly, to serve their common users better by taking advantage of one another's collections. (Borek, Bell, Richardson, & Lewis, 2006, p. 456)

A key factor in library automation was the leveraging of decentralized resources from several libraries, joining them virtually to make them appear unified (as in the union catalogs of the bibliographic utilities), or creating an aggregate set of useful information from disparate libraries (for copy cataloging, ILL, or preservation microfilming). To achieve success, all of these new services required collaboration between or among institutions.

Digital Content Prompts New Reasons for Collaboration

With the emergence of library projects handling digital content in the mid-1990s, the forces driving collaboration shifted. Digital content posed problems unlike those that libraries had faced before. Within a library, interdisciplinary teams had to be assembled with expertise in mass storage, file formats, metadata and interoperability standards, user behavior and accompanying interfaces, and digital preservation. This involved teams that had to adopt principles from various library departments (Systems, Cataloging, Conservation, User Studies), but had to learn a host of new knowledge and skill sets. And few libraries could develop all these needed skills on their own. Because of the significant challenge posed by the emerging field of digital content, libraries found it necessary to not only build collaborative teams from various departments within a given library, but to also collaborate with a host of other institutions. At that point in time, the primary force driving collaboration shifted from saving resources and avoiding duplication of effort, to bringing people together to solve new problems.

Others have observed digital projects pushing librarians into more collaborative actions. A key advocate for collaborative work, Liz Bish-off (2004), formerly of the Colorado Digitization Project, has observed, "Rarely do we find statewide or even regional resource collaboration. Thanks to the digital library, a cultural shift is beginning to take place, and . . . is putting collaboration on digital initiatives on the front burner for all types of libraries" (p. 34). Bishoff goes on to cite the advantages of these collaborations:

> Together, institutions that see aspects of a problem differently can constructively explore their differences. The resulting joint solution is always stronger than what one library or museum could achieve alone. . . . Collaboration makes it possible for every institution to capitalize on the professional traditions and expertise of all. (p. 34)

Others have cited the primacy of collaborations to contemporary digital projects. In her important paper on "cyberinfrastructure," Coalition for Networked Information Associate Executive Director Joan Lippincott focuses on the importance of collaborative work in this new environment, and places "Partnerships" as the central element in her opening diagram, making partnerships the link between all other activities (Lippincott, 2002, p. 439).

Some of the collaborative digital-based efforts were focused on developing important standards for interoperable retrieval of digital content. These included the 1995 Dublin Core (which brought together librarians, computer-based retrieval professionals, and text-encoding standards specialists), the 1998 Making of America II Project[3] (a collaboration between archivists, text-encoding experts, a systems office, and a library school), the 1999 project on Technical Imaging Metadata[4] (a collaboration between NISO standards creators, digital imaging specialists, library automation experts, and museum professionals).

Other digital content projects have needed collaboration just to accomplish the project goals, which frequently have involved the creation of a union catalog or (more recently) the creation of a virtual collection composed by linking together the content of multiple institutions. One of the first such projects (begun in 1995), the Museum Educational Site Licensing Project (MESL) aggregated digital content and metadata from six museums and the Library of Congress into an identical set that was disseminated via seven different retrieval systems on seven different university campuses (Besser, 1997; Besser & Stephenson, 1996; Besser, Lack, & Yamashita, 1999; McClung & Stephenson, 1998; Stephenson & McClung, 1998). This mammoth project involved extensive collaboration between many different types of personnel at these fourteen institutions—catalogers, information technology staff, museum education departments, museum publications departments, teaching faculty, instructional tech-

nologists, imaging specialists, reference librarians, etc. The project required intensive collaboration at the outset to assure interoperability, and throughout the project's three-year lifespan the participants collaborated on changes to the various implementations through evaluations, improvements, and service extensions. Collaboration also contributed to mutual support, information sharing, and a host of other less tangible benefits.

There are many more recent examples of large multi-institution collaborations involving the cooperation of many different departments within each institution. Primary among these are the Colorado Digitization Project (www.cdpheritage.org) and the Virtual Museum of Canada (www.virtualmuseum.ca). According to Borek et al. (2006), "These services are standards based. They provide centralized search portals for end-users, as well as supplying organizations with training and tools to enhance their digitization abilities" (p. 458). These projects go far beyond union catalogs, and offer many different services. They leverage the cumulative knowledge among all participant organizations, and are able to tackle problems that most of their participant members could not tackle on their own. They encourage collaboration between people from multiple backgrounds and have them bring their various perspectives to bear on challenging new problems.

PRESERVATION OF ELECTRONIC WORKS[5]

The preservation of electronic works involves layers of complexity beyond those encountered in most digital content projects (Besser, 2000; Garrett & Waters, 1996). Preservation projects encounter similar challenges that previous digital content projects faced. But, in addition, preservation projects face issues of rapid format obsolescence as well as the need to use a particular type of electronic machine even to identify what the work really is. And these preservation projects need to assure that a work will be accessible into the next century (a very difficult prospect, given that thus far most digital file formats have changed at least every few years, and few analog video formats last more than twenty years without being eclipsed by newer formats) (Besser, 2001).

Preservation of electronic works involves significant standards development, and is intimately intertwined with issues of access. As Jeffrey Field (2003) of NEH has observed:

> It is interesting to note that in characterizing the notion of "digital preservation," we speak or write about ensuring "continuing access to digital collections." In using this locution, we acknowledge that, with reference to digital technology, preservation and access are fused, because preservation becomes the ability over the long term to retrieve and reproduce digital information. This is why the creation of metadata standards for digital objects is such an integral part of developing a digital preservation program. (p. 66)

An important part of earlier preservation microfilming projects involved technical research (much of it at the Image Permanence Institute under funding from NEH), experimentation, and the development of standards and guidelines. Looking toward preservation in the digital age, Field (2003) contends that one of the two key components of a national preservation infrastructure is "the pursuit of research and demonstration leading to the creation of standards, best practices, and a new preservation technology" (p. 60).

Few libraries have the staff to tackle many of these issues on their own. As Stewart Granger (2002), the coordinator of a major United Kingdom digital preservation project has written:

> Even a cursory examination of the problems of digital preservation indicates the positive need for collaboration amongst interested parties and institutions. It should be obvious that such collaboration is likely to facilitate cost savings, either by economies of scale or by other means. That, I think, is both true and important but I believe does not convey the scale of the problem confronting us. (section 1.2)

Granger cites a number of areas where collaboration will be critical for digital preservation, most of which few libraries have experience with: developing and maintaining emulators, developing metadata tools, and providing data recovery services.

Collaboration is seen as a critical part of national preservation plans in the electronic age, in the United States and abroad. Field (2003) asserts, "To advance our capacity to ensure continuing access to digital collections—textual and non-textual—we will need to sustain a collaboration among multiple agencies and knowledge domains" (p. 59). Neil Beagrie (2002), the UK's higher education official responsible for digital preservation has written, "In the UK widening collaboration across sectors and between institutions has been seen as a key requirement to address digital preservation challenges at a national level" (Introduction section). As Michèle Cloonan (2001) has observed in her insightful article about the future of preservation, "Digital preservation projects are already creating (or forcing) some cross-disciplinary collaborations" (p. 239).

But, the UNESCO *Guidelines for Preservation of Digital Heritage* warns:

> Collaboration costs. It takes time and energy to negotiate agreements, to work with remote partners, and to maintain momentum. Organisational priorities can be sidetracked by problems in the collaborative relationship itself, taking attention away from the real mission of preserving digital materials. (National Library of Australia, 2003, p. 62)

CASE STUDY: PRESERVING DIGITAL PUBLIC TELEVISION

Preserving Digital Public Television is a highly collaborative project (Preserving Digital Public Television, 2006) between the two largest originators of public television programming (WGBH in Boston and WNET

in New York), the New York University Library and its master's degree program in Moving Image Archiving and Preservation (MIAP), and the Public Broadcasting Service, national broadcasting network (PBS). Core project team members include digital library experts, broadcasting technical staff, television librarians and archivists, digital preservation specialists, moving image preservation faculty and students, video conversion specialists, and programmers.

In November 2002, the author met WNET special projects staffer Nan Rubin at the annual meeting of the Association of Moving Image Archivists. They began ongoing discussions around the possibility of a large-scale public television preservation project. Public television was already engaged in digital editing and preparing to shift to digital distribution, and was worried about how to save content when analog tape was not part of the life cycle of programs. At the same time, the Boston and New York public television stations were planning a digital asset management system that would further the need for digital preservation.

In March of 2003 more than two dozen representatives of WNET, WGBH, PBS, and NYU met in New York to discuss feasibility and commitment to such a project. All parties were enthused about collaboration. NYU could contribute expertise that the public television parties did not have (in building and maintaining digital libraries, in standards and wrappers for long-term preservation of digital materials, in linking with a larger community that had been struggling with digital preservation of textual materials since the mid-1990s, and in understanding how choice of compression schemes and file formats affect preservation). The two public television stations and PBS could contribute expertise that the others didn't have (in understanding and managing the content created, in intimate knowledge of the production process and the lifecycle that each bit of content goes through, in knowing about quality needs and benchmarks that must be met for distribution and broadcast, in understanding the asset management system that was being planned for both stations).

Regular meetings began between smaller groups representing the various parties. In the fall of 2003, Nan Rubin audited NYU's MIAP introduction course, and became intimately familiar with MIAP's approach and expertise. And in September 2003 when the Library of Congress issued their Request for Proposals for their new National Digital Information Infrastructure Preservation Program (NDIIPP), these parties were well-positioned to apply for funding. In November 2003 they submitted a three-year proposal requesting three million dollars from NDIIPP to be matched by another three million dollars from the collaborators. They were awarded just a little less than they requested, and signed a contract in October 2004 for a project due to run until October 2007.

All of the project partners as well as the management of the larger NDIIPP project commonly regard the first two years of the project as

very successful despite a variety of set-backs (NYU lawyers delaying half a year before signing the agreement, the head of NYU's digital library program leaving to take a faculty position elsewhere). The project has generated important studies: on user needs for archival material; on metadata schemes in use by other television collections; examining workflows of various productions to determine where preservation-related metadata might be added earlier within the life cycle; on intellectual property issues that might inhibit preservation of older material. The project has also taken the lead in helping other projects—bringing together the principals involved in various digital video wrapper schemes (MXF, AIF, METS) to discuss ways that they could work together; bringing groups together to help with important decision making for the Library of Congress's new National Audiovisual Conservation Center; facilitating the final stages of PBS's Next Generation Interconnection System; promoting the new public broadcasting metadata standard (PB-Core).

Why has this collaboration been so successful? First of all, there was a huge amount of mutual respect among the parties even before they first met. NYU had a huge respect for public television. The public television participants had a great deal of respect for the work of the digital library community. Previous preservation-oriented writings of WGBH staff (Ide, MacCarn, Shepard, & Weisse, 2002) and of MIAP staff (Besser, 2001) contained remarkably similar ideas, and both sides already had an enormous respect for each others' approaches to the problem. The parties felt a great deal of synergy in that they all shared common goals, but each party brought a different important skill or knowledge base into the collaboration.

All the parties involved were committed to the project, and would have continued their engagement even without the NDIIPP funding. From early on in the project there was active high-level commitment and support from most of the players (at the vice-president level from the two stations, at the dean's level from the university). And because of the complexity of the problems facing the project, all parties could see continued ongoing payback in collaboration over many future challenges that would need to be addressed after the initial grant period ended.

Another key reason for success was the level of deference between the parties and the attempts to understand each other. There was acknowledgment of strong cultural differences between the television participants, the library participants, and the academic program participants. Each had respect for the others' institutional cultures, and many attempts were made to understand those differences. There also was a great deal of sensitivity exhibited—knowing when to defer to the other party's expertise, and a willingness to drop a proposal that one party found problematic. In addition, all parties recognized the importance of achieving goals that may be of primary importance to only one or two of the parties (such

as MIAP wanting to create real-life working experiences for the student employees, the NYU Library wanting to test out repository design, or the television stations wanting to improve their asset management systems). And from the beginning project decision making was consensual, with each party seeking out all partners' views before taking any action that might even mildly impact another partner.

Case Study: Preservation Research On Analog Tape Content

In 2005 the NYU Library along with the MIAP academic program began to formulate a preservation research proposal on the deterioration of tape-based media. Collection assessments had become an important tool to set conservation priorities for monographs and other paper materials by identifying subsets of the collection that were most at risk. This new project would attempt to create similar collection assessment tools for tape-based audio and video collections.

Most preservation assessment has been based upon visual inspection of random portions of the collection. While that appears to work well with paper collections, many in the audio and video world remain skeptical of the utility of such assessments on tape preservation. Visual inspection provides clues to brittleness of paper, mold, or other types of the most critical paper risks. Yet many critical risks to tape collections (signal weakness, control track decay) cannot be discovered without actually playing the tape. And, by far, the most critical risk factor for tapes—format obsolescence—has nothing to do with visual inspection, and can be derived from catalog records. In addition, tape preservationists have hypothesized that factors such as tape stock, and recording and previous storage conditions may play a major factor in deterioration, so any assessment system selecting only small portions of the collection for more intensive scrutiny must consider these other factors.

This project proposed to create a preservation assessment tool specifically geared to audio and video tape collections. The tool would be designed to aid academic and research libraries in assessing risk to tapes, and to set priorities for treatments and reformatting. Funding was secured, and the project began in mid-2006.

The collaboration aimed to use the strengths of both parties. The library had considerable prior experience in conducting assessments to prioritize preservation of paper collections, and the head of the Preservation Department had published on the subject of selection for digitization. The library also had a large tape collection covering a wide span of time and formats that could be used as a test bed. The academic program knew a lot about issues of chemical and electronic factors affecting tape deterioration as well as issues of format obsolescence risks. The academic pro-

gram had also taught collection assessment of audiovisual collections as a fundamental part of the curriculum. Faculty in the academic department had a long track record on research. And the parties had enjoyed a two-year collaboration, in which selected students in the academic program were given paid internships in the library's Preservation Department, giving them practical hands-on experience under the library's Moving Image Preservation Specialist.

The project work plan took advantage of the strengths and emphasized the needs of both parties. Project research would be directed by the Moving Image Preservation Specialist. Each year of the two-year project, the bulk of the research would be carried out by a different MIAP Research Fellow—an immediate past graduate of the MIAP Program (contributing the latest ideas from the academic program, and answering the pressing need of MIAP to demonstrate to incoming students that immediate postgraduate fellow positions could replace the lack of financial aid that the program could offer). Current MIAP students would be hired to view and log conditions of tapes to test whether predictors for deterioration held true (giving real-life experience to students in the academic program, and helping the library extensively canvass their collection), and MIAP faculty would guide the iterative research involved. The work plan appeared to be the basis for a solid collaboration.

But problems arose just as work began on the project. The first indication was a dispute between the academic program and the library Preservation Department over the job description of the MIAP fellow: the academic program wanted the job description to say that research would be guided by both the library and MIAP, and the Preservation Department wanted to only mention the library. This first dispute was settled by the library administration, who developed language to make clear that daily reporting would be to the Preservation Department, but that research would be collaborative between both units.

A more serious problem having to do with how recently the new hire should have graduated was not resolved without leaving bitter feelings between the parties. Though both parties appeared committed to common primary objectives of the project, their secondary objectives were quite different. The academic program saw the hiring of the MIAP fellow as a replacement for financial aid, and was so committed to hiring an immediate graduate in each of the project's two years that they wrote that explicitly into the grant proposal. The Preservation Department wanted the best person for the job, and obviously the best person was not necessarily an immediate past graduate, but someone who had had post-graduate work experience. In addition, the Preservation Department felt that prior MIAP graduating classes should be eligible for the honor of a fellow position, while the academic department was worried about their own

credibility, having promised the fellow position to the set of students who had just graduated.

In addition, embedded culture within the NYU libraries may have played a role. The long-standing policies of a previous administration had encouraged library departments to be extremely protective of their turf and discouraged collaboration, even between library departments. Under that administration, most departments viewed any attempts at collaboration with suspicion, and resisted ceding any forms of decision making to other units. Though the current library dean has made collaboration a priority and encouraged the kind of atmosphere that involves the give-and-take relationships that come with collaboration, these embedded cultures take a long time to change.[6]

The point is that such subtle variations in perspective and historical practice must be accounted for between or among collaborating parties, and must be worked out orally and in writing when the collaboration is being codified. As can be seen from this example, writing one party's secondary need into the text of a grant application is not sufficient if that need ends up clashing with the secondary need that the other party has not articulated there. Instead, parties in a collaboration should try to discuss and codify all aspects of their different approaches beforehand, and even try to probe for secondary needs that have not been articulated. General approaches about how to solve future clashing needs should be outlined as well. Such forward thinking may help to diffuse the tensions between the parties and facilitate the smooth operation of the project.

MAKING COLLABORATION WORK

Most guidelines for library collaboration have been based upon experience derived from a limited number of concrete projects. Here is a summary of key points from these prior observations.

As William Potter (1997, p. 416) has pointed out, collaborative projects tend to work best when the libraries involved have a common funding source, such as in statewide consortiums. In such cases, economies realized from collaboration do not necessarily have to be demonstrated to different funding bodies, each of which may be suspicious that the other parties are realizing greater cost savings than their own library.

A task force on library cooperation formed by the Ontario Library Association pointed to several key ingredients in making a collaboration successful: "strong sustained leadership; a history of cooperation and interorganizational understanding . . .; [and] committed personal, professional relationships among key persons who can make decisions to act jointly (as cited in Borek et al., 2006, p. 457).

The UNESCO *Guidelines for Preservation of Digital Heritage* urges those embarking on projects to look at prior experience, which suggests that collaboration often is successful if the partners do the following:

- Understand what they want to achieve collaboratively
- Choose appropriate partners who can contribute
- Share interests and commitment, established through discussions and demonstrated in action
- Allocate enough resources to meet commitments . . .
- Communicate often and effectively . . .
- Set realistic targets and regularly evaluate the arrangements (National Library of Australia, 2003, pp. 65–66)

We can derive the following modest observations from the two case studies presented in this article:

- *Share goals:* All participants in a collaborative project should agree with the basic goals of the project. Signing a joint proposal for funding may not be enough to guarantee mutual understanding of common goals. Spending much time with other collaborators is one of the few ways to help each party understand how those coming from different perspectives and cultures may perceive the project in various ways.
- *Respect secondary goals:* Project partners may have a variety of secondary goals. Though these may not be a part of the main project goals, they could be critically important to one of the parties. These secondary goals should be articulated early on, and new secondary goals that may emerge should be identified and discussed as they may effect the operation of the project.
- *Acknowledge and respect differences:* Collaborations tend to be more successful if each party acknowledges and respects the differences between themselves and the other parties. It's a real advantage to think that other perspectives, approaches, and skill sets can enhance a project rather than act to its detriment. Groups that are not too protective of their own ways of operating tend to be good collaborators. Participants should expect there to be give and take in a project, and that things will not always be done precisely the way they think is best. Ability to defer to others tends to work better than strict adherence to a single "correct" approach.
- *Think beyond a single funding round:* Expectation of continued engagement between collaborators can be a good indicator of collaborative success. Often, a single funding opportunity prompts collaboration, but if partners see a long-term future together, there is strong motivation for them to solve immediate difficulties.

As the UNESCO preservation guidelines caution, "The benefits of collaboration usually do not happen by accident, but result from careful attention to choices" (National Library of Australia, 2003, p. 63). One should not expect to automatically be a successful collaborator any more than one should expect to be a good cataloger, reference librarian, or preservationist. Each of these requires learning, experience, and some

kind of predisposition for that type of work. While one should not expect to spend years studying to be a collaborator, it is naïve to think that one can just walk into a first collaborative environment and be successful. Studying and learning from one's own mistakes and those of others can be an effective path towards successful collaboration. Electronic preservation projects heeding these warnings about collaboration issues are more likely to succeed.

Notes

1. *Electronic works* refers to works that require electricity-based technology to view them. This encompasses all digital works, as well as analog video and audio works. These works were first created in the last half of the twentieth century, and they pose particular preservation problems in that all require electricity-based machinery that must both read a particular storage device and understand the encoding scheme. These works pose the challenge of making them readable when current devices become obsolete, and the methods for decoding them are forgotten.
2. The later AACR editions/revisions published in 1978 and 1988 were particularly useful in spurring further growth in cooperative cataloging.
3. MOA2 eventually morphed into the Metadata Encoding and Transmission Standard (METS), which is currently the standard most frequently used to wrap content for submission to a digital repository.
4. Which eventually became the NISO Draft Standard for Technical Metadata for Digital Still Images—Z39.87.
5. For the purposes of this article, we do not mean for "electronic works" to encompass photographic or motion picture film, as at least rudimentary viewing of those types of works can take place without electronic machinery. Though many of the arguments here will also hold true for those film-based media, the inability to even determine what is stored on digital and magnetic storage devices without the proper electronic machinery adds a huge level of complexity and responsibility to the preservation problem for digital and magnetic media works.
6. It should be noted that the adoption of a collaborative culture in the NYU Digital Library (as alluded to in the previous case study) was fairly quick, as that department was completely developed under the current library dean, and had no prior exposure to the turf-protecting culture.

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