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ABSTRACT

This case study details how the University of Northern Colorado (UNC) Libraries made the shift from a centralized model where digitization took place largely within the archives department, to a decentralized one that encompasses multiple library units. This shift came about as the result of the addition of a digital initiatives librarian position and the formation of a digitization steering committee comprised of employees representing different departments from throughout the Libraries. The result was a marked increase in the number of objects that could be digitized and made available online within a given period of time.

Library digitization is a multi-faceted process involving expertise in areas ranging from content selection, copyright, and web design to object reformatting and description. Rarely does one person, or even an entire department, possess all of the necessary skills and knowledge needed to see a digitization project through from inception to completion. For libraries that do not have a unit dedicated solely to the production of digital collections, creativity is often required to bring together the necessary skill sets in a way that allows for both maximum efficiency and quality in output. Archives and special collections departments are often central to this effort.

This case study details how the University of Northern Colorado (UNC) Libraries made the shift from a centralized model where digitization took place largely within the archives department, to a decentralized one that encompasses multiple library units, notably the technical services department. This shift came about as the result of the addition of a digital initiatives librarian position, the evolving nature of library materials acquisitions resulting in freed time for technical services staff, and the formation of a digitization steering committee comprised of employees representing different departments from throughout the UNC Libraries. The result was a marked

increase in the number of objects that could be digitized and made available online within a given period of time.

Literature Review

The professional literature shows that interdepartmental collaboration for digitization initiatives is not uncommon at academic libraries, and that this approach results in more successful projects. Archives and special collections departments figure prominently as collaborators in many cases.

"Organizing for Digitization: A Survey," a survey of 40 Association for Research Libraries institutions, found that the majority of surveyed libraries use cross-departmental project groups in order to take advantage of expertise from across the library, with 84 percent using such groups to handle various aspects of digitization.[1] In the survey, Boock and Vondracek looked at the roles of administration, archives, collection development, reference, special collections, systems, technical services, and digital library units in some aspect of digitization and reported on their involvement in tasks such as content selection, metadata, web design, software installation and maintenance, and preservation. While each of these departments played a role at some libraries, aside from digital library departments, special collections, systems, and technical services units had the highest rates of participation.

In "Organizing for Digitization at Oregon State University: a Case Study and Comparison with ARL Libraries," Boock compares the results of the above-mentioned survey with the Oregon State University Library's experience of incorporating digitization responsibilities into the existing organizational structure.[2] At Oregon State University, scanning and metadata activities occur mainly within a digital production unit housed within technical services, while content selection is largely the responsibility of reference, archives, and special collections. The author asserts that "digitization projects have been most successful when they involve staff from across the library organization."[3]

Other case studies can be found in literature reflecting on the importance of interdepartmental collaboration. For example, at the University of Maryland Libraries, Gueguen and Hanlon describe how the Office of Digital Collections and Research and the Department of Archives and Manuscripts worked together to streamline the process of building digital collections and to build upon existing

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1. Michael Boock and Ruth Vondracek, "Organizing for Digitization: A Survey," *portal: Libraries and the Academy* 6 no. 2 (2006): 197-217.

2. Michael Boock, "Organizing for Digitization at Oregon State University: A Case Study and Comparison with ARL Libraries," *Journal of Academic Librarianship* 34, no. 5 (2008): 445-51.

3. Ibid., 450.

workflows and expertise, with the outcome of increasing production.[4] Prilop, Westbrook, and German describe how the University of Houston Libraries embarked on a collaborative project to develop an interdepartmental workflow for digitization that involved digital services, special collections, and Web services departments.[5] The process relied on visual planning techniques and resulted in the implementation of an automated workflow and materials tracking system.

At Colorado State University, a "convergence" of librarians and archivists occurred to create a collection of 13,000 images more publicly accessible via digitization.[6] This process included the creation of a Digital Projects Management Plan Working Group and use of a wiki for documentation and project tracking; together the working group and wiki "have improved communication and will continue to streamline communications for future digitization projects."[7] Authors Hunter, Legg, and Oehlerts discuss how this project led them to a greater understanding of differing approaches between archivists and librarians.

At University of Denver Penrose Library, archives and technical services were merged into one processing unit. Colati, Crowe, and Meagher discuss how existing workflows in technical services were used to facilitate processing of archival materials in a much more rapid manner than had historically been the case.[8] Technical services technicians were trained in archival procedures and cataloging technicians were utilized to create item-level description for archival materials. Another collaborative project at Cleveland State University's Michael Schwartz Library also involved systems and collection management technicians. Boock, Jeppesen, and Barrow describe how systems staff helped to work through technical and access-related difficulties while subject bibliographers helped select items for digitization and even created subject-specific metadata.[9]

4.   Gretchen Gueguen and Ann M. Hanlon, "A Collaborative Workflow for the Digitization of Unique Materials," *Journal of Academic Librarianship* 35 no. 5 (2009): 468-474.

5.   Valerie Prilop, R. Niccole Westbrook, and Elizabeth M. German, "Collaborative Project Development in the Creation of an Interdepartmental Workflow," *Collaborative Librarianship* 4, no. 2 (2012): 60-66.

6.   Nancy Chaffin Hunter, Kathleen Legg, and Beth Oehlerts, "Two Librarians, an Archivist, and 13,000 Images: Collaborating to Build a Digital Collection," *Library Quarterly* 80, no. 1 (2010): 81-103.

7.   Ibid., 93.

8.   Gregory C. Colati, Katherine M. Crowe, and Elizabeth S. Meagher, "Integrating Archives Processing and Technical Services," *Library Resources Technical Services* 53 no. 4 (2009): 261-270, http://www.ala.org/alcts/sites/ala.org.alcts/files/content/resources/lrts/archive/53n4.pdf (accessed January 8, 2016).

9.   Michael Boock, Bruce Jeppesen, and William Barrow, "Getting Digitization Projects Done in a Medium-Sized Academic Library: A Collaborative Effort between Technical Services, Systems, Special Collections, and Collection Management," *Technical Services Quarterly* 20, no. 3 (2003): 19-31.

In "Documenting Local Procedures: The Development of Standard Digitization Processes through the Dear Comrade Project," Symonds and May discuss the importance of developing clear procedures for digitization projects.[10] They found that pre-project planning was essential, noting that "while this lesson may seem obvious, when schedules are full and resources limited, the initial instinct can be to jump into a new project in order to stay ahead or to focus on the first part, such as scanning, and make decisions that can have a negative impact on future parts."[11]

Local Collections

UNC Libraries' Archival Services Department (ASD) contains approximately 7,000 linear feet of material including books, newspapers, photographs, negatives, motion picture film, lantern slides, furniture, sports equipment, sculptures, and a variety of other materials in diverse formats. ASD holdings are divided into three primary collecting areas: University Archives, James A. Michener Papers, and Special Collections.

University Archives document the administrative and cultural history of UNC and all aspects of campus life, tracing the university's growth and transformations as well as providing particular insight into the development of educational theory and practice in Colorado, the region, and the nation. Novelist James A. Michener, a faculty member from 1936 to 1941, noted that the school was "one of the major influences in educational renovation" in America.[12] Papers from university personnel and alumni, with special emphasis on materials published by the faculty, staff, and administrators, chronicle the intellectual and cultural life of the institution.

The James A. Michener Papers consist of nearly 1,000 linear feet of the papers, publications, and other materials related to Michener, his family, friends, and associates. Prior to his death in 1997, Michener designated the James A. Michener Library as the official repository for documenting his long literary career. Michener's papers include research notes, manuscripts, galley proofs, correspondence, field notebooks, maps, photographs, slides he collected while writing his novels, and other archival materials and artifacts. Papers and records from several of Michener's colleagues form an important part of the collections. These include photographs and correspondence from Michener's photographer Robert Vavra, documentary films starring Michener from Emlen House Films, and the papers of Michener's long-time secretary, Nadia Orapchuck. Additionally, ASD maintains a nearly exhaustive

10.   Emily Symonds and Cinda May, "Documenting Local Procedures: The Development of Standard Digitization Processes through the Dear Comrade Project," *Journal of Library Metadata* 9, no. 3-4 (2009): 305-323.

11.   Ibid., 320.

12.   James A. Michener, foreword to *Shaping Educational Change, The First Century of the University of Northern Colorado at Greeley*, Robert Larson (Boulder: Colorado Associated University Press, 1989), xi.

collection of Michener's works, ranging from articles written as an undergraduate for his college's literary magazine to his novels published in dozens of languages.

ASD's Special Collections include a variety of papers, records and books deemed rare, unique and of significant research value to warrant long-term preservation. These collections generally focus on either regional or educational history, but also include materials focused on other areas. Following, some highlights are described. The Connie Willis papers document the literary career of the internationally renowned science-fiction novelist and short story writer. Willis has received numerous awards throughout her career, including ten Hugo Awards, six Nebula Awards, and three Locus Awards; and she was recently inducted into the Science Fiction Hall of Fame. Her papers consist of over 60 linear feet, including handwritten drafts of her works, correspondence, edited galley proofs, research notes, artifacts, and additional materials. The O. T. Jackson papers detail the African-American agricultural settlement of Dearfield in northern Colorado. The town, which was founded by Jackson, thrived briefly in the early 20th century, but collapsed due to the hardships of the Great Depression. The David and Lydia Miller papers focus on rammed earth and other environmentally-friendly construction techniques used both in Colorado and throughout the world. Numerous early reading primers and textbooks, including several nationally important reading and science series developed at UNC, provide the strength of the book collection as well as further documenting UNC's place in the history of American education.

The Changing Nature of Archives

As with all archival endeavors, the accessibility of materials for researchers is of paramount importance. Digital access has become the standard expected by nearly all researchers. Archivists are frequently confronted by the question "when will everything be online?" Although it is unlikely that everything within a repository will be available online in the near future, considerable effort must be made to select which materials should be a priority for digitization. A variety of reasons including possible preservation concerns and intrinsic value of items inform the selection process, but serving the needs of researchers should be one of the top priorities. ASD serves the needs of both the university and the larger community of scholars and researchers. Researchers range from school children to professional academics, and these researchers access a wide variety of materials from all of ASD's collecting areas.

ASD has focused considerable efforts to increase access to the materials, including several efforts at digitization. However, these digitization efforts were often unfocused. Their early digitization followed two basic patterns: scattershot digitization based on research requests, and participation in regional digitization projects with the Colorado Digitization Project (CDP). CDP was a leader in digitization efforts in the Rocky Mountain west that served as "a collaborative organization supporting digitization infrastructure for cultural heritage organizations

of all kinds."[13] ASD participated in several of their grant projects, including the Sound Model audio digitization program and the Western Trails program. The numerous resources digitized for these projects were accessible almost exclusively through CDP sponsored websites, and little local control was exerted over the materials.

The Changing Nature of Technical Services

The Technical Services Department (TSD) at UNC serves both the James A. Michener Library and the Howard M. Skinner Music Library, the two libraries that make up the UNC Libraries system. Like technical services departments everywhere, this department has undergone numerous reorganizations over the years. Currently, the department is organized into two units, each with its own manager. One unit, devoted to monographs and one-time purchases, is made up of four technicians and one librarian manager. The technicians in this unit are responsible for monograph acquisitions and claiming, receiving, processing, and cataloging. The processing is largely done by work study students. It is the manager of this unit that would ultimately help oversee the digitization work performed in TSD. The second unit, devoted to serials and continuing resources, is made up of five technicians and one librarian manager. The technicians in this unit handle databases and electronic packages, complete serial check-in and claiming, and ERM maintenance. Government documents are also handled in this unit.

Since the early 1990s, library collections have experienced significant changes. With the proliferation of non-print formats, collections have become increasingly intangible. This change has caused dynamic revision to traditional technical services duties and workflows. Fewer firm orders are created as more resources are purchased in electronic packages. This changing purchase model has workflow implications that then trickle down through technicians devoted to receiving, processing, invoicing, and cataloging. With these electronic packages, far less cataloging is done in-house since package purchases often include vendor-supplied MARC records.

TSD has not been immune to these changes. Batch loads of vendor records now account for a significant portion of bibliographic records created. In 2012, the department began using OCLC's WorldCat Cataloging Partners program for items shipped from its primary book supplier. With the adoption of this tool, many incoming titles can be processed and labeled by student workers and bypass cataloging altogether. Over the years, the number of technicians devoted to monograph workflow has dwindled and for those that remain there are sometimes significant periods of "down time." While this reduction of incoming materials has allowed more time to retrospectively catalog legacy collections, not all technicians are trained to catalog and they require other options to augment daily work.

13.   Nancy Allen, "Collaborative Digitization Program (CDP)," *D-Lib Magazine* 10, no. 4 (April 2004).

Interdepartmental Collaboration

UNC Libraries began its digitization efforts in the late 1990s, although public access was not provided via a digital repository until 2008. At first, this activity was undertaken almost exclusively by ASD, which conducted all scanning of locally-held materials as well as some metadata creation. Early digitization projects were haphazard at best, with much effort being reactive to researcher requests and perceived research need. Single items within larger collections were scanned, but with little attempt at standardization of the process or thought towards long-term access to the materials. A part-time librarian was responsible for managing the local instance of the digital repository software that was hosted by a statewide library consortium. While this arrangement worked relatively well for small amounts of material, it allowed for only a limited scope of digitization activities and resulted in slow growth for the digital repository. As of September 2012, the repository held roughly 1,000 items.

In October 2012, the new full-time position of digital initiatives librarian was established with an eye toward coordinating efforts and making the libraries' digitization program more robust. While the new librarian worked closely with the head of Archival Services, the position was not integrated into an existing library department. For about a year, the work of digitizing content and creating metadata was completed solely by Archival Services staff and the digital initiatives librarian. However, it soon became clear that in order to increase production output significantly, technicians from other areas of the library would need to be called on for assistance.

The most logical place to expand production work was technical services, which employs the largest number of support staff of any department in the library. Library technicians there had skills that translated nicely to digitization activities. Those with a cataloging background had experience describing resources and adhering to standards for description. With these existing skills, it was relatively easy to train cataloging technicians to create metadata for digital objects. Technicians without cataloging training also had a background in work that requires attention to detail and quality control; these skills are important at all levels of digitization and can contribute to excellent scanning workflows. Some TSD technicians even had existing experience with archival organization since they were sometimes deployed to assist ASD during periods of down time.

The Technical Services manager was already involved in digital projects in an advisory capacity as a member of the Digital Initiatives Group (DIG), which provided guidance to the digital initiatives librarian in planning and prioritizing projects. She took on an expanded role in digitization projects by helping to coordinate and oversee the scanning and metadata work of Technical Services technicians, who have since become an integral part of the digitization workflow. They underwent training in scanning, image editing, uploading objects to the digital repository, and creating metadata records, and they now complete the bulk of this work. This has freed up the

digital initiatives librarian and head of Archival Services to focus more on content selection, quality control, policy planning, and documentation. The transition occurred remarkably smoothly, with technicians readily picking up new digitization-related skills. While they devote only a small percentage of their time to these tasks, Technical Services technicians have proven themselves invaluable in the library's larger efforts to increase digitization output.

The formation of DIG also proved instrumental in efforts to strengthen ASD's pre-existing digitization efforts. Founding group members included the digital initiatives librarian, head of Archival Services, Technical Services manager, associate dean of UNC Libraries, head of Library Technology, web services librarian, an adjunct archivist, and a systems specialist. Monthly meetings of the group were, and continue to be, essential for planning and prioritizing projects and maintaining communication between departments. Projects that have moved past the planning stage are generally managed most directly by the Archival Services head, Technical Services manager, and digital initiatives librarian; however the input of all group members is critical to the ongoing success of these projects.

Along with the creation of DIG, the addition of the position of digital initiatives librarian contributed to the sense of cohesion and direction that allowed the new interdepartmental approach to succeed. The digital initiatives librarian acted as chief liaison between UNC Libraries and the Alliance Digital Repository (ADR), a service of the Colorado Alliance of Research Libraries (CARL) consortium which provided the technical infrastructure and software hosting for UNC Libraries' local digital repository instance. The digital initiatives librarian worked with ADR staff to troubleshoot repository issues, create consortial metadata guidelines, and migrate the repository software to an updated version. At the library level, she created local metadata guidelines, designed metadata templates for individual digital collections, trained technical services staff in metadata creation, provided quality control for staff-created metadata, and trained staff in uploading content and metadata into the digital repository system.

The new decentralized approach to digitization efforts has allowed the ASD faculty and staff to focus efforts on other areas of archival work, including improving the accessibility of collections through strengthening finding aids and preparing the ASD storage areas for a massive remodeling. The ASD faculty and staff still participate in the digitization process, but now are not often involved in the day-to-day operations of long-term scanning projects. The head of Archival Services is integral to the process of determining which collections will be selected for digitized and determining the prioritization of various projects. The archives technicians focus primarily on digitizing materials specifically requested by researchers. Since these requests normally represent very small pieces of a collection or single items within a larger collection, it is more efficient for the archives technicians to scan these materials within the department as opposed to adding it to the larger digitization queue.

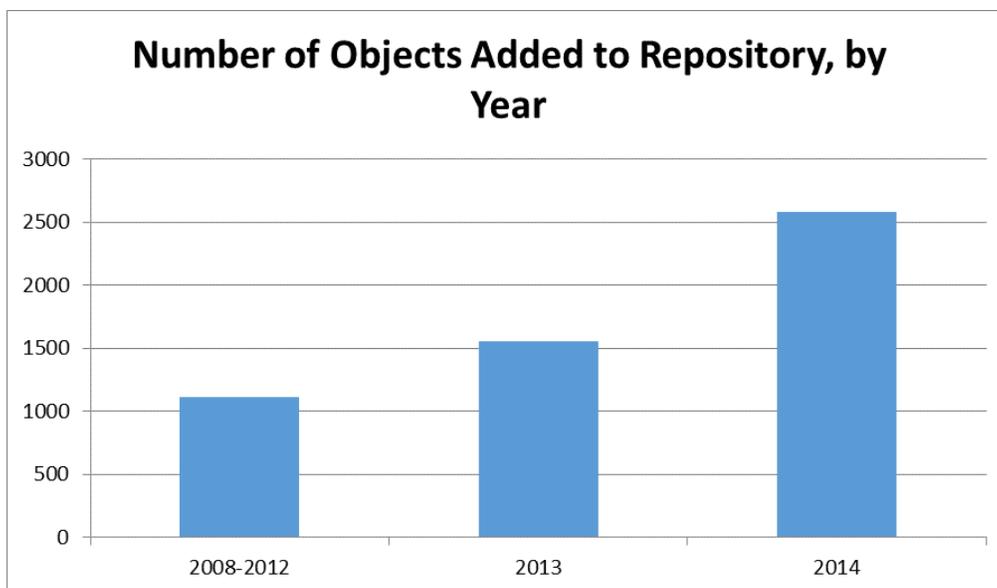**Number of Objects Added to Repository, by Year**

Figure 1. Repository growth since 2008.

Training

In order for digitization projects to be undertaken by technicians unfamiliar with both scanning and working with archival collections, it was necessary to develop an in-depth training program to guide the technicians. The goals of the training efforts were threefold: to ensure that the digital objects created in the digitization process met with archival standards, that the archival materials were being handled in a manner conducive to the items' long-term preservation, and to ensure that proper metadata was created to allow accessibility to the object. Everyone involved with the digitization projects was required to watch introductory webinars on scanning processes and basic metadata. The videos provided an overview of these two broad topics, ensuring that all technicians had at least some familiarity with the entire process.[14] Introductory reading on metadata, specifically Dublin Core, was also provided for those who would be focusing on metadata creation. Technicians were given the opportunity to discuss the material with and ask questions of the librarians before moving on to the next steps in the process.

The head of Archival Services developed detailed documentation to support the technical aspects of the scanning project. Documentation was created for each type of

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14. The training webinars were freely available online from ALA/ALCTS as part of their Institutional Repositories Webinar Series at http://www.ala.org/alcts/confevents/upcoming/webinar/irs (accessed January 8, 2016).

material to be digitized, including text-based documents, slides, and photographs. For each material type, step-by-step instructions and screenshots were provided to familiarize the technicians with the methods necessary to scan materials using the local hardware and software. Each technician was assigned to work with a specific type of material; for example, one individual focused almost exclusively on a series of handwritten diaries, while others focused on photographs documenting the history of the university's theatre arts programs. Prior to beginning the digitization process, the head of Archival Services conducted one-on-one training sessions with the individual technical services technicians. The initial training session focused on the first two goals, and technicians learned the correct methods for handling archival materials and the correct methods for scanning the items at archival standards. Since the scanning technicians were not involved with metadata creation, they were not provided additional training on metadata standards. For those technicians assigned the task of metadata creation, the digital initiatives librarian provided additional training on using the repository software. She also created data dictionaries for each collection and worked with each technician to ensure comfort with and understanding of the information provided. Thus, the third training goal was met.

Collaborative Projects

When digitization began in TSD in 2014, the first project undertaken was scanning of early Masters theses dating back to 1914. Modern theses and dissertations are born digital, but those from much of the history of the university are in print only. Each technician assigned to thesis scanning was given a specific year to digitize, with the knowledge that work on a project will take many years to complete. In the first full year of work, twenty-five theses were completed. The early work with this project helped inform and develop the general workflow to which later projects would adhere (see Figure 2).

Another project soon undertaken was the digitization and transcription of a series of Civil War-era letters written by a Union soldier and some of his comrades. This project was begun as the result of a university initiative focused on using primary resources in education. Scanning also commenced on photos documenting the history of the UNC theatre program, specifically performances by the Little Theatre of the Rockies. Digitization was started on a collection of diaries belonging to a World War II-era faculty member, as well as a collection of plant-related slides from a project requested by a current biology faculty member. One technician undertook a project to complete microfilm digitization for over 170 rolls from the James A. Michener Papers. This project utilized high-speed scanning equipment housed at another local university. Other collections were already digitized and merely needed metadata, including a series of early student scrapbooks. This wide range of projects provided more than enough material and variety to keep technicians fully engaged.

As the numerous projects detailed above were undertaken, it became apparent that a system for prioritization was needed. The digital initiatives librarian and members of DIG worked closely to develop a system to prioritize collections for
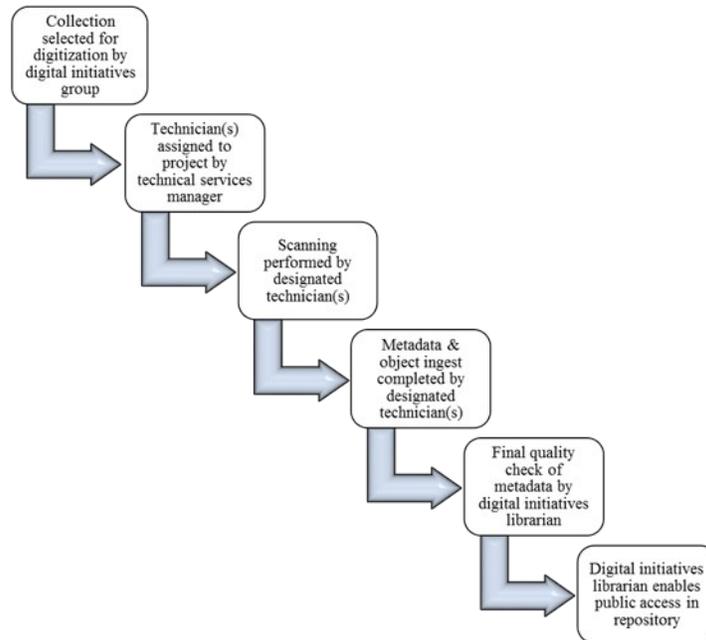
Figure 2. Typical digitization workflow in new interdepartmental model

digitization. A list of possible scanning projects was created, and individual projects were assigned one of three priority levels: 1. High, 2. Routine, or 3. As Time Allows. This information was entered into a spreadsheet, where assignments were also recorded regarding which staff members will complete specific tasks such as scanning and metadata creation for each project. The spreadsheet was updated as projects were added or completed. In the case of some larger collections, project-level spreadsheets were also maintained to track staff progress.

Lessons Learned

These interdepartmental collaboration efforts progressed nicely, but there were a few minor glitches along the way as the projects developed. When TSD technicians began scanning, it became evident that one of the biggest hindrances was the unfamiliarity that many of them had with some of the technology involved. While a couple of the workers were able to begin their work with little additional training, some needed more training until they became comfortable with the processes. Basic file and path navigation was the biggest obstacle for several technicians. Once this was understood, trainers incorporated more check points to determine when further training was needed to ensure comfort with a process.

At times, the software used caused unforeseen problems. For example, during the digitization of early university theses and dissertations, some of the typescript used in the early volumes caused the OCR software to invert or incorrectly reverse pages. This resulted in the need for additional training so technicians would be aware of this problem and include a quick quality check in the steps they performed. At other times, technicians have been able to develop time-saving techniques and improve workflows on their own. For example, one TSD technician involved in the digitization of theses and dissertations developed directions for using Photoshop to resize all pages at once, and shared these with others working on the project.

Project management has been an ongoing problem in the digitization workflow. With multiple people involved in various steps, it was desirable to develop tracking methods to ensure all steps were completed for each item. For some projects, this process was more straight-forward than for others. For example, with the theses and dissertations a simple Microsoft Excel spreadsheet was developed with columns for each step of the process, from obtaining the volume from ASD through to metadata creation and ingestion of the digitized item into the digital repository. For other projects performed by only one or two people, no tracking method was developed other than email, the assumption being that tracking the steps closely was less necessary when the process moved through fewer hands.

Future Directions

Prioritization of projects has been an ongoing topic for those involved in digitization decision-making. When more people became available for digitization work, many projects were started with very little direction in regard to timeframes and levels of importance. This problem, coupled with ongoing discussions of project management, led DIG to begin looking at software to solve this problem. Several programs, open source and otherwise, are being considered in hopes that a universal solution can be found to track all the digitization projects.

Another obstacle encountered was lack of storage space. Everyone involved in the digitization projects used shared storage space on a local server that rapidly filled with the increased rate of scanning. This problem has led the steering group to commence discussions not only about cloud and other storage options, but also to address the need for development of a digital preservation policy. No local policy has been developed that dictates which copy is the preservation copy, so scans are kept on the local drive even after a copy is ingested in the repository. This practice needs to be evaluated in light of current storage demands.

Sustaining motivation has sometimes been a problem with the digitization workflows. While TSD technicians undertook their new duties and completed the work requested conscientiously, full embrace of digitization as a regular job duty has been slow. The technical services manager and other members of DIG have begun looking at ways to keep technicians motivated and accountable in this new type of work. One goal is to develop a method of tracking each technician's digitization-

related statistics, including pages scanned and metadata records created among other criteria. Another goal is to regularly showcase the newly digitized collections in some public way to draw attention to the importance of the work and to acknowledge the efforts of all involved.

Conclusion

Since efforts began to expand the archives' digitization activities across departments, the UNC Libraries have experienced a myriad of benefits. An ever-increasing number of objects have been scanned and made available online over the course of two years (from approximately 1,000 in 2012 to over 2,500 in 2014), a trend that is expected to continue into the future. Technical services technicians have been challenged to learn new skills and the department has gained ways to augment workloads in the face of diminished demand for print acquisition and cataloging, while archival services has been released from the burden of undertaking all digitization activities, thus freeing technicians for other tasks. At the institutional level, an enhanced digitization program helps lend the libraries a higher profile on campus and has led to new opportunities for project partnerships with faculty and staff outside the libraries.

At a broader level, interdepartmental collaboration for digitization has enhanced a sense of collegiality among librarians and technicians and has provided a sentiment of joint ownership over projects that were previously siloed within one department. This has contributed to higher quality content being made available and a more thoughtful approach to materials selection and prioritization. While challenges remain in areas such as project management, these issues do not detract from the overall success of the experiment.

Like others before them, UNC Libraries personnel have discovered the truth in the notion that it takes a village to create a digital library. At the same time, the archives have retained a central role in the process and the existing knowledge and skills of ASD technicians have been crucial to the success of the endeavor. Complementing this expertise with that of other libraries technicians has proven to be the key to kickstarting the UNC Libraries' digitization program.

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