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We've Got Mail: Email Preservation at a Small, Private University

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2016 Gene J. Williams Award Winner

The Gene J. Williams Award, presented annually by the Society of North Carolina Archivists, recognizes excellence for a paper on an archival topic written by a North Carolina graduate student for a graduate level course. This award honors the late Gene J. Williams, archivist at the North Carolina Division of Archives and History and at East Carolina University and charter member of the Society of North Carolina Archivists.

We've Got Mail: Email Preservation at a Small, Private University by Nahali (Holly) Croft

Background

During my two years as a graduate student, Campbell University, a private, religious-affiliated university, employed me as an intern, first to work with digitization and later to work in its archive with both analog and digital materials. The school has two libraries, and the archive falls under the purview of the main library. Though there is an archive, the university does not employ an archivist or a records manager. None of the librarians at the university have specific archival training, but the state's traveling archivist program brought three visiting archivists to campus in 2015 in order to provide recommendations on how to better preserve and provide access to the materials that have been collected.¹ Both of my supervisors were cataloging librarians, with one having a specialization in metadata. Because I was specifically studying archival

standards and practices, as I learned skills that directly related to my work, I was given wide berth to implement them in the archive. Often my supervisors relied on me to understand and develop best practices for all aspects of preservation of the university's records.

Being a private university, there is no state-prescribed mandate for records retention, and the university has never provided the archive with a mandate for collecting school records. Even with this, the librarians are committed to asking for records from the different departments, and they hold at least partial records from all four past university presidents, beginning with records from the university's founder that are over 100 years old.

The university's third president retired in 2003, and the fourth president moved to the position of president pro tempore in 2015 upon his retirement. Though the archive has partial records for the third president, there are still files contained in his office in the main library. As the fourth president is still an active faculty member, any records from his administration will remain in his possession until he retires. Both of these men headed the school at a time where materials began to be created digitally. Both used email regularly. The collections of these two individuals, which will certainly end up in the university archive, were the most pressing cases for why the school needed to implement a workflow for email ingest. However, at any time, the archive might have received records from faculty members or prestigious alumni that would have necessitated such a procedure even earlier.

This paper will discuss the obstacles and solutions to implementing an email preservation system at a small university. I reviewed five possible programs for the best fit

for the situation, though only three were considered seriously for implementation. At the conclusion, I will discuss why the path taken was most appropriate, which may benefit others looking to implement similar systems.

Background and Relevant Literature

Departmental records make up much of the archive's collection. However, the collection also contains other materials of interest to the school, including past presidents' personal correspondence. Email, being a type of correspondence, functions in the same manner as the letters of yesteryear, documenting events, transactions, and relationships.² In 2011, the Pew Research Center found that 92 percent of adults who use computers also use email, and 60 percent check email at least once a day.³ An estimated 212 billion emails will be sent in 2016, fifty-eight percent of which will originate in businesses.⁴

Emails create a "stream of evidence" concerning the activities of individuals or entities. As much as three-fourths of a company's best insight comes from email correspondence, and it is the most used method in both academia and corporate environments to "generate, organise, share and leverage knowledge."⁵ Not all of the value of email correspondence comes from the content of individual emails. Analyzing a corpus of emails can provide a more comprehensive look at the activities and decision-making processes within an organization than paper-based records have traditionally provided.⁶ "Narrative searches," where researchers find critical clues scattered over many different emails within one individual's account, have also been useful in learning more about the personal lives of those who donate their personal papers to libraries and archives, even

within professional email accounts. These narrative structures do not take place in a linear structure. They develop over time, and often include correspondence with many different individuals. It has become imperative to find a system that will preserve messages in a way that ensures the collection is usable for researchers. However, not every email contains historical significance. Elements of a well-curated email collection include an organizational structure with defined categories, a lack of junk mail, and little to no inclusion of "daily traffic," such as announcements.⁷

Part of the issue with preserving emails is the variance in the clients used to access user accounts. While Microsoft dominates the "enterprise email market segment," there were over 4,000 clients available in 2012.⁸ Clients do not store and track emails in the same manner.⁹ Settings on the client can conflict with servers, instruct servers to delete messages stored on them, and create incomplete backups, just to name a few of issues one may find when working with emails. Coupled with user error, purposeful deletion, or even hacking, email is susceptible to loss.¹⁰

The "cloud" has brought its own challenges to email preservation. The affordability and accessibility of cloud-based storage for email has drawn in users, particularly with its integration of utility tools like messenger applications and office programs. Using cloud computing requires users to provide their data to a provider and then completely trust the provider's ability to keep the data confidential. However, cloud security is not always a consideration to the user until it becomes a problem.¹¹ Having everything in digital storage has lulled many into believing that their information is securely backed up, but in reality, third parties can and do steal information. Another issue arises when faced with data

loss: some users have found companies that host the cloud storage have little to no customer service and users have little recourse when told their messages are unrecoverable.¹²

Another concern with email preservation is that an email is not one piece or file, but rather a collection of data — a composite object.¹³ The email header acts as an envelope, containing information including the sender's email and IP addresses, the receiver's email address, the subject, time of creation, delivery stamps, servers in transit, carbon copy and blind carbon copy information, and content length. Other aspects of the email include the body, encoding, and attachments.¹⁴ In order to ensure the integrity and authenticity of messages, the InSpec Project at King's College found that there are 14 message header properties and 50 message body properties in a single email that need to persist. As¹⁵ email headers, in particular, can serve as legal evidence, maintaining the integrity of emails should be a concern for anyone tasked with the responsibility of preserving it.¹⁶

Repositories should be aware that freedom of information laws and civil discovery laws apply to emails, and the burden of producing the records may then fall on the archive if it owns the only known copies of an account.¹⁷ By 2005, one out of every five organizations in the United States had received subpoenas for employee email in regards to discrimination claims.¹⁸ Notably, *Victor Staley, Inc. v. Creative Pipe, Inc.* found that the duty to preserve relevant evidence is owed to the government, not to opposing parties. In other words, companies or other entities issued subpoenas are legally required to respond to the government, not the plaintiff. Further, because there is no national standard for document preservation, organizations should design policies

that comply with the toughest demands imposed by any court in order to avoid prosecution.¹⁹

Archivists may expect to receive entire email collections, which can be quite large and span decades.²⁰ From a research perspective, having a complete collection increases the research potential, though libraries and archives may still carry out selection activities based upon evidential value, aesthetic value, market value, associational value, and exhibition value.²¹ Archivists should also be prepared to receive accounts residing on both "dead" and "live" computers.²²

The Library of Congress's archiving tips for personal email provide the following steps to ensure proper preservation:

1. Identify all email sources.
2. Decide which messages have long-term value.
3. Export the selected messages.
4. Organize the saved messages.
5. Make copies and manage them in different places.²³

These steps provide the foundation for the inclusion of email in the existing workflow for digital materials, though the archive also needs to establish physical and intellectual control of the items — something that would not be necessary for personal archiving.²⁴ The University of Illinois' "Digital Accession and Processing Workflow" and OCLC's "Walk This Way: Detailed Steps for Transferring Born Digital Content from Media You Can Read In-House" are particularly useful for implementing a workflow for digital materials.²⁵

Chris Prom offers several suggestions for email preservation tools, including Aid4Mail, Emailchemy, and Xena, which are systems that I reviewed for the university's archive. The instructors in my digital forensics for digital collections course suggested I also review readpst in the BitCurator environment and ePADD.²⁶ As with all software systems, these will update and evolve, and new software will be created that may warrant a review at a later time. For the purposes of this study, programs chosen for review follow Prom's three suggestions for institutions: "defining policies, choosing appropriate tools, and implementing them in the light of local environmental factors and available resources."²⁷

Fitting Email into the Digital Workflow

The Campbell University archive contains both analog and digital materials. The digital materials include items digitized for the university's digital library — images of newspapers, yearbooks, and photos — and born-digital materials, mostly photos, video talks, and sermons. As the archive acquires items, accession records are created. Digitized files are given new, separate records from the analog formats. Personal information is removed, and then metadata is assigned. Files are then copied so that there is a preservation copy and an access copy. Access copies are stored on the university's server as part of the digital library, and preservation copies are stored in the archive with documentation, including reference, provenance, context, and fixity information.²⁸

In the current workflow, there has not yet been cause to utilize write blockers, create disk images, or conduct forensic explorations for content, since library staff created

the majority of the digital files for digitization. However, the library will eventually receive a disk or a flash drive from a donor, which will necessitate the need for a more robust ingest process. Through classes in electronic records management and digital forensics, I have had the opportunity to explore programs that will assist with those processes and plan for their future usage in the workflow. However, email seemed to require tools specific to that medium in order to ensure those files would be stored in a client-neutral, open source format. Providing access to emails once they were preserved was yet another concern. Finally, cost was a factor as well. In a university that does not have either an archivist or a records manager, funds for managing archival workflows are small. This paper has given me the opportunity to explore tools that fill a gap in the digital materials workflow.

Archiving Email in Practice

The university uses Microsoft Office Exchange as the standard for faculty, staff, and student emails. Being proprietary software, emails are stored in a different format than open source clients such as Thunderbird or Eudora, which utilize text-based formats.²⁹ The computer assigned to me does not have Microsoft Office installed, though it is standard on all faculty computers. I access my university email through the online Exchange server. However, because the university may change providers in the future, and the archive could receive personal email files that are in a different format, it became important to select a system that could handle multiple email file formats. Because the library does not yet have access to all of the third president's files, there is concern that his emails may be in an outdated format.

For purposes of testing the email programs, I chose to use Windows Mail, which is available freely as part of the Windows 10 operating system, and which exports emails in an EML format. For readpst, I wanted to see its functionality with a PST file, so one of the librarians allowed me to use her account as a test case.

With my status as an intern at the university, I had a known end date for my employment, at which time the school would bring in another graduate student. Knowing that we were developing a workflow for people other than me to use molded the choices made during this project. Through my coursework, I have developed a comfort level with digital forensics processes and tools that the librarians at the university do not have. I could not be certain that the intern that replaced me would come into the job having experience with different operating systems, command line programs, and the Open Archival Information System (OAIS) reference model.³⁰ With these parameters in mind, I have reviewed briefly programs that would not fit our situation, but have focused on the ones that would.

Aid4Mail

The features included in Aid4Mail immediately drew my interest.³¹ This program is able to convert and migrate 40 email formats. One of its strengths is that it will convert email files from clients that have been defunct for years, such as Netscape Messenger and MSN Mail. This system also allows conversion to multiple formats, including CSV and XML. Outlook mail formats can be converted to either of the de facto preservation formats — MBOX and EML — as well as ZIP and PMX. The process is simple, having a series of choices during set up that ensure the

correct location is selected for the email being preserved and that it will be converted into the file type the user desires. I used Aid4Mail for Archivists in the demo mode, meaning I was only able to convert and work with 50 emails, but that was enough to assess how the program would work in the university's setting. The downside for Aid4Mail was the cost. This program is the most expensive of the programs tested because a new professional license must be purchased for each PC on which the program is installed, and discounts only apply to large orders placed at one time, which placed it outside of Campbell University's budget constraints.

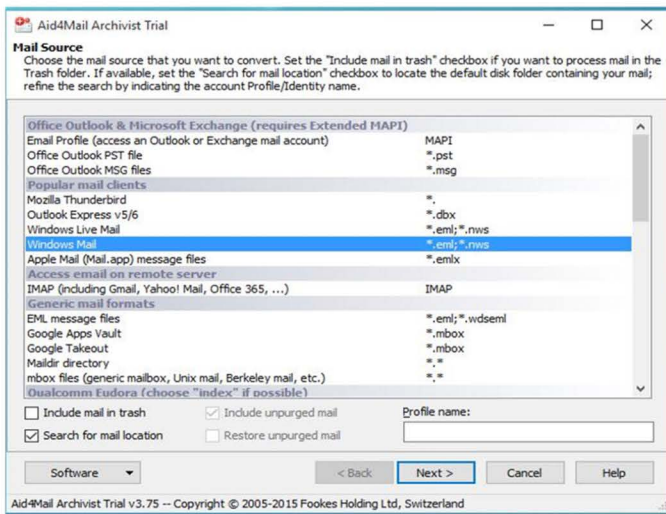


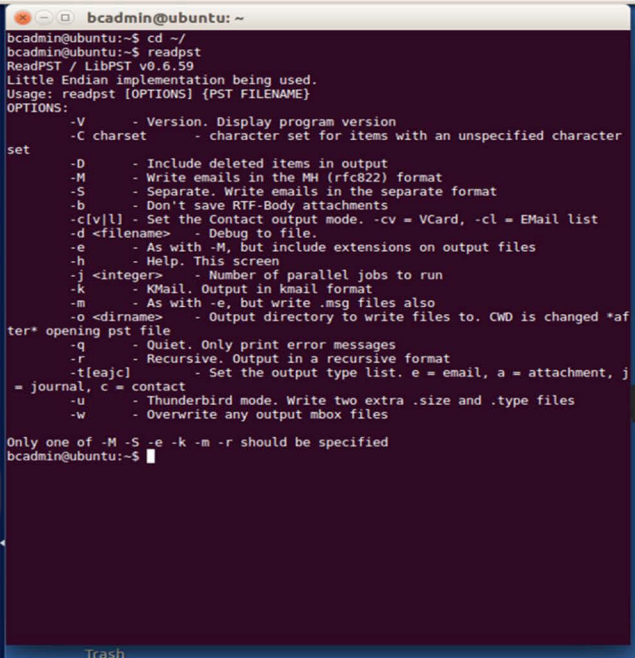
Fig. 1. Aid4Mail

readpst

The librarians at the university are not comfortable using the command line interface. Therefore, readpst is not a

good fit for the archive. Though the tool was not something that would work in our particular situation, it is worth noting the functions available to users. This tool's main function is to convert Microsoft Outlook files (PST) to MBOX, though it can convert files to simple text as well. readpst has the ability to omit attachments, include deleted items in the output, and separate each email into separate folders.³² Though it is a command line tool, readpst can be quickly mastered and is particularly useful for exploring email header information. As readpst is available as part of the BitCurator environment, it is available freely and can be run on any type of machine through VirtualBox. It also is part of the libpst package, which is a set of tools that decode email messages in PST format.³³

Fig. 2. readpst in the BitCurator environment



```
bcadmin@ubuntu: ~
bcadmin@ubuntu:~$ cd ~/
bcadmin@ubuntu:~$ readpst
ReadPST / LibPST v0.6.59
Little Endian implementation being used.
Usage: readpst [OPTIONS] {PST FILENAME}
OPTIONS:
  -V      - Version. Display program version
  -C charset  - character set for items with an unspecified character
set
  -D      - Include deleted items in output
  -M      - Write emails in the MH (rfc822) format
  -S      - Separate. Write emails in the separate format
  -b      - Don't save RTF-Body attachments
  -c{v|l} - Set the Contact output mode. -cv = VCard, -cl = EMail list
  -d <filename> - Debug to file.
  -e      - As with -M, but include extensions on output files
  -h      - Help. This screen
  -j <integer> - Number of parallel jobs to run
  -k      - KMail. Output in kmail format
  -m      - As with -e, but write .msg files also
  -o <dirname> - Output directory to write files to. CWD is changed *af
ter* opening pst file
  -q      - Quiet. Only print error messages
  -r      - Recursive. Output in a recursive format
  -t{eajc} - Set the output type list. e = email, a = attachment, j
= journal, c = contact
  -u      - Thunderbird mode. Write two extra .size and .type files
  -w      - Overwrite any output mbox files

Only one of -M -S -e -k -m -r should be specified
bcadmin@ubuntu:~$
```

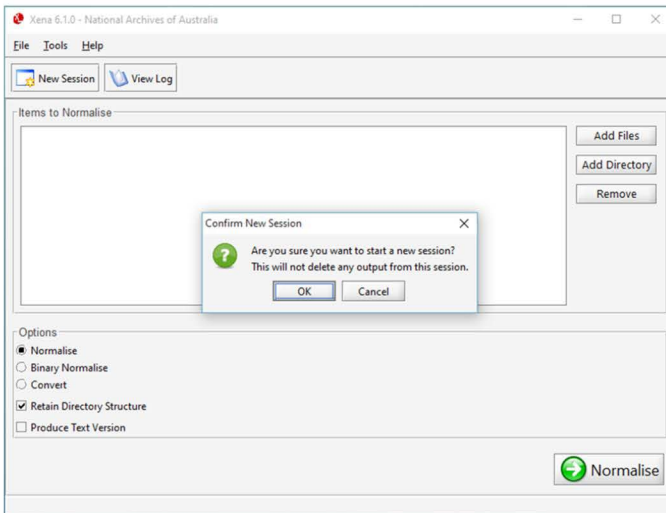


Fig. 3. Xena

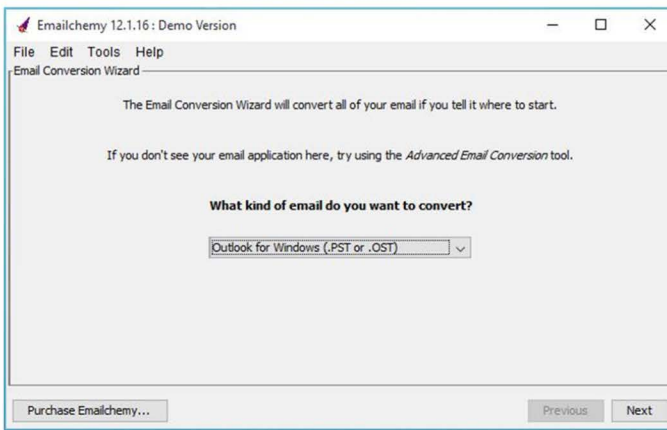
Xena

XML Electronic Normalising for Archives (Xena) is an open source tool developed by the National Archives of Australia.³⁵ The software incorporates readpst, but it has a graphical user interface as well as a command line interface. It is part of the National Archives' Digital Preservation Platform.³⁶ Xena is migration software that is not limited to email formats. It can also be used to convert and migrate office documents, images, and audio files.³⁷ Files are added to the system by clicking the "Add Files" button on the right of the screen, and the user has the choice to convert or normalize the files selected. There is the opportunity to create a test version before committing to a conversion. The files save in the preselected location.

A test of Xena found that the program ran very slowly, and it was impossible to see progress unless I clicked

on the View Log. The program took several minutes to complete the task of converting my email, though the "Xena Output" file was easy to find in my Documents folder. This was a task that took other software less than a minute to complete. It should also be noted that Xena has not been updated since July 31, 2013.³⁸

Fig. 4. Emailchemy



Emailchemy

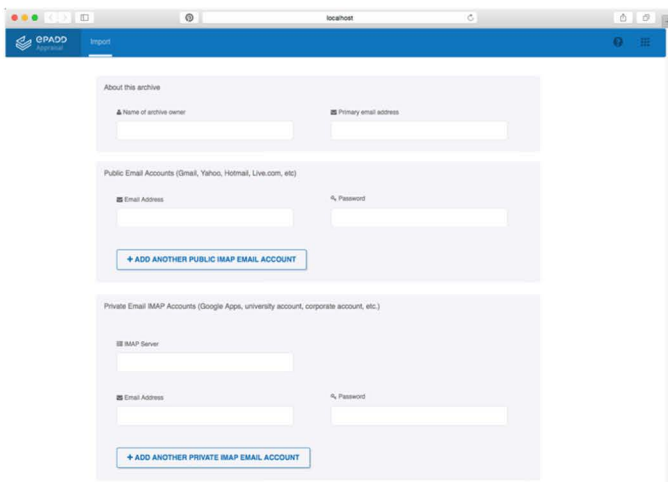
Emailchemy has a number of conversion options.³⁹ Like Aid4Mail, it requires purchasing a license for use. However, Emailchemy's cost is far less than Aid4Mail when purchased incrementally, so it was not priced out of reach of the university. This software program has options for both migration and management. It is also available for Macintosh for most formats, whereas Aid4Mail does not operate on Macintosh systems at all. One downside of the Macintosh version of Emailchemy is that it cannot convert or migrate AOL Mail, though the Windows version can.⁴⁰ When

running the program, the user selects how to convert the file, selecting the current file type and then the file type desired. As with Aid4Mail, I tested a trial version of Emailchemy. The demo version places the text "Please purchase Emailchemy" on every converted email to prompt the user to buy the product.

ePADD

ePADD (Email: Process, Appraise, Discover, Deliver) is supported by Stanford University's Special Collections and University Archive.⁴¹ It is a newer system than most of the others, having just completed its proof-of-concept phase in July 2015.⁴² ePADD allows the user to discover sensitive data in the appraisal mode, and during ingest, the program has the ability to concatenate information about an individual — including multiple addresses, names, or other information.⁴³

Fig. 5. ePADD



For our purposes at the university, Emailchemy and ePADD were the two best options, though Xena was strongly considered in place of Emailchemy due to the cost of the latter. The combination of the two software packages is necessary to import the most common email formats, allow the user to view file contents, and identify and redact sensitive materials prior to making emails available to patrons.

Using Emailchemy and ePADD Together

One of the features that ePADD has and other email preservation systems do not is the ability to pull files directly from the Microsoft Outlook Exchange server, much like a regular email client. It begins the concatenation of users at the beginning of the process, by allowing for multiple accounts to be set up at once. If the user has already stored his or her emails as MBOX files, those can be uploaded in the Appraisal mode as well. However, other formats cannot be used, and ePADD does not have the ability to convert them. When I tried to pull the emails from the university server, the program could not authenticate them. However, once I exported them and converted them into MBOX format, the program ran smoothly.

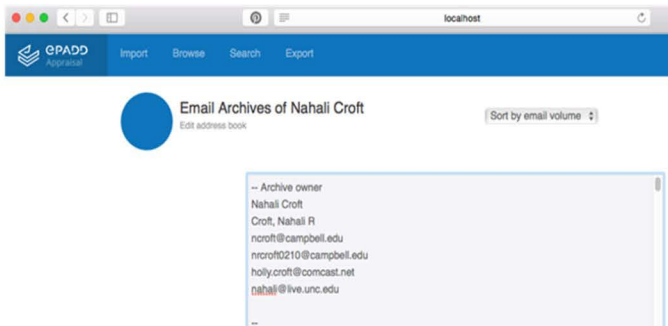
Therefore, the smoothest process is to run all incoming email accounts through Emailchemy to ensure they are in MBOX format before using the ePADD software.

The output from Emailchemy goes into a file named "converted_email" in the user's folder. A status bar appears to let the user see the process's status, and once completed, there an MBOX file appears. When the conversion is completed, this file can be reviewed in ePADD. There are four modules, which the user selects from the left side of the

screen. The program defaults to the Appraisal module, which allows users to review email prior to accessioning it to a repository.⁴⁴

The mail can be reviewed once the MBOX file is loaded. ePADD allows the user to find all mentions of individuals, organizations, and locations, and all attachments are viewable. My email had no information deemed sensitive, so that folder was empty. In the Appraisal module, there are options to edit correspondence. This is one of the ways ePADD allows the user to concatenate individuals. For instance, I was able to add additional email addresses to my name, as pictured.

Fig. 6. Editing Correspondence

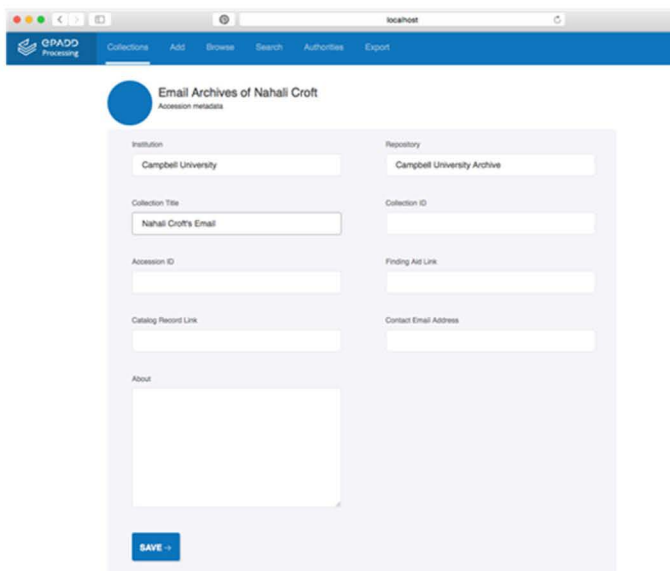


There are additional options in the Appraisal module to search and annotate emails that were not important to this workflow but might be valuable for later exploration. The export option is important if sensitive emails need to be excluded from the workflow, as the user has the ability to deselect them from transferring or to transfer certain emails with restrictions. Emails must be

exported in order to move to the Processing module because ePADD's Processing module will not recognize any files that have not been appraised and exported.⁴⁵

After exporting the emails, ePADD asks the user to zip the folder where they exported and submit it to the archives. Then the user may switch to the Processing module. Though the previous module had asked for the folder containing the exported files be zipped, during my testing, the Processing module imported the unzipped folder. Under the Collections tab, the user may assign metadata and accession information to the email.

Fig. 7. Assigning Metadata



The screenshot displays a web browser window with the URL 'localhost'. The page title is 'Email Archives of Nahali Croft' and the subtitle is 'Accession metadata'. The interface includes a navigation bar with 'Collections', 'Add', 'Browse', 'Search', 'Authorities', and 'Export'. The main form is divided into several sections:

- Institution:** Campbell University
- Repository:** Campbell University Archive
- Collection Title:** Nahali Croft's Email
- Collection ID:** (empty field)
- Accession ID:** (empty field)
- Finding Aid Link:** (empty field)
- Catalog Record Link:** (empty field)
- Contact Email Address:** (empty field)
- About:** (empty text area)

A blue 'SAVE' button is located at the bottom left of the form.

ePADD has the ability to search OCLC Fast for LC Subject Headings, DBPedia, VIAF, and LCNAF.⁴⁶ When assigning metadata, some of the authority record choices were obvious, but other times, I used the "relative confidence" algorithm to find the best choice. Additionally, there were situations in which I needed to input a record because either the choice I wanted did not appear or items needed authority records that the system had not detected.

Fig. 8. Using the algorithm to find the authority record for "computing services"

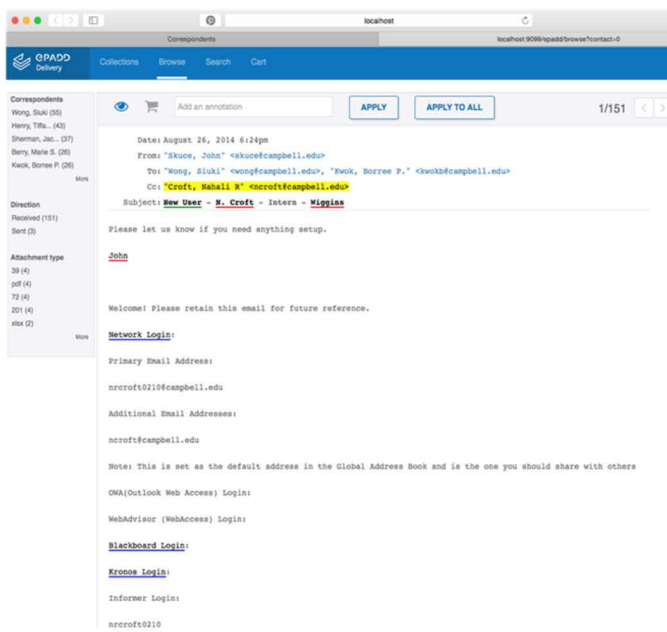


After ensuring that authority records and metadata are assigned in the Processing module, the next step is to export the data so that it can be accessed in the Delivery and Discovery modules. The Delivery module allows searching for emails and viewing full content of unrestricted messages, provides access to the emails at a managed workstation, and enables remote access in a web server.

Campbell University's situation does not warrant using the Discovery module right now, but the Delivery

module could make email collections available at the main library. The browse function on the Delivery module will allow users to mark emails as reviewed and to add them to a cart so that they can export the files they want to their own MBOX file for saving their research.

Fig. 9. The review button and the cart are at the top left



Conclusion

Campbell University does not currently budget for the archive, and though there has been money for a digitization project, that has not extended to preserving those digital files. Therefore, the librarians are constantly looking for low- or no-cost solutions that will help maintain the records in the collection. Fortunately, many digital

preservation programs are open source, and the library has not encountered any resistance to using open source materials for digital curation and preservation from the university's administration or IT department. This made the selection of ePADD easy, as it is a robust program designed to ensure library users have access to email collections, but only after ensuring the emails are appraised and sensitive information is redacted or restricted. Emailchemy, though very easy to use, is not freeware. However, it efficiently converts a variety of email formats more quickly than most other products, so purchasing it is the best option for Campbell. With a guide provided on how to run the workflow, the combination of Emailchemy and ePADD should be easily learned by librarians at the university with little or no archival and digital curation background. This was one of the biggest concerns for this project.

Finally, ePADD will provide a straightforward means for patrons to engage in research of email collections at Campbell University once the archive has emails as part of its holding — a day that is coming soon. Too often, archivists develop workflows once a problem arises. However, here I had the opportunity to create a workflow that fit the archive's mission without the stress of a collection to process and make available.

Nahali (Holly) Croft is the Digital Archivist at Georgia College in Milledgeville. She received her MSLS with a concentration in Archives and Records Management in May 2016 from the University of North Carolina at Chapel Hill.

NOTES

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