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Electronic Theses and Dissertations Workflows: Interdepartmental Collaboration at the University of Arkansas Libraries

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Electronic Theses and Dissertations Workflows: Interdepartmental Collaboration at the University of Arkansas Libraries

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Abstract

Creating workflows that involve the work of multiple departments within a large organization can be challenging, especially when the procedures are complex and involve a number of stakeholders. This paper describes and evaluates the redesign of an interdepartmental workflow for the dissemination of electronic theses and dissertations (ETDs) at a mid-sized academic library. The paper outlines the collaborative planning process within the library as well as the eventual outreach to additional stakeholders on campus, addressing the challenges of tackling such communication between the library and other ETD stakeholders. It then presents a detailed examination of the newly revised, semi-automated workflow, the revised student submission forms that resulted from inter-departmental communication, and lessons learned that may be valuable to other mid-sized academic libraries who may be considering similar projects.

Keywords: electronic theses and dissertations, collaboration, institutional repository, workflow

Introduction

Creating workflows that involve the work of multiple departments within a large organization can be challenging, especially when the procedures are complex and involve a number of stakeholders. This paper describes and evaluates the redesign of an interdepartmental workflow for the dissemination of electronic theses and dissertations (ETDs)[1] at a mid-sized academic library. The workflow involves four separate departments with different reporting channels and different goals. A lack of consistent communication and proper documentation led to many redundancies and inefficiencies. In order to navigate this difficulty and manage the complexity of the workflow, a working group was formed to discuss a better way of handling metadata

[1] As this paper contains many acronyms, the authors found it prudent to include an acronym key. Please see Figure 1.

creation in thesis and dissertation cataloging. The paper outlines the collaborative planning process within the library as well as the eventual outreach to additional stakeholders on campus, addressing the challenges of tackling such communication between the library and other ETD stakeholders. It then presents a detailed examination of the newly revised, semi-automated workflow, the revised student submission forms that resulted from inter-departmental communication, and lessons learned that may be valuable to other mid-sized academic libraries who may be considering similar projects.

Figure 1. Acronym key. This figure lists all acronyms in this paper, in alphabetical order, in the left column and the expanded form of the acronym in the right column.

Acronym	**Term**
ETDs	electronic theses and dissertations
FTP	file transfer protocol
ILS	integrated library system
IR	institutional repository
IP	intellectual property
LCC	Library of Congress classification
LCSH	Library of Congress subject headings
MCU	monographs cataloging unit
OAI	Open Archives Initiative
OCLC	Online Computer Library Center
TCM	Technology Commercialization Manager
TCO	Technology Commercialization Office
UMI	University Microfilms International
UofA	University of Arkansas, Fayetteville

Literature Review

Library Collaboration

Collaboration and effective communication have long been topics of research in the library community. Not only is collaboration important, but it is a necessity and a survival skill as has been noted by Lubas & Bordeianu,[1] Rowley,[2] Gaetz,[3] and Absher and Cardenas-Dow.[4] Research in library collaboration runs the gamut from general works on the importance of collaboration and effective communication like those mentioned above, as well as the work done on communication practices in general by Bottorff et al.,[5] Boyd, Casey, Elder and Slay,[6] Eads,[7] Gossen et al.,[8] and Honeyman,[9] to specific works detailing collaboration of all kinds. Ferer,[10] describes a collaboration between the library and the campus writing center, and Hernon and Powell[11] describe a convergence of campus information services. Wahl[12] describes the collaborative process for creating a workflow for streaming media ordering, and Prilop, Westbrook, and German[13] describe collaboration between the digital library and other library departments. In addition, Besser[14] describes two collaborations between the NYU library, public TV networks, and the Master of Arts program in Moving Image Archiving and Preservation.

Technical Services Collaboration

In addition to these works on library collaboration, there is a vast amount of research into the collaboration of technical services units like that of Li and Burley.[15] This area of research gets even more specific, describing the collaboration within technical services units as in Falk, Hertenstein, and Hunker,[16] and collaboration between technical services units at different institutions as described in Lee and Frost,[17] Harris and Hinchcliff,[18] Maurer, Gammon, and Pollock,[19] Harcourt and LeBlanc,[20] and Parrott.[21] There are also works describing collaboration between technical services and other library departments: Lubas and Bordeianu,[22] Ashman and Buie,[23] Babb,[24] Beisler and Ragains,[25] and Beisler and Kurt.[26]

Theses and Dissertations Collaboration

Given that the topic of collaboration is so prevalent in the literature, it seems that academic librarians should hone their collaborative skills. The need for collaborative skills is particularly important when working with ETDs, monographs which necessarily involve multiple departments. Jewell, Oldfield, & Reeves[27] describe the University of Waterloo E-thesis Project and its partnerships with Theses Canada and the Networked Digital Library of Theses and Dissertations. The project they describe was a collaborative ETD effort involving three different institutions. The real focus of their paper, however, is on issues with open access.

Theses and Dissertations - Campus Cooperation

A subcategory of ETD collaboration literature is campus cooperation. Bishop, Marshall, and Winter[28] and Feuer[29] focus their papers on the process of building ETD collections, and Feuer[30] and Lipincott[31] address some of the changes in institutional policies and practices that necessarily occur from such implementation. Fyffe and Welburn[32] describe the benefits of ETD programs to both the student and the institution. Finally, Early and Taber[33] dive into the specifics of ETD collaboration, concluding that "ETD depositories require a great variety of skill sets and thus will involve multiple departments; libraries and graduate schools are primary players, but not exclusively, in ETD workflows; and communication and collaboration between departments are important from start to finish."

ETD Workflows

There is an extensive body of literature on ETD workflows. For our purposes, we focused on a

few main themes: workflow management, division of labor, author-supplied metadata, and embargoes and copyright. We will address metadata harvesting and crosswalking as well as metadata manipulation in the next section.

Many scholars, such as Copeland and Penman,[34] Bevan,[35] Greig,[36] Park, Zou, and McKnight,[37] Piorun and Palmer,[38] Morrow and Mower,[39] Wang,[40] Madsen and Oleen,[41] and Wang, Bulick, and Muyumba[42] are addressing workflow management. Because ETD workflows can be so complicated it is important to determine who does what. These authors discuss the division of labor in their ETD projects: Lipincott,[43] Park, Zou, and McKnight,[44] Piorun and Palmer.[45] Author-supplied metadata can be a sticky subject. Questions of quality arise when an expert cataloger is removed from the metadata creation process. Surrat and Hill,[46] McCutcheon et al.,[47] Boock and Kunda,[48] Lubas,[49] Maurer, McCutcheon, and Schwing,[50] and Robinson, Edmunds, and Mattes[51] discuss author-supplied metadata. Another sticky subject for ETDs is embargo and copyright. Questions of privacy and legal protection often come up. These authors address ETD embargoes and copyright issues: Jones and Andrew,[52] Morrow and Mower,[53] Giesecke,[54] Nagra,[55] and Hazzard and Towery.[56]

Metadata Harvesting and Conversion

Quite a few articles have been published detailing ETD metadata harvesting and conversion, such as the work done by Deng and Reese,[57] McCutcheon, Kreyche, Maurer, and Nickerson,[58] and Lee and Averkamp.[59] Other authors, like Lubas,[60] Reese,[61] Park and Tosaka,[62] Maurer, McCutcheon, and Schwing,[63] Robertson,[64] Wang, Bulick, and Muyumba,[65] Park and Brenza,[66] Potvin and Thompson,[67] and Veve[68] also address metadata manipulation topics. While harvesting and conversion are a major part of our ETD workflow, detailed explanations of how to harvest metadata from an IR and how to edit stylesheets for metadata conversion are not the primary focus of this paper.

The above survey of the literature tells us that at the very least, libraries will need to collaborate with whomever organizes and receives theses and dissertations for a given institution, usually (but not always) the Graduate School. A Technology Commercialization Manager (TCM), someone who helps researchers commercialize intellectual property (IP), may also need to be involved in the cooperative process. ETD catalogers must therefore stay in contact with both of these units, integrating cataloging with at least two other departments on campus. In addition, if an institutional repository (IR) is part of the ETD process, that is an additional department that cataloging must stay in contact with.

This paper delves into the specifics of a workflow redesign for ETDs at a mid-sized academic library. Details are provided on the collaborative planning processes: first, collaborative planning within the library, and second, collaborative planning with outside stakeholders. The steps taken to bring together the departments involved and keep them working together are addressed. The newly revised and semi-automated ETD workflow is examined in detail by way of a workflow diagram, and new student documentation, a result of interdepartmental collaboration, is presented and explained. Finally, this paper presents some lessons learned that can benefit other mid-sized academic libraries, who may be considering similar projects.

Collaborative Planning Within the Library

Library Discussion of Metadata Workflows

In 2016, after the previous special formats cataloger left the position, it became apparent to the head of technical services as well as the two catalogers responsible for ETDs (the Cataloging Librarian for monographs and the Institutional Repository Coordinator), that separate metadata for ETDs was being created in the catalog and in

the IR. With the acknowledgment of this redundancy, a working group was formed. Our working group was comprised of the Head of Technical Services, the Head of Acquisitions and Cataloging, the Cataloging Librarian for monographs, the University Archivist, and the Institutional Repository Coordinator.

The ETD working group met once a week for a period of about three months. Our first meetings were to acknowledge the issues at hand, namely that the workflow for ETDs was redundant and inefficient. Subsequent meetings addressed how to best correct the workflow to eliminate those redundancies. In between meetings we read literature pertaining to bepress, metadata conversion, and harvesting metadata (refer to the Metadata and Harvesting portion of the literature review). We also exchanged emails informing one another what we had learned. For example, when the MCU (monographs cataloging unit) figured out how to set up the harvesting function in MarcEdit to gather metadata from our IR, they sent that information out to the working group via email.

We all brought various talents to the table: firsthand knowledge of the current ETD workflow, knowledge of thesis and dissertation cataloging, project management skills, knowledge of various metadata schemas (ProQuest, bepress, etc.), and technical skills -- skills needed to create XML stylesheets for metadata transformation between ProQuest and bepress metadata, and for using an OAI harvester to harvest metadata from one place and reuse it in another. To aid us in developing stylesheets, we pulled in another library staff member, our Web Developer.

The collaborative aspects pertaining to the development of the metadata portion of the ETD workflow went smoothly. Though the project involved three departments within the library – cataloging, special collections, and the IR – it was simple for the people involved to set up meeting times, exchange emails, or drop by one another's offices to discuss the project. As we will explain later, the same was not true for collaborating outside of the library.

At the end of three months of these face-to-face meetings and email exchanges, we were able to implement the metadata portion of the semi-automated workflow. This portion of the new workflow, discussed below, enabled us to complete ETD cataloging more efficiently, thereby getting the ETDs to our users more quickly than we had before.

Overview of New Semi-Automated ETD Workflow

Here we present an overview of the entire workflow. The bulleted list includes steps involving communication between the library and other campus stakeholders. The details of the collaborative planning with those stakeholders are in the following section.

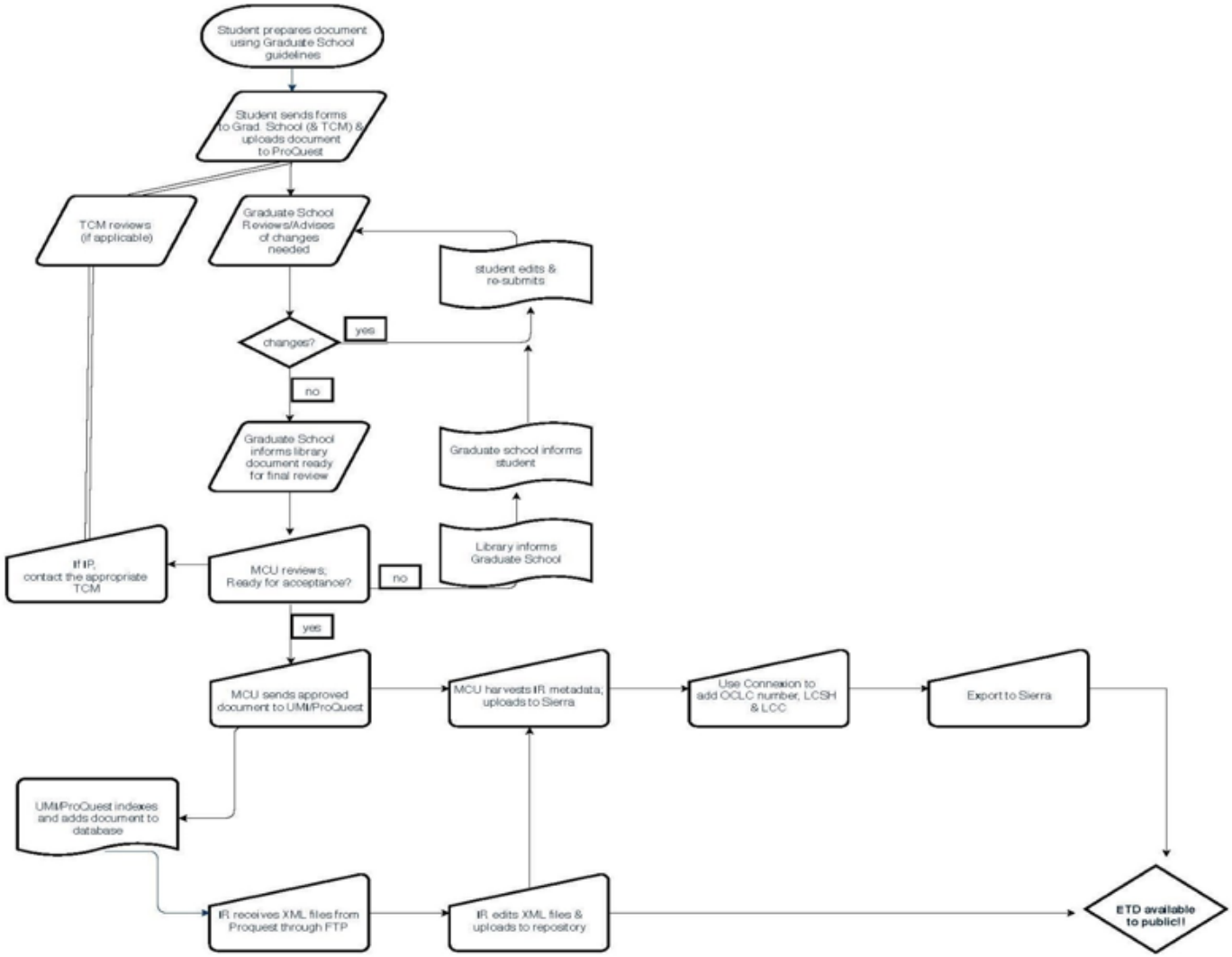
McCutcheon et. al.[69] share the following as their process for cataloging ETDs in OhioLINK: "metadata entered by authors and harvested for catalog record; e-mail notification system is triggered for automatic cataloging; metadata transformed to MARC record and given consistent data; access point created for collocation; provisional record sent to local catalog using gateway interface; final editing in Connexion and sent to local catalog." We noticed many similarities between our workflow and that of OhioLINK, and appreciated their bulleted list outlining their rocess.[2] We acknowledge them now as we present

[2] For those interested in a detailed examination of the steps in this workflow, please see Appendix A.

our own bulleted list outlining our ETD workflow. To see a diagram of the process, refer to Figure 2.

- Metadata is entered into UMI/ProQuest by the authors of the theses and dissertations.
- TCMs are contacted, by the authors of the theses and dissertations, if necessary.
- The e-mail notification system built into UMI/ProQuest serves as a trigger for the Graduate School to review the thesis or dissertation forms and document. When approved, an email is sent to the MCU with the requisite forms attached.
- The MCU provides a final review of the document and delivers it to UMI/ProQuest for publication.
- UMI/ProQuest indexes the metadata, publishes it (barring embargo), and transforms it into an XML file that is then sent through a FTP server to the IR.
- IR, using the batch process in MarcEdit, transforms the XML files using a modified stylesheet, originally created by Logan Jewett at Iowa State University, to work with the bepress schema.
- IR combines and edits the XML files using Notepad++, to add in needed information and posts them to the IR, ScholarWorks@UARK.
- MCU harvests the metadata from ScholarWorks@UARK with the OAI tool in MarcEdit and uses a local stylesheet, modified from a stylesheet created by Marielle Veve and Terry Reese, to convert Dublin Core metadata harvested from bepress to MARCXML.
- MCU batch uploads the file to our Innovative Interfaces ILS using a locally devised ETD load table then exports to OCLC Connexion.
- Final editing takes place in the OCLC Connexion client -- MCU adds LCSH and a LCC, and the finished record is contributed to the OCLC WorldCat database then exported to the local catalog.

Figure 2. New ETD Workflow Diagram



As may be apparent from the above bulleted list, this is not a process that moves neatly from the Graduate School to the Libraries and then out to the students, faculty and community users. Rather, this is a complicated workflow requiring the MCU to insert itself in many steps of the overall process. The work with the Graduate School is completely separate from the work with the TCMs, but the students interact with both of these departments nearly simultaneously. In cases where there is IP, occasionally the MCU will hear from the TCMs before they hear from the Graduate School, but occasionally the opposite is true. Because the process is convoluted, good communication is essential for success. In our case, the MCU maintains contact with the Graduate School, the TCMs, and the IR throughout the entire process.

Collaborative Planning With Non-Library Stakeholders

While the collaborative planning for the metadata workflow was taking place, the MCU and the IR were also in touch with campus stakeholders outside of the library. It was apparent that there was not enough communication occurring between the library and the Graduate School or the library and the TCMs. It was also fairly apparent that between our various departments there was not enough documentation to explain the various procedures for disseminating, housing, and protecting ETDs. These realizations prompted the MCU to contact the Graduate School and TCMs, and determine whether there was an interest to work more collaboratively together on the entire ETD process. While it was fairly easy for the library departments to stay in contact, being that they were in the same building, the same could not be said where the Graduate School and TCMs were concerned. Thus we discovered the first real challenge in wielding our multi-departmental workflow -- distance.

It is fairly easy to pop down the hall to visit a fellow library colleague and iron out some details. It is not easy to do this with departments located in separate buildings on campus or, in the case of our Agricultural TCMs, off the main campus. The Graduate School and the TCM from Tech Ventures, both located on campus, were happy to be more collaborative through phone calls, email exchanges, and face-to-face meetings, but the TCMs from Agriculture were more interested in accomplishing collaborative goals through email. This turned out to be satisfactory as the Agricultural TCMs did not have as many questions or issues with their current part in the ETD process.

A series of face-to-face meetings was organized between the four departments interested in collaboration -- the MCU, the IR, the Graduate School, and the TCM from Tech Ventures. At the first face-to-face meeting, three representatives were present -- the head of the MCU, a representative from the Graduate School, and the TCM from Tech Ventures. We faced a couple of challenges in this meeting.

First, we were not all speaking the same language. There was jargon from all three sides, so some time was needed to define words that were common for one individual but not necessarily for the group. For instance, no one except the MCU representative knew what an IR was. In hindsight, we realize we should have defined those technical words or vocabulary words from our field when collaborating with those outside of the field. It seems obvious now, but in the midst of a project with so many moving parts, it can be easily forgotten.

Second, there was some tension between the three representatives because we all had very different goals – for that meeting and in general. More than once the original agenda of the meeting, which was to determine what part we currently played in the ETD process, was lost

amidst the need to soap-box about our individual departments' concerns and frustrations. Having a written agenda for each member of the meeting would have helped here. In addition, realizing that not everyone wants the same things that you want and being able to adjust to that, may have helped our meeting be more productive. Again, in hindsight these seem obvious, but when things like deadlines, technical issues, and ego are involved, they are so easy to overlook.

That original meeting did help us get on the same page. We determined that those in the library did not have a clear understanding of the Graduate School's role in the dissemination of ETDs, and the Graduate School did not have a clear understanding of what happened to the

ETDs after they sent them to the library. The situation was the same between the library and the TCMs -- neither department had any idea what the other did. In fact, the TCMs were desperately afraid that the library was publishing ETDs that contained IP without their go-ahead. We were not, but that just highlighted the lack of communication between the two departments.

By the end of the meeting the various roles of stakeholders in the ETD process had been defined. With these roles clearly situated in our minds, we addressed some additional concerns. The TCM wanted a better system of communication with the MCU as well as updated documentation. The Graduate School representative and the MCU both wanted to stay in regular contact and potentially alter the existing student documentation. In all, that first meeting was a success. We knew where we needed to go next.

After that first meeting, many emails were exchanged between the MCU, the IR, and the Graduate School to answer questions. These questions were primarily about publication and access or questions from students raised when filling out their paperwork. Examples include:

- What is ScholarWorks@UARK?
- What is a FTP server and what is its role?
- How much access do people have to my thesis in ScholarWorks@UARK?
- What does the graduate school check for when the student submits?
- What does the library check for when the student submits?
- What is the best way to share IR information with students?
- How can we help each other and the students?

These email exchanges resulted in another face-to-face meeting between the MCU, the IR, and the Graduate School, in which we discussed the thesis and dissertation guidelines as well as the submission forms provided to the students. If we didn't understand them and had trouble answering one another's questions, surely we couldn't expect our students to understand the documents. The Graduate School began work on reformatting the submission forms with clearer language, which will be discussed in the next section.

In a third face-to-face meeting between the MCU, the IR, and the Graduate School, we discussed the IR's LibGuide on publishing settings and how best to get that information to the students. At the same time, emails were exchanged between the MCU and the TCM at Tech Ventures to finalize a procedure of communication that would ensure each thesis or dissertation with intellectual property was handled appropriately. The result was a written procedure in the MCU's procedural documentation.

Outcomes of Collaborative Planning With Non-Library Stakeholders

Revised Student Submission Forms

Before the many emails and face-to-face meetings of ETD stakeholders, the Graduate School and sometimes the Libraries would receive questions about the content of the ETD forms that we could not answer because 1) we did not have a hand in creating the forms and so were unsure of the content, and 2) the language on the forms was unnecessarily convoluted. In both cases, there was a breakdown in effective communication.

The Graduate School and the Libraries had been using two forms, each a single-sided sheet, for longer than the people involved could remember. For reference, see Figures 3-4.

In the old student submission form (Figure 3), the second section refers to Research Committee Review. In the asterisked portion of this section, the form refers to the Office of Research Support & Sponsored Programs, an office that no longer exists. The university does have an Office of Research & Sponsored Programs, but the office students should be directed to here, is the Office of Research Compliance.

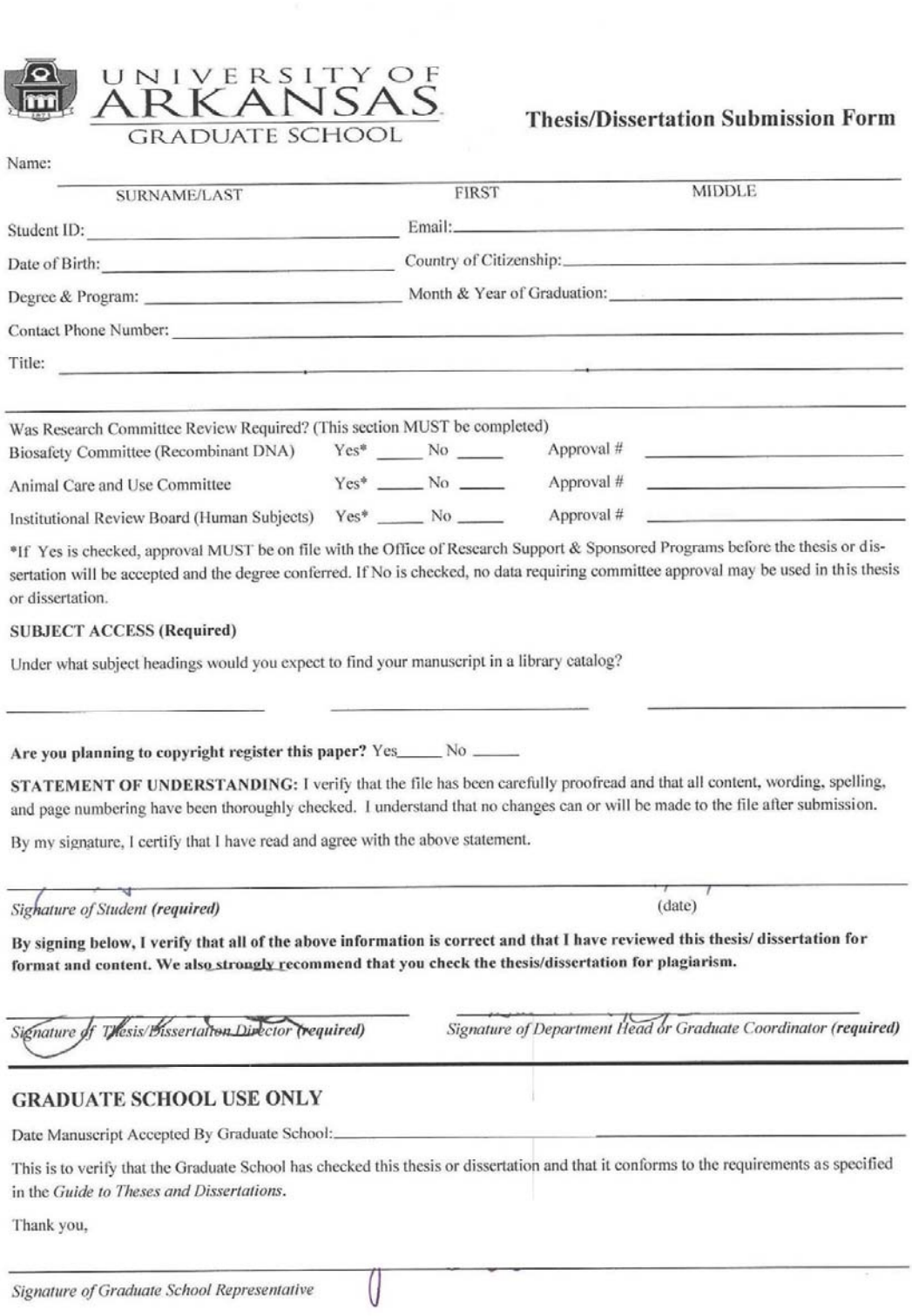
In the next section, subject access (required), the single question: Under what subject headings would you expect to find your manuscript in a library catalog? -- was not enough information for students to understand what was being asked of them. Directly under the subject access section is a question regarding copyright. This question has been defunct since the university started using ProQuest to house and disseminate theses and dissertations.

All of these issues were thoroughly discussed in our third face-to-face meeting with the MCU, the IR, and the Graduate School. Clearly, some things needed to change on the forms we were giving our students. The old intellectual property disclosure form (Figure 4), requested students to fill in a student name section that was different in format from the name section in the student submission form. For some of our students, particularly those with compound surnames or patrilineal names, this sometimes became a point of confusion. Students would fill in their names a different way for each form, adding to the confusion of filing and cataloging those theses and dissertations.

The largest problem with the old intellectual property form, was that students did not understand what the form was asking them to do. Again, a redesign was necessary so that the middle section, in which students identify whether their thesis or dissertation does or does not contain an invention, would be clear. A glaring error in the old form was that there was absolutely no information on it about our Agricultural Technology Commercialization Office. Students were only being directed to Technology Ventures, but even that method of contact was a little unclear, as the TCM from Technology Ventures pointed out. He recommended several large changes to the IP form, which we all found reasonable.

Collaborating more frequently and effectively allowed us to edit existing documentation explaining the thesis and dissertation process for students (https://graduate-andinternational.uark.edu/_resources/forms/thesis-dissertation-guide.pdf). The revised student submission forms are now straightforward, have a clean design, and are easier for students (and us) to understand (Figures 5-6).

Figure 3. Thesis/Dissertation Submission Form.



UNIVERSITY OF ARKANSAS
GRADUATE SCHOOL

Thesis/Dissertation Submission Form

Name: _____
SURNAME/LAST FIRST MIDDLE

Student ID: _____ Email: _____

Date of Birth: _____ Country of Citizenship: _____

Degree & Program: _____ Month & Year of Graduation: _____

Contact Phone Number: _____

Title: _____

Was Research Committee Review Required? (This section MUST be completed)

Biosafety Committee (Recombinant DNA) Yes* ____ No ____ Approval # _____

Animal Care and Use Committee Yes* ____ No ____ Approval # _____

Institutional Review Board (Human Subjects) Yes* ____ No ____ Approval # _____

*If Yes is checked, approval MUST be on file with the Office of Research Support & Sponsored Programs before the thesis or dissertation will be accepted and the degree conferred. If No is checked, no data requiring committee approval may be used in this thesis or dissertation.

SUBJECT ACCESS (Required)

Under what subject headings would you expect to find your manuscript in a library catalog?

_____ _____ _____

Are you planning to copyright register this paper? Yes____ No ____

STATEMENT OF UNDERSTANDING: I verify that the file has been carefully proofread and that all content, wording, spelling, and page numbering have been thoroughly checked. I understand that no changes can or will be made to the file after submission.

By my signature, I certify that I have read and agree with the above statement.

_____

Signature of Student ***(required)*** (date)

By signing below, I verify that all of the above information is correct and that I have reviewed this thesis/ dissertation for format and content. We also strongly recommend that you check the thesis/dissertation for plagiarism.

_____ _____

Signature of Thesis/Dissertation Director ***(required)*** *Signature of Department Head or Graduate Coordinator* ***(required)***

GRADUATE SCHOOL USE ONLY

Date Manuscript Accepted By Graduate School: _____

This is to verify that the Graduate School has checked this thesis or dissertation and that it conforms to the requirements as specified in the *Guide to Theses and Dissertations*.

Thank you,

_____

Signature of Graduate School Representative

Figure 3. Old Student Submission Form

Figure 4. Previous Intellectual Property Disclosure Form.

Graduate School

UNIVERSITY OF ARKANSAS

Intellectual Property Disclosure

(Notification of Invention)

Student Name: _____ ID Number: _____

Degree: _____ Program: _____

Thesis/Dissertation Title: _____

_____

Please check the appropriate line below, sign and date.

Note: For the purposes of this form, "invention" does not include original works such as a piece of music, poetry, etc.

1. This thesis/dissertation _____ does* or _____ does not contain an invention of commercial interest.

2. Was the project supported by an external sponsor? Yes_____ No _____

If yes, has the Office of Research, Support, and Sponsored Programs been notified? Yes_____ No _____

*If the thesis/dissertation DOES contain an invention of commercial interest, the signature of a Technology Licensing Officer must be obtained.

The Technology Ventures Office is located at 535 West Research Center Blvd., Suite 108, Fayetteville, AR 72701. If there are any questions regarding commercial interest please call the Technology Ventures Office at 479-575-5806.

***TLO Officer**: _____ **Date:** _____

(signature)

Information about inventions and the University Patent and Copyright Board Policy 210.1 can be found at http://techventures.uark.edu

Student: _____ **Date:** _____

(signature required)

Student Email: _____

Thesis/Dissertation Director: _____ **Date:** _____

(signature required)

Thesis/Dissertation Director Email: _____

Program Chair/Graduate Coordinator: _____ **Date:** _____

(signature required)

Program Chair/ Graduate Coordinator Email: _____

This form is required for all students submitting a master's thesis or doctoral dissertation and must be submitted to the Graduate School with the final copy of the thesis or dissertation.

Revised: 04/2013

Figure 4. Old Intellectual Property Disclosure Form

Figure 5. Revised Thesis/Dissertation Submission Form.

UNIVERSITY OF ARKANSAS | Graduate School & International Education

Thesis/Dissertation Submission Form

Name: _____
Surname/Last First Middle

Student ID: _____ Email: _____

Date of Birth: _____ Country of Citizenship: _____ Phone Number: _____

Degree & Program: _____ Month & Year of Graduation: _____

Title: _____

Mullins Library would like to use your birth date to create your personal name authority record.

Does this meet your approval? Yes ◯ No ◯

Was Research Committee Review Required?*

Biosafety Committee (Recombinant DNA)	Yes ◯	No ◯	Approval # _____
Animal Care and Use Committee	Yes ◯	No ◯	Approval # _____
Institutional Review Board (Human Subjects)	Yes ◯	No ◯	Approval # _____

**If Yes is checked, approval MUST be on file with the Office of Research Compliance before the thesis or dissertation will be accepted and the degree conferred. Approval letter MUST be included in thesis/dissertation Appendix. If working under advisor's approved protocol, student must have been added to the protocol. Additionally, if Yes is checked for Animal Care and Use, and approved work is performed off site, UA IACUC requires notification. If No is checked, no data requiring committee approval may be used in this thesis/dissertation.*

Library Subject Headings: Under what subject headings would you expect to find your manuscript in a library catalog?

_____ _____ _____

Statement of Understanding: I verify that the file has been carefully proofread and that all content, wording, spelling, and page numbering have been thoroughly checked. I understand that no changes can or will be made to the file after submission. I understand that my paper will be accessible through ProQuest and the institutional repository, ScholarWorks@UARK.edu, according to the publishing settings I choose for ProQuest. For more information: http://uark.libguides.com/c.php?g=536547&p=4905494.

By my signature, I certify that I have read and agree with the above statement.

_____
Signature of Student *Date*

By signing below, I verify that all of the above information is correct and that I have reviewed this thesis/ dissertation for format and content. I also verify that it contains no plagiarized material.

_____ _____
Signature of Thesis/Dissertation Director *Signature of Department Head or Graduate Coordinator*

Graduate School Use Only

This is to verify that the Graduate School has checked this thesis or dissertation and that it conforms to the requirements as specified in the *Guide to Theses and Dissertations*.

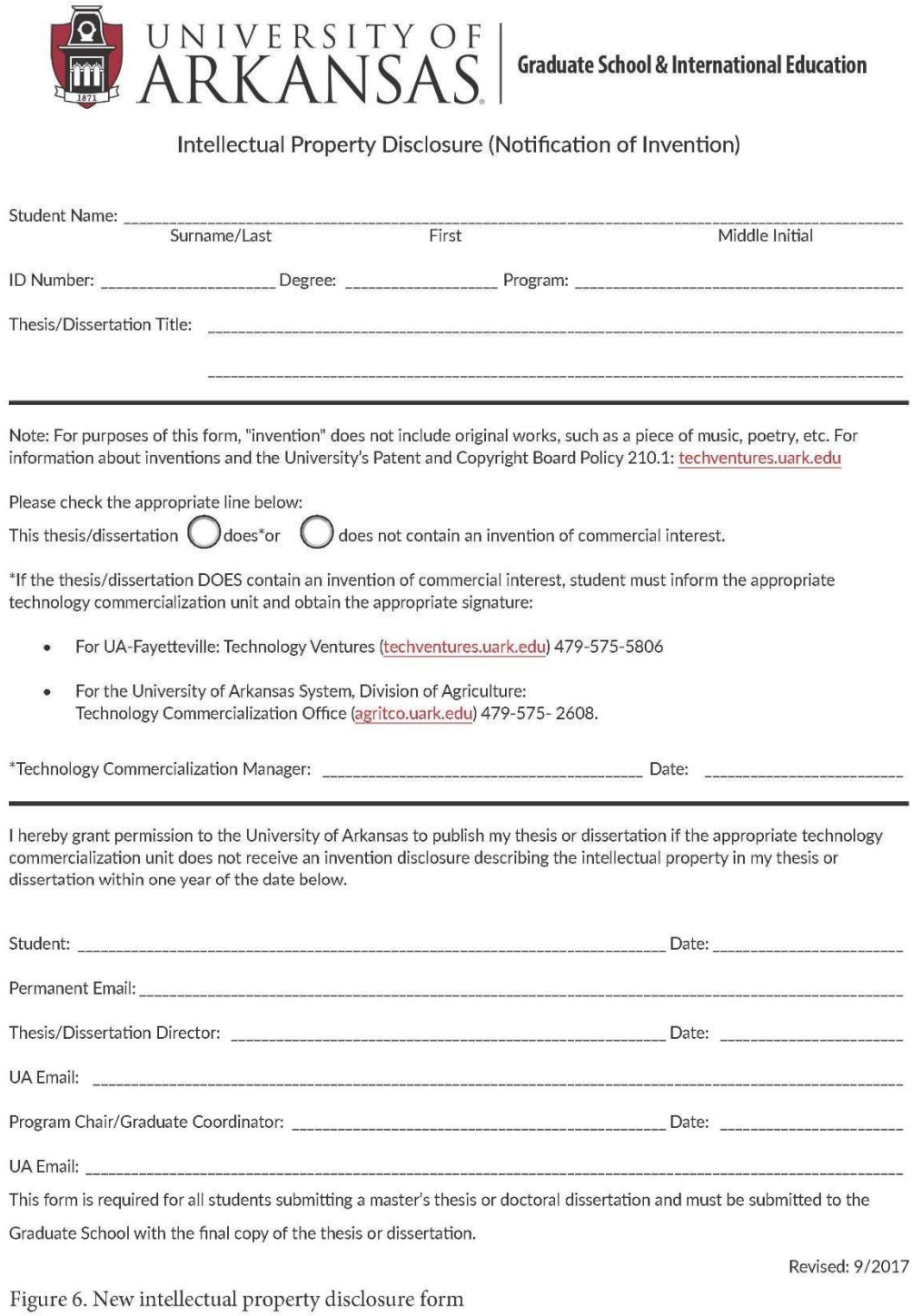
Thank you,

_____
Signature of Graduate School Representative *Date Manuscript Accepted by Graduate School*

Figure 5. New student submission form

Revised: 3/1/2018

Figure 6. Revised Intellectual Property Disclosure Form.



UNIVERSITY OF ARKANSAS | Graduate School & International Education

Intellectual Property Disclosure (Notification of Invention)

Student Name: _____
Surname/Last First Middle Initial

ID Number: _____ Degree: _____ Program: _____

Thesis/Dissertation Title: _____

_____

Note: For purposes of this form, "invention" does not include original works, such as a piece of music, poetry, etc. For information about inventions and the University's Patent and Copyright Board Policy 210.1: techventures.uark.edu

Please check the appropriate line below:

This thesis/dissertation ◯ does*or ◯ does not contain an invention of commercial interest.

*If the thesis/dissertation DOES contain an invention of commercial interest, student must inform the appropriate technology commercialization unit and obtain the appropriate signature:

- For UA-Fayetteville: Technology Ventures (techventures.uark.edu) 479-575-5806
- For the University of Arkansas System, Division of Agriculture:
  Technology Commercialization Office (agritco.uark.edu) 479-575- 2608.

*Technology Commercialization Manager: _____ Date: _____

I hereby grant permission to the University of Arkansas to publish my thesis or dissertation if the appropriate technology commercialization unit does not receive an invention disclosure describing the intellectual property in my thesis or dissertation within one year of the date below.

Student: _____ Date: _____

Permanent Email: _____

Thesis/Dissertation Director: _____ Date: _____

UA Email: _____

Program Chair/Graduate Coordinator: _____ Date: _____

UA Email: _____

This form is required for all students submitting a master's thesis or doctoral dissertation and must be submitted to the Graduate School with the final copy of the thesis or dissertation.

Revised: 9/2017

Figure 6. New intellectual property disclosure form

The form in Figure 5 is the revised student submission form. Here students are required to identify personal information; whether or not their ETD required Research Committee Review; whether or not they give permission to the libraries to use their birthdate in the creation of Name Authority Records (NARs); the subject headings they might use to locate their manuscript in the library catalog; and two statements of understanding: 1) how their manuscript will be accessed in ProQuest and the IR, and 2) verification that the information on the form is correct and the thesis or dissertation has been edited and not plagiarized. The final element of this form is a signature from a Graduate School representative and the date they accepted the manuscript.

The form in Figure 6 is the revised Intellectual Property Disclosure (Notification of Invention) form. On this form, students are again required to identify personal information (now in the same format as the submission form so as to avoid confusion). They are then required to indicate if the thesis or dissertation does or does not contain an invention of commercial interest.

If it does, they must obtain a TCM's signature. On this form they are given a link to information about inventions and the University's Patent and Copyright Board Policy as well as the contact information for the TCMs -- either Tech Ventures or the Division of Agriculture. The TCM from Technology Ventures played a large role in advocating for his department and obtaining these necessary changes.

Next, the student is required to sign and acknowledge that the university will publish the thesis or dissertation if the appropriate technology commercialization unit does not receive an invention disclosure within one year of the date on the form. Last, the student must obtain signatures from his or her thesis or dissertation director, and the program chair or graduate coordinator.

After making these portions of the forms more clear, there were discussions between the

MCU, the IR, and the Graduate School to clarify publishing setting terms for the students. The IR coordinator had been contacted by several students requesting removal of their thesis or dissertation from the IR. This prompted the IR to create documentation in their LibGuide explaining the publishing settings of ProQuest as they relate to the IR (see Appendix B). Having informed the Graduate School of this LibGuide, the Graduate School then agreed to provide access to this documentation in the thesis/dissertation submission form. There is a link which sends students to the LibGuide that the Office of Scholarly Communications created. The

LibGuide explains, "The publishing settings laid out below explain what you are selecting through ProQuest and how it will translate when added to ScholarWorks@UARK." These publishing settings range from the most open access option to the least open (see Appendix B).

The overhaul of the thesis and dissertation submission forms involved quite a bit of back and forth between our various departments. The TCM from Technology Ventures was more than happy to draft a new version of the IP form, and the Graduate School was very open to altering the documents and allowing the library to represent itself on those documents. This process required frequent, clear communication, written and verbal. Through it all everyone remained collegial, which was key given our different goals. We also realized the importance of explanation and ensuring understanding. As we moved through this project, our communications became easier, more succinct, and suitably descriptive.

Lessons Learned and Suggestions for Remedy

As the contractor's maxim states, "measure twice, cut once." Well, we measured, sort of, and started cutting right away. We hope that other

mid-sized institutions can benefit from the lessons we learned. Following are some things we recommend considering before getting started on an ETD workflow project.

Preparation

- Have a written agenda for each member of a meeting.

- Stick to the agenda!

With so many minds in a room, each with a different goal, preparing for a meeting with a written agenda is a must. Send a calendar invite with the agenda twenty-four hours ahead of time to allow people to prepare. Then, stick to it! First, determine the meeting leader. That may or may not be the person who created the meeting. If you are the meeting leader, don't let your colleagues take over and steer you off track. Kindly remind them what the agenda items are, and table any additional discussions for next time. Also, don't allow side conversations to distract from the overall goals of the meeting. There is nothing worse than having to repeat yourself three times because people have formed side groups in your meeting. You might begin each meeting with a little overview and a caveat. For example, welcome people to the meeting, state the meeting's agenda items (which everyone should have received twenty-four hours earlier), write down the day's goals on a whiteboard or display them on a projector screen, and then ask that people avoid side conversations so that the group can accomplish its goals. It may seem a little overbearing, but it will in fact keep everyone on task.

- Set up a procedure for obtaining permissions to publish previously submitted ETDs in the IR **before** you publish them.

- Create a plan for how you will deal with this situation moving forward if you have already published items **without** receiving permission.

In our repository's second year, seven individuals contacted the IR coordinator requesting their work be removed. Because they had not given explicit permission for their work to be available in this form, they wanted the works taken down. The IR complied, but it did raise some questions. From the beginning of the implementation of the repository, the IR coordinator was asked to start adding in the ETDs from 2009 to the present. She was assured that her office had permission to add these ETDs. However, this assurance came into question after the calls for ETD removal.

It was in response to these issues, that the IR coordinator asked the Graduate School to add the line to the statement of understanding on the student submission form, explaining that the publishing settings students choose through ProQuest determine whether or not their work will be added to the IR. We did not want the same mishap with lack of permission, or lack of understanding of permission, to happen again. As for ETDs added to the IR before this clarification was put in place, it has been determined that the ETDs will remain in the IR until an author requests removal, which will be provided along with apologies. Moving forward, all ETDs added to the IR will have given explicit permission to do so.

- Design a central area for procedural and workflow documentation.

One thing we wish we had done at the outset is create a wiki or a Slack (team collaboration tool) account for this project so that everyone, from the TCMs to the Graduate School to the two departments in the library, had a central area of communication and documentation. After we had designed our workflow diagram (Figure 2) -

something created by the IR Coordinator and the head of the MCU - we shared it with the cataloging assistant in the MCU. Her first comment was surprise and then appreciation for finally being able to understand her role in the overall process. She found it incredibly helpful to know where she fit in the progression, but it was some months between when the diagram was created and when it was shared. In hindsight, that should have been shared earlier and not just with the MCU assistant, but with all the stakeholders. Had there been a central area for documentation, everyone involved would have had immediate access to this.

- Troubleshoot stylesheets before beginning the new workflow.

Troubleshooting stylesheets before implementing the new workflow will save time and eliminate headaches. There are many metadata decisions to make here. A few examples are things like compound names, names that begin with Mc or Mac, or patrilineal names. These all need to be considered and accounted for in the stylesheet if one is being used to crosswalk metadata. Depending on the institution, there may be other name form decisions to make. Even if metadata transformation is not a consideration, the way these particular kinds of names are handled, needs to be a consideration in ETD cataloging. A collaborative team can be beneficial here in making decisions on how to handle these names and in creating code for the stylesheet to recognize different name forms. As we mentioned earlier, we brought in our Web Developer to help us with this aspect of the metadata workflow.

Communication

- Introduce yourself and the project to all stakeholders early on and create an explicit (written-down and agreed upon) method of communication.

It took a meeting and several emails before the MCU and TCMs worked out their communication preferences. Some people prefer phone calls, some people prefer emails, and some people prefer to talk face-to-face. It is important to establish those communication procedures early on when implementing an ETD workflow or when redesigning one. Not doing so can cause unnecessary distress, particularly on the part of TCMs as they are working to protect our students' IP.

It was our experience that each department preferred a different means of communication—the TCMs preferred emails and phone calls, the Graduate School was open to emails and face-to-face meetings, and for the two library departments it was easiest to just visit one another's offices. No matter what the means, it is important to find out how people want to communicate and to get those details ironed out and in writing beforehand.

Our group agreed on communication methods by simply asking in our first meeting how each department preferred to be contacted. One TCM preferred phone calls, but the MCU preferred emails. All it took was a verbal discussion to ascertain the benefits of one over the other before email was the method agreed upon. The other TCMs, not present at this meeting but contacted afterward, preferred emails. There was agreement there between the Agricultural TCMs and the MCU. The Graduate School wanted to use email primarily, but were open to meeting in person for more in-depth discussions. This was amenable to the MCU and the IR. As in all things collaborative, some degree of compromise is a necessity. We suggest being open to communication methods you do not typically employ. We also suggest that you be prepared to defend your preferred method of communication with solid, factual evidence as to why it is preferable over another form. We suggest getting this in writing so that the method of communication becomes a sort of procedure in (and

outside of) the workflow. This way, there is also a record of the decision made. Sometimes it is easy to forget these things if a verbal agreement is all that exists.

- Avoid jargon in meetings, emails, or phone calls.

Always be sure to define technical words or vocabulary words from your field when collaborating with those outside of your field. Institutional repository, for example, is not a term most people are familiar with. If you start bandying about field-specific terms, or worse, their acronyms, you will receive blank stares. If you're on the phone it will go suddenly very quiet.

- You may not see or hear a reaction from an email, but rest assured, it happened.

If you feel it is important to use specific terms in your conversation, we suggest including the terms and their definitions in your meeting's agenda (more on that below), or writing them down or displaying them where everyone in the meeting can see them. If on a phone call, provide a brief explanation of what the term means and give your colleague a moment to process that new information. Ask if they understood or if you need to clarify. If writing an email, include a brief definition of the term you are using within the text. In any of these cases, be sure to follow up.

Ensure understanding. There is no point in moving forward if everyone is not on the same page.

- Keep in mind that not everyone wants the same things that you want.

Each stakeholder in the ETD process has different goals. It is important to keep that in mind when pushing forward your own agenda. A certain degree of empathy is needed here to understand what is important and why it is important to your colleagues. Thorough discussion will be necessary, and it is important to remember that compromise is key in any collaborative effort.

- Run decisions through the proper channels.

Seek approval for changes to policy or procedure at the proper level in your organization. Even small parts of the larger process need to be run up the chain of command. An opportunity arose in the middle of this project to provide an alternate publication option for our M.F.A. in Creative Writing students. However, unknown to the MCU, that provision had not been run by the Associate Dean or Dean of the Libraries. Things came to a grinding halt in that area, but that never had to be the case. Lesson learned: always, always double-check that changes to procedure or policy have been approved at the appropriate level.

Conclusion

The process of providing access to an ETD can be arduous and convoluted, but with proper collaboration between departments; clear and consistent communication; and streamlined workflows, universities can provide quick, efficient access to the scholarship on their campuses. The UofA ETD workflow has benefited greatly from collaboration efforts. By maintaining nearly daily email communication and frequent face-to-face meetings, the MCU, the IR, the Graduate School, and the TCMs have gained a better understanding of one another's roles in facilitating access to the UofA's theses and dissertations. In addition, interacting with various departments within the libraries and across campus provides catalogers of ETDs with an expanded perspective. One is no longer cataloging in a vacuum, but has direct access to the people who are in regular contact with end users. This allows ETD catalogers to reorganize workflows and create metadata in a way that will benefit those they serve. Through our collaborative efforts, our workflow now eliminates the redundancy of creating metadata twice for the same theses and

dissertations, and our students now have clear instructions, and clear forms, helping them through the process of publishing their ETDs. The main lesson we hope to impart to others is communicate, communicate, communicate. From the very beginning of the project, communicate well and often – with the various stakeholders, up and down the chain of command, within and without departments.

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Appendix A: Detailed Workflow Examination

The Graduate School is the point of service for our students. This is where students deliver all of their thesis or dissertation documentation. As students are filling out the thesis and dissertation submission forms, if the thesis or dissertation has intellectual property, or an invention, they must see the appropriate TCM. At the UofA there are two separate technology commercialization departments: The Division of Agriculture's Technology Commercialization Office (TCO), which serves all agricultural students and Tech Ventures, which serves the rest of UofA Fayetteville. When students complete paperwork with one of the TCMs, that TCM will contact the MCU to let them know to expect a thesis or dissertation with intellectual property. This is a red flag for the MCU to take particular care not to publish that thesis or dissertation to ProQuest without receiving a go-ahead from the TCM.

After students submit all of their paperwork and have uploaded their thesis or dissertation using the UMI Administrator tool, the Graduate School reviews that information, and the thesis or dissertation, for completion and correct formatting. If anything needs revision, an email is sent from the Graduate School, through the UMI Administrator tool, to the student requesting the needed changes.

When the paperwork and thesis or dissertation is ready, the Graduate School emails the monographs cataloging unit the student paperwork, and we file that into specific folders on our server. The UMI Administrator tool sends us an email (automated process) as soon as students have uploaded their thesis or dissertation. We wait until we have received the student forms from the Graduate School, then we provide one final check for formatting. If there are errors, we inform the Graduate School and they inform the student. This way, the students only have to go through one point of contact – the Graduate School.

When a thesis or dissertation is delivered to ProQuest for publication, they then index the metadata and transform it into an XML file. The XML files are delivered through a FTP server to our IR, ScholarWorks@UARK, and arrive zipped. The IR uses a java program called ETD CON to unzip the files for easier use. These include a PDF of the thesis or dissertation, an XML file with all of the metadata about the thesis or dissertation, and any supplemental files that the author has included.

Once the files are unzipped and ready to be edited, the IR uses MarcEdit to run the unzipped XML metadata files through a stylesheet that will crosswalk the ProQuest metadata into bepress metadata. Most of the files go through the process intact. However, there are still a few that have to be added manually because of unknown errors in the stylesheet (troubleshooting is ongoing). Once the files are changed, the IR combines 20 of the XML files (with bepress metadata) in Notepad++, to create a larger XML file. Using Notepad++ a student worker, checks the title of the ETD against the library catalog and ProQuest as well as the degree and department names to ensure accuracy. The student also looks for issues with the correct form of a student's name, e.g. Mccloud instead of McCloud.

When the student worker finishes checking the combined file, the IR Coordinator reviews and determines whether or not the ETDs have an embargo. If an ETD has an embargo, that information is also added. At this point the IR Coordinator must also determine the best academic subject areas for each ETD, what bepress calls Disciplines. These are broadly similar to the subject

headings used in the library catalog which allow for easier accessibility. Finally, the ETDs are uploaded to the IR.

The MCU then harvests the IR metadata using the Harvest OAI Records tool in MarcEdit and uses a local stylesheet to convert qualified dublin core metadata (harvested from bepress) to MARCXML, saved as a .mrc file. The .mrc file is then loaded into our Innovative Interfaces ILS, using a locally devised load table and each individual record is exported to OCLC Connexion. In Connexion, Library of Congress subject headings (LCSH) and a Library of Congress classification number (LCC) are added, and the final, polished record is exported back into the ILS.

In this newly revised workflow, the metadata for a particular thesis or dissertation is only created once, eliminating the redundancy of both the IR and the MCU creating metadata. The collaborative nature of the workflow allows for simple and efficient cataloging of ETDs and provides quicker access. This workflow also allows for more time to be spent on adding the LCSH and LCCs, elements deemed important by reference librarians for helping students locate the appropriate research in their fields.

Appendix B: Publishing Settings

Your master's thesis or doctoral dissertation should be posted separately with ProQuest through the Graduate School. The publishing settings laid out below explain what you are selecting through ProQuest and how it will translate when added to ScholarWorks@UARK. These publishing settings range from the most open access option to the least open.

Definitions:

> **Open Access:** Research offered to users worldwide for the purpose of furthering research, scholarship, and education.
>
> **Metadata:** Information that you have provided about your thesis/dissertation that can be used for researchers to more easily find your paper. This includes the title, author and abstract.
>
> **Search engine access:** An optional publishing setting, in the ProQuest database, that allows websites like Google, Bing and Yahoo to find the metadata for your paper. All metadata in ScholarWorks@UARK has search engine access.
>
> **Embargo:** A publishing setting that allows you to prevent downloads of your paper for a limited time.

Publishing Settings:

ProQuest Settings and Descriptions	**ScholarWorks@UARK Translations**
Open Access Publishing Plus – Search engine access to metadata, full paper is downloadable. (ProQuest charges a fee for this setting)	Search engine access to metadata, full paper is downloadable. (No charge)
Traditional Publishing – Search engine access to metadata can be selected, full paper is downloadable only from the ProQuest database.	Search engine access to metadata, full paper is downloadable. Can be a good alternative to ProQuest Open Access Plus.
Do not delay release – Search engine access to metadata can be selected, no embargo has been applied. Full paper will be available, in either Open access or Traditional above, immediately after ProQuest has added the information.	Search engine access to metadata, full paper is downloadable and will be available immediately after ScholarWorks@UARK has added the information.
Delay release – Embargo has been applied - Search engine access to metadata can be selected, metadata available through the ProQuest database, full paper is not available for download for a limited time.	Embargo has been applied - Search engine access to metadata, full paper is not available for download for a limited time.