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Janetta Waterhouse
University at Albany, State University of New York, jwaterhouse@albany.edu

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Janetta Waterhouse

Libraries, University at Albany SUNY, Albany, United States

Work email: jwaterhouse@albany.edu

Work phone: 518-442-3631

ORCID iD: 0000-0002-2442-4807

Janetta Waterhouse is the Director of Technical Services and Library Systems at the University at Albany, SUNY.

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This is a case study on the workflow analysis process utilized by the technical services departments at the University at Albany SUNY in preparation for a migration from a legacy library system to a library services platform. The focus is not on specific technical services functionality but rather on the efficient, bottom-up methodology. Tasks were identified, sequenced, and entered into a spreadsheet. Responsible persons or units were marked in the appropriate cell to complete the swim lane diagram. The resulting documentation served as a simplified process diagram for the workflow that can be easily maintained on an ongoing basis.

Keywords: process improvement, process diagram, iterative assessment, continuous improvement

Introduction

This is a case study of the workflow analysis process that University at Albany Libraries technical services departments utilized to review, evaluate, and document workflows. The focus of this article is not the specific workflows being analyzed but the workflow analysis process itself, specifically the data collection method, process mapping technique, and resulting swim lane diagrams. Even if technical service departments become more project focused for some activities, processing orders and materials continues to be a primary aspect of this core library functional area. Workflow analysis is a common need for library departments, especially technical services units. Rummler and Brache, authors of *Improving Performance: How to Manage the White Space on the Organization Chart*, state multiple times and very directly that "An organization is only as good as its processes." (2013, p. 14) Applying this concept to libraries, Dowdy and Raeford (2014) refer to "the key role that operational workflows play in the success or failure of the Libraries' ability to manage its resources" (p. 178). Given a lack of resources, whether funding, staff or both, it is in a library's best interest to ensure that workflows are as efficient as possible.

Common drivers for workflow analysis in libraries include new technology, staff changes, and various management needs. With regard to technology as a driver, libraries have been migrating from legacy integrated library systems (ILS) to cloud-based library services platforms (LSP) for the past several years. LSP workflows are quite different due to the integrated, next-generation architecture and format agnostic workflow design. ILS upgrades were not frequent, happening perhaps once a year but possibly less often. LSPs on the other hand have regular releases, as frequently as once a month. More to the point, these upgrades are managed by the vendor and happen

whether a library is ready or not. A by-product of these new platforms, therefore, is the need for more frequent workflow review.

Another driver, staff changes, may be a result of internal or external factors. Internally, budget cuts or attrition may result in less staff. Externally, managing different formats or different purchasing models may require doing more different types of work with the same or even fewer staff. These changes or decreases in staffing necessitate the most efficient workflows possible within the library, as noted by Shelton and Carrico (2019): "Staffing and organization are frequent topics of assessment, especially as library budgets shrink. Ensuring the effective use of financial and Human Resources is imperative if libraries are to succeed." (p. 68)

Management needs that may drive assessment include process efficiency (often to meet strategic goals), gaining an understanding of processes for new managers, and training needs for staff. A common driver found in the literature is that new managers or directors request workflow analysis to help them understand operations in a new institution, unit or position. Although the process of analyzing workflows is not documented to specifically address staff training, employees with a better understanding of how their tasks fit into an entire workflow is nonetheless a benefit of the process. All of these drivers compel technical services units to ensure processes are as efficient as possible, and workflow analysis is the solution.

There are several approaches to the workflow analysis process documented in the library literature that will be reviewed here. They vary in their approach, collection method, process mapping technique, and output. Of those that used a bottom-up approach, several required a considerable amount of time or resources. Many resulted in complex outputs that may not be easily maintained by personnel at all levels within technical services. The streamlined workflow analysis process presented here represents

a bottom-up approach, where staff at all levels actively participated in the collection of data by brainstorming tasks for each workflow within their responsibility. The technique builds tasks by workflow in a simple manner that results in relatively easy-to-maintain swim lane diagrams. Although this article is about analyzing technical services workflows, this methodology could be used in non-technical service areas as well.

Literature Review

The literature reviewed includes information on 21 articles and book chapters related to technical services workflows dating back to 2006. These workflow analyses included common elements such as the drivers, goals, methods, tools and techniques, output, and outcomes. The literature reviewed also included common themes, such as the importance of communication, addressing staffing concerns or organization, and issues around workflow recommendations and implementation. Another theme was related to new workflows needed for new material types or purchasing models, sometimes including implementation of new technology. Across all of these elements and themes, of particular interest to this author are the methodologies used and the complexity of the output process diagrams.

In the case of workflow analysis, methodologies, defined as "a body of methods, rules or postulates" (*Methodology*), include the approach to the analysis, the data collection method, and the technique for creating the process diagrams, lists, or flowcharts. The range of functional areas considered appropriate for technical services operations for the purposes of this literature review included acquisitions, electronic resources, metadata management, and record loading. Table 1 includes a snapshot of the 21 resources that the author reviewed, sorted by publication date. [place table 1 near

here] The table includes the publication year, author(s), institution, the workflow(s) being analyzed, the lead, the article focus (whether on the functionality, analysis process or both), approach (bottom-up or top-down), collection method(s), and the output documentation of the analysis. “N/S” for not specified was entered if the author was not able to ascertain the information from a resource. Data in the Workflow column begins with an asterisk if the literature documents the workflow for an entirely new business process or newly implemented software.

The Lead column represents whether the analysis was led by an internal person or group or an external company or consultant. This is relevant because workflow analysis that depends on external resources are likely to be more costly and possibly more time consuming. Both consequences would be drawbacks to the iterative workflow analysis that may become the new norm for technical services units. The most common lead was the internal group, listed as team, task force, or working group. Closely following was the combination of an internal team with an external consultant, company, or an academic department. Only one (Hunt) seemed to be led by an external company, although some were launched by an external company or consultant and then completed within the libraries (Andreadis, Loring, Medeiros). Only three articles indicated that the analysis was led by an individual, and two were not specific enough to determine who had primary responsibility for the workflow analysis.

Literature Focus

Of the literature found within the parameters, a few workflow articles did not address the workflow analysis methodology. One example is the Work Process Model referred to in Andreadis, et al. (2007, pp. 42-43). The chapter was an administrative overview of the project to reorganize technical services units across two colleges and

did not provide details on how the model was developed. Other literature that did not describe the analysis methodology focused instead on the business needs and functionality.

Turner's (2016) ebook batch processing article, for example, included no specific details with respect to how the analysis was conducted but concentrated on implementing ebook batch processing. Another example is the ebook cataloging workflow of Sapon-White (2013). Even though the article stated that "libraries need to be expert designers of workflow" (p. 135), the extent of workflow analysis process discussion was that the "head of cataloging and metadata services took responsibility for designing the workflow" (p. 134). The Downey (2014) article described a pilot project for a demand driven acquisitions (DDA) purchasing model. It also had minimal references to the workflow analysis process. Although it included a "DDA technical process sequence" (p. 10) and a discussion of the workflow tasks, the analysis process of collecting data and mapping it were not included. Stein, Applegate and Robbins (2017) wrote about new workflows established around institutional repository (IR) metadata for the IDEALS repository at University of Illinois at Urbana-Champaign (UIUC). One workflow was established for the ingest process to "improve metadata quality prior to uploading batch ingests in order to mitigate the introduction of new metadata errors" (p. 644). The other workflow was designed to retroactively clean up metadata already in the IR.

In these four cases, the articles' focuses were on new workflows where existing workflows were not already in place to use as a source for data collection. As a result, the approach for these was often top down because information on how to conduct the work needed for the new functionality was likely derived from external sources. UIUC, in particular, designed process diagrams (pp. 653, 656) for metadata review by

understanding the metadata elements of related standards, the ingest process of the DSpace IR, and the needs of the OpenRefine tool used to clean data.

The majority of literature reviewed included some discussion of both the technical services functionality and the workflow analysis methodology. One set is related to implementing new electronic resource management systems (ERMS). Even though these systems are new, some workflows to handle eResources were already in place. Medeiros (2007) described a "holistic approach to redesigned workflow" (p. 72) that was prompted by issues with eResource licensing and management of administrative metadata. Unfortunately, this holistic approach took three hours of meetings per week for two years, not including additional time for their collection methods of publisher discussions and reading eResource documents and electronic resource management (ERM) white papers. The project started with ERM and ended with the implementation of three software applications, including an ERMS (p. 64).

Similarly, Duke University Libraries (Dowdy and Raeford, 2014) charged a new team to document and analyze eResource workflows that served as a precursor to the evaluation, selection, and implementation of an ERMS. Collection methods included reviewing published workflows and interviewing staff, which the authors described as "laborious but necessary"; they specifically analyzed the flowcharts created for "weak points, overall logic, and to see if tasks could be moved or automated for greater efficiency" (p. 177).

ERM is far from simple or streamlined, in part because of the wide variety of formats, purchasing methods, and licensing models. Even more challenging is the non-linear nature of ERM, all of which combine to make this a common theme of workflow analysis. Hamlett (2016) described a process to analyze eResource lifecycle workflows. As with Dowdy and Raeford, the background research involved reviewing

recommendations and best practices, namely DLF/ERMI documents, NISO standards, and ERM articles (pp. 170-171), and next steps included interviewing staff. Similar to several other articles, after task data was collected, workflows were documented and diagramed, and follow-up meetings to review and refine the output were held. Campbell, et al. (2015) also documented an approach to eResource workflow review. Their process started by conducting individual or focus group interviews, a bottom up collection method. The team then crafted a key steps document that was used to create a swim lane, and the diagram was reviewed and revised as necessary.

Some analyses were based on a transition from print to electronic and used the workflow analysis process as part of that transition. Graves and Arthur (2006), for example, considered "workflow analysis as the first step in planning to prepare staff to transition from working with print to electronic resources" (p. 239). Workflows were crafted by individuals that were reviewed by a larger group, and flowcharts were created to capture the entirety of each process. Schmidt and Dulaney (2014) documented a problem-solving method used with one of two staff reorganizations in their article. The Pence Law Library evaluated workflows, previously based on print material, that were disrupted by eResources. The task force used a spreadsheet that functioned as a swim lane, though not referred to by that name, to describe and analyze existing workflows. The problem-solving method was to address the issues that were generated from review discussions of the process maps as a basis for identifying change.

Yet another set of literature that included information on the analysis methodology in addition to functionality were related to the flow of print materials. Gibson (2015) documented a time to shelf study for physical materials and provided a synopsis of the time-to-shelf flag method employed to collect data. The data, resulting

in timelines by material and order type, served as a benchmark, and workflow changes were made to reduce turnaround time by material type. Similarly, Dragon and Barricella (2006) utilized time flags as a data collection method. The goals of their project were to measure time, both for material flow and task completion, and to analyze the path of the materials through the physical space (pp. 2-3). Flag data was used to create time graphs, and materials path diagrams were devised to evaluate physical flow. An assessment project at Wells College analyzed workflows for physical materials starting with receipt in acquisitions and ending with transfer to circulation for shelving (Godbout, 2007). Multiple continuous improvement tools, such as process behavior (run) charts and cause-and-effect (fishbone) diagrams, in addition to Customer and Supplier Screens and more were the source of data collection. The primary output was a Key Steps Worksheet, and the run charts, indicating process performance in terms of average days in pipeline and process variation, were used to demonstrate productivity improvement.

A few articles focused more specifically on the analysis process itself and included less about the technical services functionality surrounding the business process of the workflow. Hunt's (2019) article is one such example. It covers several process improvement tools and techniques for consideration, including succinct descriptions of process map and process improvement. The approach itself is unknown, as details about data collection were not covered. Regarding the output, he describes the process map in this way: "[it] takes these beginning and end points [of a process] and records each stage in the process between these two points. The process map can be enhanced with the use of 'swim lanes' which can highlight functional areas that participate in the process." (p. 12) After presenting a foundation of process improvement techniques, he then applies them specifically to the "entity relationship model of FRBR" (p. 14).

Collins and Wilson (2018) document NCSU's adaptation of an agile application framework to technical services operations. They do not focus on specific workflows or workflow analysis projects but rather on the value of workflow analysis. Of three strategies they used to build a more agile environment, the third was workflow mapping and analysis. They map workflow review with the following steps: defining the objective and scope of the project, collecting information about the processes, creating workflow maps, reviewing the workflows, and reviewing concerns that arose during mapping and analysis (pp. 16-17).

Loring (2007) included a summary followed by more in-depth information on the process improvement framework applied at Smith College. "These approaches include describing the process, identifying customer needs, developing a standard process, error-proofing a process, streamlining a process, and reducing variations in, or mainstreaming, a process." (p. 55) In addition, he expanded on how the elements of the framework pertained to the project. Overall it was a bottom up approach, and he agreed that the process improvement principle of "long-term success depends on taking a rigorous, systematic, and disciplined approach to problem solving" (p. 57) applied to their work.

Approach and Data Collection Method

Bottom-up approaches are those that start with specific tasks to develop generalized workflows, as opposed to top-down approaches that design an ideal workflow and then determine the sequence of tasks needed to implement it. Most authors emphasized the importance of involving all staff. One such example is from Canepi (2007): "Actively involving staff in work redesign process provides the employee an opportunity to legitimize this normal job crafting behavior, buy into

organizational goals, and potentially alter the job in ways that benefit the organization." (Canepi, 2007, p. 21)

Unfortunately, some bottom-up approaches utilizing specific collection methods were especially time consuming. Blake and Stalberg (2009) planned and executed a project to review eResource workflows that included the three primary phases of shadowing, workflow mapping and workflow analysis (p. 243). They considered workflow analysis to be the action of reviewing the flowcharts that were created during workflow mapping (p. 244). Their work spanned a year, including 11 weeks of job shadowing to collect data (p. 245).

The authors stated that the project supported the goal to improve efficiency and also exceeded their intent to give new employees an in-depth understanding, "as it provided a tool for workflow analysis that continually enables staff members to engage in workflow review and improvement" (p. 252). However, staff contributions to the project were non-trivial. One author estimated 150 hours dedicated to the project, and other staff members in the aggregate contributed nearly as many hours (p. 252). The authors noted that shadowing was "long and taxing", "long and a bit stressful", (p. 245) and refer to it as a challenging experience; they also referred to the workflow analysis step of reviewing draft workflows as an "intensive review process" (p. 249). Advice they provided included: "A comprehensive workflow analysis project requires a lot of time and energy. Make sure your library and staff are willing and able to invest an appropriate amount of librarian and staff time." (p. 252)

Likewise, the Asia Library and International Studies (ALIS) departments within University of Michigan Library undertook a laborious technical services workflow analysis project (Billings, et al., 2017). The project was executed in two phases over nearly two-and-a-half years (p. 626). The first phase involved a staff survey followed by

in-depth interviews and the creation of workflow maps (p. 608), and the second phase engaged consultants employing lean methods. The activities that took the most amount of time were the staff interview collection method and process mapping. Pairs of team members conducted two 90-minute interviews for 17 staff members, which included transcription of the interviews (p. 611). The workflow mapping step created individual workflow maps as Visio flowcharts (p. 613). While at least some of the workflows utilized swim lanes to represent tasks of multiple people or units, the swim lanes had flowcharts embedded and were relatively complex. "The time it took to map each workflow was generally lengthy, although it varied based on the complexity of the workflow and the level of detail transcribed therein." (p. 613)

Additional output from the lean methodology used by the consulting company included current state, value stream, and future state maps (pp. 615-620). Working groups put together recommendations for improvements as part of a roll-out plan. The output totals are impressive: 90 distinct workflow maps, five current state maps, two value stream maps, and 32 working group recommendations for improvement (p. 624). The authors reflected on the project with comments such as: "Overall, we learned that workflow analysis requires time, effort, and honesty. During every stage of the project, staff members continued to perform their regular job duties as well as participate in the time-consuming workflow analysis." (pp. 625-626) and "…such a project requires a considerable time commitment" (p. 626).

In two cases, the analyses seemed to involve elements of both bottom up and top down approaches. For the workflow task analysis conducted at Southern Illinois University (Canepi, 2007), a draft workflow was created and then reviewed by a group for modification. Afterward, other methods were used to collect additional data, including a job inventory questionnaire that ranked tasks and included time percentages

(p. 23). Staff tracked their activity for at least 5 days as a comprehensive method to identify how time was spent that established "a baseline against which future change could be measured" (p. 22-23). Youngman (2006) described a process flow analysis for monographic ordering at Kansas State University (KSU) and provided a concise summary of the "Origin and History of Process Flow Analysis" (pp. 38-39). Their methodology involved working with KSU department of Industrial Engineering graduate students as analysts. Staff were interviewed and analysts "developed a graphic map of the process" (p. 41), which reflects a bottom-up approach. However, the analysts then applied lean principles of process improvement to create a new map for the recommended process, which suggests more of a top down approach to changes.

Process Mapping & Outputs

Several articles described the creation of complex process diagrams to capture the workflow, often using flowcharts with the standard symbols (Billings et al., Dowdy and Raeford, Loring, Graves and Arthur, Youngman), sometimes including color coding (Hamlett, Blake and Stalberg). A few articles included concise lists or diagrams of the processes. For example, the IDEALS output included simplified box diagram workflows and short checklists for both new workflows (Stein et al.), and other articles included staff responsibility matrices (Campbell, et al., Dowdy and Raeford). Turner's (2016) output combined the individual process analyses into a single "Life of" workflow overview that represented "point of order to shelf" (p. 125) that is somewhat similar to a swim lane.

Three articles refer to swim lanes directly (Hunt, Campbell, et al., Billings, et al.), and even though Schmidt and Dulaney (2014) don't refer to their output as a swim lane, the spreadsheet description, with staff listed horizontally and tasks listed vertically

(p. 72) functions as a swim lane. The Hunt (2010) article covered several techniques, and outputs varied by the techniques that were employed, one of which was the swim lane.

Given that the routine workload for technical services staff has no reprieve for additional projects such as a workflow analysis, a methodology that is time-intensive may not be feasible for under- or barely-staffed technical services departments. Furthermore, complex diagrams using traditional flowchart techniques are challenging and time-consuming to maintain. It is highly likely that these flowcharts don't lend themselves to upkeep by a team of people but rather place the burden on one or two. While these detailed flowcharts capture the granularity of workflows and decision points, it is unlikely that they are updated with any frequency due to the complexity of the analysis process and the difficulty of maintaining process flowcharts themselves. This is not ideal in the age of cloud hosted systems with frequent releases and the need for continuous assessment.

Background

The University at Albany (UAlbany) is one of 64 institutions within the State University of New York (SUNY) system. Prior to the pandemic, UAlbany averaged just under 18,000 FTE, and the Libraries' collection budget was approximately seven million dollars. At the time of this workflow analysis, technical services was made up of three departments: Acquisitions Services, Discovery Services (discovery and database maintenance), and Metadata Services (cataloging). These departments are within the Technical Services and Library Systems division, and there were between 18 and 20 staff that participated in the workflow analysis process.

Sixty libraries within the SUNY system migrated from individual Aleph legacy systems to a consortial Alma/Primo instance. The migration took a total of three years, and the libraries went live with the new systems between June and July 2019. In addition to migrating from a legacy ILS to an LSP with monthly releases, the libraries moved from single, self-managed servers to a state-wide consortium that introduced consortial procedures and best practices. Another wrinkle in the migration was that UAlbany did not have an ERMS in place prior to the migration and would be effectively implementing one for the first time.

The Director of Technical Services and Library Systems started at UAlbany in July 2017, after the SUNY project's first year of product evaluation, bidding, and contracting. As the new director at an institution that was in the early stages of migration from a legacy ILS to a next generation LSP, the author wanted to conduct workflow analysis for several reasons. The primary reason was to learn the workflows of the division and increase understanding of the overarching technical services process for all staff. This was important in light of the upcoming migration and anticipated changes to data management and workflows. A secondary reason was to determine whether or not any inefficiencies could be identified and resolved. If so, having more streamlined workflows might free up staff to work on the many data cleanup projects that are necessary both before and after a library system migration. Additionally, the author wanted staff in the division to learn and participate in a bottom-up process to review and document workflows so that everyone would be able to maintain these workflows in the new, regularly-updated LSP. It is unlikely that every release would impact technical services, however, changes will happen with or without staff preparation. Having a method to review the documentation for a given workflow as needed was deemed essential.

Lastly, the author insisted that the output of the workflow analysis process be simple to create and maintain. Complex flowcharts that are updated every few months or years would not be desirable in the more dynamic environment of the LSP. In the midst of this transformational ILS to LSP change, the library was also transitioning from a staff intranet that required someone with the ability to edit HTML to wiki software supported by campus ITS. This wiki changed the internal documentation from a dated intranet that was rarely updated combined with multiple files and versions spread across a file server to Confluence (R). As a browser-based wiki that is version-controlled, it is easy to use for creating and editing information and available to everyone in the library. This bottom-up approach, with its simple collection method and swim lane diagrams as process maps that can be easily maintained on the wiki, met all requirements.

Methodology

Workflow analysis is a common business methodology that is not specific to libraries and is considered a core element of process improvement. "Process improvement is a method by which the interrelated activities that lead to a desired result are analyzed and then redesigned to achieve the result more efficiently." (Loring, 2007, p. 52) Rummler and Brache emphasize repeatedly that "*An organization is only as effective as its processes.*" (2013, p. 43), "…work gets done through processes" (2013, p. 61), and "Failure to improve process performance results in failure to improve organization performance. Failure to effectively manage processes is failure to effectively manage the business." (1995, p. 115)

Online business analysis source DocuVantage refers to workflow analysis as the first step for process improvement and cite two reasons for workflow analysis: to streamline manual processes or to automate processes (*Workflow analysis*). Preferably these will be "reliably repeatable processes" (Blake and Stalberg, 2009, p. 242). For the purposes of this article, workflow is "a series of steps designed to produce a product or service." (Rummler & Brache, 2013, 43), a general definition that is applicable to workflows throughout the library. This series of steps, especially removing those not needed, is a significant aspect of the analysis process; "Streamlining a process involves removing steps…that take time but add little or no value to the result." (2007, Loring, p. 56).

An overview of the workflow analysis methodology used at UAlbany Libraries is followed by the details. The author employed a bottom-up approach to collect information about tasks that were used to build a process map in the form of a swim lane. The analysis was initiated with an overview session to describe the technique. A workflow was noted on a single easel-size sticky sheet, and staff brainstormed individual tasks for a workflow, putting each task on a sticky note that was placed on the sheet. Next, staff most familiar with the workflow deduplicated and sequenced the tasks on the sheet, reviewing terminology and task sequence in small groups. When a sheet had a full task sequence for a workflow, the tasks were put in the first column of a spreadsheet, and a group met to complete a swim lane diagram for the workflow by adding the staff or unit that was responsible for each task in columns, and marking the appropriate cell. Staff were involved in each stage and had the opportunity to review and provide feedback on the swim lane diagram.

Approach

A primary principle behind the workflow analysis process utilized was to involve staff early and to distribute the work to the staff that perform the tasks. By starting with the specific tasks needed to complete each workflow, activities which are best known to the staff that perform them, the more generalized workflow could be determined. Library consultants Lugg and Fischer (2004) considered this bottom up approach as a form of task-based strategic planning (p. 84) and noted that these low level tasks are nonetheless "bursting with implications for the direction of the organization" (p. 84). Much has changed with purchasing models and library systems since that was written in 2004, however, those changes have made attention to this level of work even more necessary. The integrated nature of the LSP has automated some of the more simple or routine tasks performed in technical services units, creating the need for iterative evaluation of staff workflows to ensure efficiency and alignment with priorities.

According to Lugg and Fischer (2004), this bottom-up approach, working from the specific to the general, has multiple benefits. It shows respect to staff and validates their efforts. "When staff recognize that managers understand the detail, they are more likely to buy in to proposed changes." (p. 85) Other authors refer to the impact of staff buy-in as well. In an article that covered best practices for a successful workflow analysis, Arthur (2016) stated that "The success of any workflow project is tied to the level of motivation and active participation by the team." (p. 81) Schmidt and Dulaney (2014) also state that "Staff buy-in was considered a critical element of success" (p. 71). Mitchell (2007) directly tied redesign to change management by stating "Broad buy-in by staff and constituents and full staff participation were seen as antidotes to rejection [of change] and lack of cooperation." (p. 4)

Lugg and Fischer pointed out other benefits of working from specific to general. Among them were that it allows for identifying both skills and training needs, and it allows staff to not only see the big picture but also but understand their role within a larger context. Also, as the people who perform the tasks on a daily basis, these frontline staff may be the people to more readily generate ideas for improvement or identify inefficiencies of proposed changes (p. 85).

Data Element Review

Workflow analysis is not only for task sequencing but also for determining information needs, especially with respect to eResources. According to Washington (2008), "If a key goal of workflow analysis is the design of new and improved processes that optimize workflow by delivering the right information at the appropriate point, then data capture is a prime consideration." One example from library literature is the new metadata review workflows created at UIUC for the IDEALS IR. That process involved comparing Dublin core elements with metadata elements required for local determinations of "high quality metadata" (Stein, et al., 2017, pp. 650-51).

As a first step in eResource workflow analysis, the ERM Committee was tasked to list eResource data elements that were in use at that time as well as data elements that would be used if available. The author considered this additional activity necessary because the move to Alma included a de facto ERMS implementation, and ERM workflows are heavily dependent on eResource metadata. Examples of eResource data elements provided to the committee were number of concurrent users, performance rights, and coverage dates, and attendees were encouraged to think broadly about information needs around eResource metadata and other data points. Questions about data elements for the discussion were shared in a spreadsheet and included the data

element, who needs it, where it is located, how it is used, what the impact of the data or its absence is, and who/when the data is captured in the workflow. An email was sent prior to the meeting to prepare staff for the discussion, and the author prepared an example list of data elements for consideration by paring down a list of data elements from the DLF/ERMI Data Element Dictionary (Riggio, et al., 2004).

Collection Method

The author's intent was to train supervisors and staff by stepping through the first few workflow analyses in a larger setting and allowing staff to complete remaining workflows by unit or department as needed. Because it was neither planned nor possible to complete all workflows for each department and unit during the introductory sessions, workflows were selected in advance for the most part (the Results section includes an example of this not being done, to the detriment of the analysis process).

Advance preparation for the data collection portion of the introductory sessions included having markers and small sticky notes that were color coordinated and easel-sized sticky sheets available in the room. A workflow name was written at the top of each sheet in the same color as a set of sticky notes that were made available nearby. Several people were involved in more than one workflow, and labeling an easel pad with a marker color that matched the sticky notes for that workflow reduced confusion.

All staff involved in a workflow were invited to brainstorm tasks, write each separate task on a sticky note, and post it to the appropriate sheet. The location of each task on the sheet was unimportant at this stage. There were questions about the level of task per note. The author's guideline was for staff to decide whether the task could be stopped and started on another day or time or by another person. If several steps absolutely must happen together, for example if the work cannot otherwise be saved in

the system, then it belonged on the same sticky note as a task; if not, separate notes would best capture the flow of the work. Given that several people were creating tasks on sticky notes for the workflow, it was expected that tasks would be duplicated. This was not a problem and actually served a useful purpose, as the terminology differed between staff for various tasks. During the next step, staff were able to discuss these differences and choose vocabulary for the subsequent documentation.

After everyone listed any and all tasks related to the various workflows being analyzed, the next step was to have the experts for the workflow combine similar tasks and put them in sequence on the sheet. Some tasks, especially those for eResource workflows, can happen in parallel and were arranged on the sheet accordingly. Although collecting task data could and did happen outside of a formal meeting, it was useful to have several people involved in case questions arose or discussion was necessary. Even at this point, it was possible that not all tasks were identified. Not all workflow analyses were completed to this point during an initial meeting; others were completed separately by the units responsible for the workflows.

Process Mapping Using Swim Lanes

A common aspect of workflow analysis is to create a map, diagram, or chart of the workflow or, in some cases, multiple workflows together. Process mapping, in general, can assist workflow analysis processes by providing visual methods of identifying the many obstacles that can plague efficient workflows. Mapping and measuring processes is important because processes cross departmental boundaries, which Rummler and Brache (2013) refer to as "'white space' between boxes on the organizational chart" (p. 43). This is true of technical services processes that transition

between acquisitions, cataloging, and discovery. Not surprisingly, process maps are common in libraries in various formats: “Workflow mapping — the creation of a graphical representation of a process using a standard flowchart language — has long been an accepted tool for understanding and improving organizational processes.” (Blake and Stalberg, 2009, p. 243)

Swim lane diagrams are a visual tool that serve as a type of process flow diagram utilized in the business performance improvement area. Attributed to Gary Rummler and Alan Brache and also known as Rummler-Brache Process Maps (*What is a swim lane diagram; Workflow*), “The swim lane flowchart differs from other flowcharts in that processes and decisions are grouped visually by placing them in *lanes*.” (*Workflow*). Advantages ModernAnalyst notes include being easy-to-follow, versatile, and “because they display so much information so succinctly, swim lane diagrams are particularly useful for identifying redundancies, problem areas or inefficiencies in a business process” (Masters).

Business resources that discuss workflow specify common issues that are also documented in library literature. The types of problems can be categorized by issues with the tasks themselves, problems with the task sequence, or complications with the overall workflow. As far as the tasks themselves, process improvement seeks to identify who is responsible for each task and whether the tasks are redundant or unneeded. With respect to responsibility, “A swim lane diagram makes responsibilities more clear than a regular flowchart.” (*Swim lane diagram*).

Process diagrams are also useful to identify the problem areas related to task sequencing. These include handoffs, when responsibility for a task shifts from one person or unit to another; turnarounds, when material needs to be returned to an individual or unit for completion of another task; and gaps or overlaps of tasks. With

respect to representation of handoffs, “A Process Map…clearly displays the points at which one function…provides a product or service to another function…These interfaces often represent the greatest opportunity for performance improvement. A process-oriented manager closely monitors interfaces and removes any barriers to effectiveness and efficiency.” (Rummler and Brache, 1995, p. 62). Within the library literature, ineffective handoffs were a common target for analysis: “handoff points between staff members proved to be another workflow element that benefited strongly from review” and “…the need to keep handoffs to a minimum served as a guiding principle” (Blake and Stalberg, 2009, p. 251). Hamlett (2016) looked at inefficiencies, gaps, and overlaps in terms of process, staff, and platforms (p. 172).

Other types of task sequencing issues that are similar in nature are exceptions and variants. According to Godbout (2006), “These variant steps were points where decisions had to be made and therefore, points where possible mistakes could result. The objective was to identify, eliminate, or change, if possible, the variant steps.” (p. 59). Loring (2007) referred to this as mainstreaming and stated that “Variation in a process can significantly hinder productivity” (p. 56).

Swim lanes are advantageous for all types of task sequencing issues. A swim lane “delineates who does what in a process…It shows connections, communication and handoffs between these lanes, and it can serve to highlight waste, redundancy and inefficiency in a process.” (*What is a swim lane diagram*). Swim lanes specifically “illustrate how the processes move between units” (Campbell, 2015, p. 508), a clear benefit to libraries.

Complications with the flow of work may also surface more easily with process mapping. The types of complications can vary from identifying a bottleneck where the flow of work slows down, which may be a common driver of initiating a workflow

analysis process; determining tasks that can be completed simultaneously, a complication of eResource processes in particular; or what Tallyfy refers to as "inefficient workplace layouts" (Pearson). By identifying inefficient work spaces, a change to the layout may improve the physical flow of materials through the library. In the materials processing world, this may indicate better locations of book trucks, as documented by Dragon and Baricella (2006).

Workflow issues related to rework and data loss are less likely to be evident solely through a visual display of the process, though Canepi (2007) notes that minimizing the number of times work was rechecked as an issue that surfaced during workflow analysis (p. 28).

A general description of the swim lane diagramming technique is to first list all tasks in a workflow sequentially as rows in a spreadsheet and then identify the person(s) or unit who performs that task by column. Rummler and Brache (2013) delineated the creation of the process map (note that they list tasks horizontally and staff or units vertically) in this way:

> "The mapping process starts by identifying the entities involved with the process, listing them on the left-hand axis, and drawing a horizontal band for each. Once this is done, the team (made up of representatives from all the functions listed — possibly including the customer) traces the process of converting the input…through all the intervening steps until the final required output…is produced. The map shows how all functions are involved as the [order] is processed. This mapping format allows the team to see all the critical interfaces, overlay the time to complete various subprocesses on the map, and identify "disconnects" (illogical, missing, or extraneous steps) in the process." (p. 47)

As far as the specific format of the swim lanes, Rummler and Brache, Smartdraw, Billings, et al., Campbell, et al., and other examples of swim lanes include traditional flowchart symbols within the lanes. This allows the diagram to be as complex as needed for the given process being mapped. The disadvantage is that the swim lanes may become overly complex. The processes mapped during this case study kept the swim lanes as simple as possible and did not include flowcharts within the lanes.

Concerning the case study, after the tasks on sticky notes were de-duplicated and sequenced, the next step was to draft a swim lane diagram by applying the sequences of the workflows to a spreadsheet. In almost all cases, this step was done outside of the introductory workflow analysis meetings by the staff member with primary responsibility over the workflow.

This was a simple process that involved listing the tasks in order down the first column of a spreadsheet. In at least one case, one person read off tasks from the sticky notes while another entered the data at a computer to create the first draft of the swim lane with tasks as rows. Completing the swim lanes involved adding columns for the person, persons, or unit that completed each task and making a mark in the corresponding cell. This may be done as simply as adding an X in the cell or by adding digits to reflect primary, secondary, and tertiary responsibility in the form of 1, 2, 3. Bringing key stakeholders together during this step was essential. It gave staff a chance to review the workflow and verify the list of tasks and their sequence. Questions and answers, as well as discussion of the terminology, were extremely beneficial for overall understanding of the work and gave staff a chance to add any tasks that may have been missed or modify the sequence.

By seeing the cells checked as the material makes its way through the workflow, it is relatively easy to identify inefficiencies, if they exist. The order of some steps can be rearranged so that one person can complete all work related to the process in order to streamline the flow. As previously noted, the inclusion of traditional flowchart symbols within the swim lanes can add granularity to specific tasks, although the risk is that the workflow will become too complicated to maintain through new releases.

Results

The results of the workflow analysis process at UAlbany Libraries were useful as a first step toward understanding, evaluating, and documenting technical services workflows. As far as identifying inefficiencies, in nearly every case, hand-offs were minimal and turn-arounds were non-existent, which was affirming for staff and managers. In hindsight, it made sense that these workflows were optimized, given the length of time that the systems were in place and how long the existing staff had been using them.

The workflow analysis process started in February 2018 with a group tasked to work on eResources during the migration. The biggest changes with a migration from an ILS to an LSP were with acquisitions workflows and ERM. Some aspects of the workflows would be streamlined by default because the library was moving from ERM across multiple systems to an ERMS within a single platform. As a result, the analysis process started with four acquisitions workflows related to eResources: DDA, Databases, eBooks, and eJournals. The first meeting discussed eResource data elements and a review of the workflow analysis process. The data element discussion was not especially useful in identifying new data to capture, but it was helpful in addressing eResource vocabulary in on overarching sense. The author wanted to make sure that all data elements of interest to stakeholders were considered when looking at ERM

workflows. Data collection was completed during the first group meeting, and staff sequenced the tasks and entered the first column of the swim lane between meetings. The group reconvened to complete the swim lanes, including extensive review and discussion. These first four swim lanes were finalized by June with minimal time spent by all participants.

During September 2018, an introductory session for other technical services workflows was held for all staff in technical services units. After the author presented an overview of the workflow analysis process, people broke off into groups to start the analysis with a specific workflow for their unit. Due to the bottom-up nature of the method, combined with the relative simplicity of process mapping using swim lanes, managers and related staff continued to analyze workflows independently through October 2018, with most technical services workflows being addressed.

The swim lanes that were created varied in a few ways that are worth mentioning (staff names have been replaced with titles). [place table 2 and table 3 near here] Table 2, DDA, and Table 3, Added Copy Added Volume, are examples of straightforward swim lane diagrams that reflect fairly simple processes with efficient progress. The DDA swim lane, as one of the earliest to be completed and least complex of the ER workflows, is very concise and lists only two units with a few tasks. Table 3 has both more tasks and more handoffs but is also a simple way to view the process. [place table 4 near here] Table 4, LC Copy Cataloging for Firm and Approval Orders, is an example that shows how simply a swim lane can capture routine work. It looks more complicated than necessary because individual names were changed to titles, but there are no *required* hand-offs. A print item is generally managed to completion by one person, thus a more simplified version of this particular workflow could be used.

[place table 5 near here] Table 5, a portion of the eJournal workflow, represents an even more complex workflow that was also adapted to fit the needs of the people performing the work. As the tasks were combined and sequenced during the data collection step, it became apparent that some tasks were applicable only for new purchases, others for renewal, some only for cancelations, and a few specifically related to troubleshooting. As a result, the staff sequenced tasks by lifecycle activity, and the swim lane was sectioned off by the lifecycle phase. It remained as a single diagram for this complicated workflow but could have been broken out into separate lifecycle workflows.

[place table 6 near here] Table 6, a portion of the Firm Orders workflow, is an interesting example for several reasons. First, it is a longer, more complex workflow that is a better representation of the benefits of using swim lanes. Second and more importantly, it reflects the flexible nature of this bottom-up approach. Initial swim lanes used an X to mark the column of the unit or person(s) responsible for each task (row) in the workflow. During the third session of process mapping and review, one staff member suggested using digits to represent primary responsibility (1) and backups (2 and possibly 3). Including this information allowed managers to identify which workflows had backup in the form of cross training and which would benefit from having additional staff trained to serve as backup. Allowing the output to change during a facilitated session demonstrated to people that the process is flexible, open to feedback, and something each staff member had the ability to influence.

Lessons Learned

The Firm Orders swim lane illustrates one of the two important lessons learned from these analyses. Table 6 is less than half of the full workflow, and the task

descriptions are noticeably detailed, making them more like procedures than simply the description of a workflow task. The difference between procedures and workflow diagram was clarified, but it could have happened earlier and with more examples. The division didn't have process diagrams or lists prior to this time, with one exception for troubleshooting electronic resources. Staff were more accustomed to detailed procedure documents. As previously mentioned, the frequency of LSP releases will make maintaining detailed procedures very difficult. Moreover, a higher view of the workflow may be sufficient in the LSP.

Collins and Wilson (2018) note that, when creating a workflow map, "The goal is to capture the flow of work — not to create detailed instructions." (p. 17) That means getting enough detail to analyze the process without including so much detail that the maps aren't useful (p. 17). Blake and Stalberg (2009) also address this dilemma: "Decisions needed to be made about how much and what types of information the diagrams would show. Rather than detail each and every aspect of how an item was processed, workflow maps were designed with a high-level view of department processes in mind." (p. 246)

In the business arena "organizations are finding Process Maps to be more useful than procedures manuals as a format for meeting the documentation requirement" (Rummler and Brache, 2013, p. 54). Conceivably, staff will transition from a procedures-oriented focus to one of process maps in the form of swim lanes. An added benefit of this desired transition in documentation may be shifting staff focus from "individual, isolated processes to more holistic or lifecycle-driven workflow. When staff are responsible for multiple stages…they become experts for entire processes, which encourages critical thinking and helps staff understand and direct change." (Collins and Wilson, 2018, p. 10)

One area in particular that epitomizes the importance of establishing boundaries between tasks in a workflow and the details of a procedure is cataloging. Cataloging details (fields, subfields, indicators, etc.) for particular formats are best left to procedures. Decisions about which workflows to analyze were not established prior to the introductory meeting for technical services in September 2018. As a result, catalogers chose workflows to analyze that were based on format, and the variations between them were technical and related to specific MARC fields. These workflows were too narrow for understanding how processes are completed across the division. Cataloging workflows are not meant to capture the work of cataloging but rather the process of materials arriving in the department, being evaluated for copy or original cataloging, and the necessary tasks in the LSP and other systems to complete the identified work. The best selection of cataloging workflows to begin with for this case study would have been copy cataloging, original cataloging, and enhancing master records.

The other major lesson learned was that workflow process analysis should be treated like a project. It is a bit confusing to talk of workflows but perform workflow analysis as a project. The author manages a program of projects for the division, but the analyses of workflows were not planned and managed as a project. Instead, the workflow analyses were treated as an extension of the workflows themselves. The problem with that approach was in the nature of project management. Project planning creates a beginning and an end by defining scope and expected outcomes, whereas workflows are sequences of tasks that continually repeat. While some analyses continued and were completed at varying levels of detail by unit managers, analysis of other workflows drifted to procedural level descriptions of the workflow tasks. By not treating the analyses as a project, there was no specific end defined, nor were all of the

workflows to be analyzed determined in advance. By utilizing at least two primary concepts of project management, scope and time management, initial workflow analysis for all technical services processes would have been better planned, initiated and executed.

Among others, Loring (2007) documented a project approach to improving efficiency and productivity of technical services operations, and Schmidt and Dulaney (2014) followed project management principles in the Pence Law Library reorganization. One of the three strategies Collins and Wilson (2018) used to create an agile environment was project management, and Blake and Stalberg (2009) conducted a comprehensive project to clarify and simplify serials and ERM. With respect to this case study, conducting a process inventory (Rummler and Brache) during a project planning process and adding a process relationship map to "…understand and display the network of processes required to run the business" (Rummler and Brache, 2013, p. 122) as an output document that was an element of the project scope would have proven advantageous.

Successful process improvement results in an affirmative answer to the question: "Is this the most efficient and effective process for accomplishing the Process Goals?" (Rummler and Brache, 2013, p. 54). By this measure, and unlike Godbout's (2006) results where there was a "measurable productivity improvement" (p. 63), the results of the workflow analyses for this case study indicated that this was a successful endeavor. However, as noted previously, two compelling reasons for the already-efficient processes were staff longevity and the length of time Aleph was in place at UAlbany. It stands to reason that reviewing these workflows in the new LSP will be necessary.

After documenting what Rummler and Brache (2013) referred to as "IS" processes and any associated disconnects, next steps included designing "SHOULD"

and “COULD BE” specifications and processes (p. 141). These could also be thought of as an “aspirational workflow map — one that shows how you would ideally like it to be done.” (Collins and Wilson, 2018, p. 17) When analyzing unknown possibilities for workflow improvements, workflow analysis in the new LSP may require a more top-down approach. Similar to institutions that implemented new workflows, collecting information about system capabilities and documented best practices from other Alma and Primo institutions, as opposed to brainstorming existing tasks, are collection methods to consider for the next round.

Conclusion

The author has used this methodology within technical service departments at other institutions with similar ease of understanding and ability to complete analyses. At a small institution, a meeting room with a large whiteboard was sufficient to capture a single workflow in one setting with minimal prep work. Previously unknown duplication of work was exposed and resolved, and turnarounds were identified and examined. These inefficient movements of materials were eliminated by rearranging the workflow so that each person could complete all tasks for the resource in question before handing off, whether physical or electronic.

In addition to workflow analysis at UAlbany, a medium-sized institution, the author facilitated workflow analysis for three SUNY institutions during the migration. The participants were from institutions that ranged from small, medium, to large in size, and the functionality covered technical services and resource sharing. The analysis followed the steps here but were compressed to a half-day session for the most critical electronic resource functions, with the understanding that interested participants would continue the process for other workflows as needed on their own. Utilizing this bottom-

up approach to data collection, a staff member familiar with the methodology could facilitate workflow analysis across all interested departments. The person facilitating does not need to know the workflows, they only need to ensure that the people who do know the workflow are included in the data collection, process mapping, and review.

Not all workflows may be analyzed during a single session, depending on the size of library. Department managers and unit supervisors, even individuals in smaller libraries, will be able to continue the workflow analysis process after understanding the methodology. Indeed, conducting initial analysis over several sessions may help staff transition to a new mindset of continuous improvement or iterative assessment. Equally important to performing the first analysis is understanding the necessity of this type of work as a routine part of technical services expectations: "Technical services must embrace a culture of assessment in order to keep pace with trends and stay in front of patrons' expectations for access to content." (Calvert and Jordan, 2019, p. 145)

This is no different than the approach utilized outside of libraries: "Process Management is a set of techniques for ensuring that key processes are continuously monitored and improved." (Rummler and Brache, 1995, p. 125) Furthermore, Rummler and Brache address 'Institutionalizing Process Management' by stressing that organizations have "…a permanent Process Team, which meets regularly to identify and implement Process Improvements" (1995, p.168). A key benefit of the methodology used in this case study is that it can be repeated as needed by the staff who perform the work. There are many precedents for this in the library arena. University of Michigan (Campbell et al., 2015) culturized workflow review by establishing a permanent team that spanned multiple units to manage workflow review projects. Collins and Wilson (2018) reiterated that workflow analysis for technical services should be an iterative

process and shared that NCSU has made workflow review a regular activity, reviewing each map every year or two.

The concept of transforming initial workflow analyses to a change in culture is probably best summarized by Loring (2007) who emphasized the need for an exit strategy to transition from the initial project to continuous assessment stating that "A challenge to any process-improvement project is to transform it into an ongoing effort so that the methods of process improvement are integrated into the way in which the organization regularly conducts its work." (p. 59)

Given that many libraries have limited budgets and staffing, it is critical to have the most efficient workflows possible. Furthermore, with more libraries moving toward LSPs that have regular releases no longer under control of libraries, it is essential to have a workflow analysis methodology that is not too complicated or time-consuming and can be carried out by the appropriate staff when needed. This type of iterative assessment will benefit from a collection method and a process mapping technique that are not overly burdensome to complete and with the resulting documentation in a format that is easy to update by any and all members of a unit. The technique for creating swim lanes documented here provides library units a way to embrace a culture of continuous improvement by providing a streamlined method and a simple tool. By extension, library operations will be positioned to support the organization and patrons in the best manner possible.

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Pub Year	Author(s)	Institution	Workflows	Lead	Focus	Approach	Collection Method	Output
2018	Collins & Wilson	NCSU	Tech Services	N/S	Process	Bottom Up	Job shadowing	Workflow Map
2017	Billings, Llamas, Snyder & Sung	U Michigan	Tech Services	Team, Working Group, Consultant	Both	Bottom Up	Staff survey, in-depth interviews	Workflow Maps (90), current state maps (5), value stream maps (2), working group recommendations (32)
2017	Stein, Applegate & Robbins	Univ of IL	*IR metadata review and cleanup	Team	Functional	Top Down	Metadata review and repository metadata element review	Numbered list of steps and workflow diagrams for QA review and batch ingest review
2016	Hamlett	CUNY Baruch	ERM	Librarian	Both	Bottom Up	Document analysis (DLF/ERMI, NISO, & more), interviews, meetings	Working functional requirements, workflow documents used to create color coded workflow diagrams
2016	Turner	Kennesaw State U	*eBook batch processing	Librarian	Functional	Bottom Up	Documentation analysis	"Life of" workflows
2015	Campbell, MacKintosh, Bahnmaier, Brown, Escobar & Shoecraft	U Michigan	ERM	Team	Both	Bottom Up	Individual or focus group interviews	Outline document, workflow charts (swim lanes with flowcharts embedded), network interconnections, staff responsibility matrix
2015	Gibson	IL State	Cat, Acq, Proc	Librarian	Both	Bottom Up	Paper flags, best practices at other libraries	Timeline by material and order type
2014	Dowdy & Raeford	Duke	*ERM & ERMS implementation	Team	Both	Bottom Up	Other published library ERM workflows, staff interviews	Staff responsibility matrix, workflow diagram flowchart
2014	Downey	Kent State	*DDA pilot	Team, YBP assist	Functional	Top Down	N/S	Process sequence list +
2014	Schmidt & Dulaney	American Univ	Tech services, esp ERM	Task Force	Both	Bottom Up	Document review	Staff and task list, issue list, position descriptions, procedures
2013	Sapon-White	OR State	*Ebook cat	Librarian and vendors	Functional	Top Down	N/S	Numbered list of tasks by vendor
2010	Hunt	Univ Warwick	Tech services, esp FRBR	External company	Both	N/S	N/S	Multiple, including swim lane Process Map
2009	Blake & Stalberg	NCSU	Serials and ER	Team	Both	Bottom Up	Interviews	Color-coded flowchart
2007	Andreadis, Barth, Cochrane & Greever	Denison & Kenyon	Tech Services	Task Force w/ Consultant	Functional	N/S	N/S	Work process model (initial & revised)

2007	Canepi	S. IL Univ	Tech services	N/S	Both	Top Down initial workflow draft; Bottom Up review and modified workflow	Workflow survey, job inventory questionnaire, daily activity tracking worksheet	Single workflow for Technical Services, unspecified format
2007	Godbout	Wells College	Tech services print	Team	Functional	Bottom Up	Top down Flowchart, Customer and Supplier Screens, Process Behavior Chart, Deployment Flowchart, Run Chart, Cause and Effect Diagram, Cause Analysis	Key Steps Worksheet
2007	Loring	Smith College	Tech Services	Steering Committee and Consultant	Both	Bottom Up	N/S	Flowcharts, cause and effect diagram
2007	Medeiros	Tri College Consortium	*ERM & ERMS implementation	Working Group	Both	Top Down	ER documents, publisher discussions, ERM white paper	Workflow documents, unknown format, stored in Blackboard
2006	Dragon & Barricella	E Carolina U	Tech services print	Team	Both	Bottom up	Flags in print materials	Path diagrams
2006	Graves & Arthur	Old Dom	Serials	Team	Functional	Top Down	Workflow charts created by individuals	Flowcharts, lists of recommendations, updated org chart
2006	Youngman	KSU	Acquisitions	Librarian and KSU Engineering Dept	Both	Bottom Up collection; Top Down recommendations	Interviews and empirical data	Detailed process map

Table 1. Literature Review Comparison Matrix. * denotes implementation of a new workflow or system

DDA Task	Collections	Acquisitions
Need online database form completed	X	
Database verify funds are available	X	X
Review existing licensing or seek a revised licensing is needed		X
Prepare CV order in Aleph		X
Send licensing to proper special fund office for signature		X
Troubleshooting special fund licensing		X
With signed license get counter signature		X
When fully executed license send activator email, notify systems to activate database via website		X
Notify all those who need to know it is accessible		X
Invoicing procedures		X

Table 2. Demand Driven Acquisitions (DDA) swim lane diagram.

Added Copy/Added Volume Tasks	Office Assistant II	Discovery Services Assistant	Office Assistant I	Library Clerk II	Students
Take Item off Shelf	X	X			
Find Record in ALEPH & Check Bib Record to ensure it is an exact match	X	X			
If discrepancy in Bib record, check OCLC for updated version. If so, overlay the record		X			
If no record match is found, send to Cataloging for Re-cat	X	X			
If item belongs to different record in ALEPH, add it there	X	X			
Locate Acquisitions created item; if no item (gift) create one; add barcode and update description	X	X			
Move order and item as needed		X			
Change 099 -> 090, then go to holdings record and update 852 $h and $i	X	X			
Write the call # tp verso	X	X			
Place on Added Volume Cart	X	X			
Consolidate materials to create one truck			X		
Review accuracy of physical item and the ALEPH record			X		
Fix errors or return to cataloger			X		

Print call # labels and other labels (as needed)			X		
Create end sheet, give truck to students			X		
Truck is processed				X	X
Review Truck and correct the errors				X	
Deliver materials to appropriate destination			X	X	X

Table 3. Added Copy/Added Volume swim lane diagram.

Copy Cataloging Task	Monograph Copy Cataloger	Acquisitions Library Clerk I	Acquisitions Library Clerk II	Acquisitions Library Clerk II	Acquisitions Library Clerk II	Other Metadata Services Staff
Search Aleph	X		X	X	X	X
Search OCLC & evaluate records	X		X	X	X	X
Add Holdings in OCLC	X		X	X	X	X
Validate Headings in OCLC	X		X	X	X	X
Overlay (599) with Aleph system number		tentative			X	X
Edit 3XX & 5XX in Aleph as needed	X		X	X	X	X
In Aleph, add holdings record	X		X	X	X	X
In Aleph, add Item record	X		X	X	X	X

Table 4. Swim lane diagram for LC Copy Cataloging firm orders.

eJournal Tasks	Subject Librarian	Director of Collections	eResources Coordinator	Discovery Dept	Library Systems	Collections Assistant	Acquisitions Dept
Select title journal, fill out order form	XX						
Review access method (IP, credentials)	XX	XX	XX				
Check if funding available	XX						
Approve order		XX					
Review order form and license, if applicable			XX				
Facilitate and finalize license approval process, if applicable			XX				
OCLC download, create order, and suppress record			XX				
Place order with vendor			XX				
Check product is turned on (available/accessible)			XX				
Notify workflow stakeholders on activation			XX				
Record order statistics (ARL)			XX				
Platform configuration, including branding & OpenURL resolver					XX		

Record admin credentials		XX	XX			XX	
Track in SS KB, verify on- and off-campus access, add/update proxy stanza if needed				XX			
Add holdings in OCLC (paid only not OA)				XX			
Notify workflow stakeholders that title is tracked in KB, reply to email				XX			
Download local eJournal bibs from SS file into ALEPH					XX		
When recorded loaded, resolve any load issues				XX			
RENEWAL							
Pull usage stats twice a year, check method, upload to system						XX	
Open order report created					XX		
Renewal: usage added to open order report, evaluate data for decision-making	XX	XX					XX
Renewal lists approved		XX					

Manage vendor renewal quote and notification process							XX
Notify vendor of renewal or cancelation							XX
Verify KB link from Minerva							XX
1-2 times a year, check access to titles in SS KB local holding resource, update if needed, track in SS KB collection if possible				XX			
Vendor negotiations for some cancellations	XX	XX					

Table 5. eJournal swim lane diagram for new orders and renewals.

Firm Order Tasks	Invoicing Clerk II	Monograph Clerk II	Serials Clerk II	Monographs Coordinator	Eresources Clerk II	Monographs Office Assistant I	Acquisitions Dept Head	Subject Librarians
Selection of Firm order for collection per Collection Department policy and budget.								X
Collect Purchase Requests in Outlook Folder "Order This", Gobi 3 and Order Basket (Or in Illiad for PODs)	1	1	2					
Process Purchase on Demand (POD) request via Illiad as rushes.		2		1				
Make sure all critical info is available such as price budget, collection, library note, notify, etc. Convert to US $ is necessary. More generally sort FMO, Special funds, or CCD		1 (GOBI)		1 (POD)	1 (Other)			
Identify Rushes / Stamp rush and place in a Rush folder.	1 (FMO)	1 (GOBI)		1 (POD)				
Identify location/collection and added copy for MetaData Services and Discovery Services		1 (GOBI)		1 (POD)	1 (Other)			

Highlight critical information to put into P.O. (Highlight notes for order log, serials, budget, notifies, etc.) Circle DDA's in Red. Note EBook or print. Identify Reserves / Rushes.		1 (GOBI)	2 (GOBI)		1 (Other)			
Identify Possible Serials		1 (GOBI)		1(POD)	1 (Other)			
Place highlighted purchase request in Vendor basket		1 (GOBI)	2 (GOBI)		1 (Other)			
Vendor Selection				1	2			
Highlighted purchase request with vendor either are given directly to staff or placed in prepare Purchase Order basket.				1	2			
Find and prepare Rush & POD orders, including searching ALEPH for duplicate.			1		1			
Bib record for order: If no duplicate, search OCLC and downloaded record into ALEPH. If no bib record is suitable create a brief record. (Refer to documents Downloading from OCLC and Create a record from Scratch).			1		1			

Transfer information for added copy (from #6) or also in and add Library note, if applicable.			1		1			
If duplicate and (not POD) staple a pink slip after filling in pertinent information. Place in Subject Librarian's mail box.			1		1			

Table 6. Beginning of Firm Order swim lane diagram.