Academic Libraries, Filtering, and the "Tyranny of Choice"

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Introduction

Choices are ubiquitous and expected in all aspects of life, from where we shop, to what we shop for, to how we obtain and consume media, food and information. Academic libraries are not immune. Our users demand a wide array of choices: different sources, formats, search options, and even study spaces and service points. Yet, with this focus on providing more choices, many people become overwhelmed and struggle to choose. Research backs this up, finding that more choices often lead to less satisfaction.[1] There is a challenging contradiction at play as people demand more choices while at the same time needing solutions for dealing with this requested abundance.

This challenge is exacerbated because providing more options also requires more human and financial resources. One major investment being made by academic libraries to expand choice is the adoption of discovery systems. These systems provide a single point of access to a massive central index that "aims to cover the body of academic library-oriented content."[2] Some libraries have begun to replace their traditional online catalogs with discovery systems as the main point of access for owned and licensed content and as a portal to un-owned content.[3] With limited resources many libraries have been motivated to find creative ways to expand access to choices in cost effective ways. One strategy, now widely adopted, to provide an abundance of choice with limited resources is Demand Driven Acquisitions (DDA). DDA is the practice of adding a large number of records to a catalog or discovery system that are not yet owned by the library. A purchase is triggered only when a title receives a certain level of usage. This practice allows the library to extend its' budget while simultaneously expanding access to content.

Both of these expansion-of-choice mechanisms incorporate filtering options designed to make the experience of choosing more manageable and efficient. Library discovery systems offer faceted navigation to help users hone in on the most relevant source(s). DDA filters out the manual process of selecting titles that was once under the sole purview of librarians. Another way of looking at DDA is that it removes the traditional filters (librarians) by letting users take on the role of deciding (filtering) some of what the library acquires. From this angle DDA can then be viewed as a workflow filter: an automated process that frees up time so librarians and library staff can focus on other priorities.

Alexander et al. define the role of online filters as "assist[ing] users with winnowing out the least applicable information to fit their...purpose more precisely."[4] For the purpose of this study we define filters broadly as mechanisms for narrowing, customizing, or even expanding options/content, depending on the parameters of the need. Filters can be externally applied or self-imposed, and so, by their very nature are contextual. For instance, children might view parental filters negatively, while parents view them as a necessity. Who decides when

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filters are applied and when they are not, and how transparent the filters are influences how they are experienced and received.

Alexander et al.'s description of filters as "assisting users" to meet an information need can just as easily describe the work of Reference and Instruction librarians. The connection between filtering and the work of librarians makes sense in light of the traditional view of librarians as gatekeepers.[5] Understanding gatekeeping as a form of manual filtering—librarians decide what to purchase and help users get to this content—and realizing that technology has automated the process of filtering, may lead one to conclude that the traditional role of librarians is, or will likely soon become obsolete.

This paper presents the results of a mixed methods study aimed at gaining insight into the use and perception of discovery system filters and librarians' perceptions of DDA. Library discovery systems and DDA are not often thought of in relation to each other, and that was part of our interest in studying them side by side. One represents a front end system and the other a backend system. They both present solutions to abundance (of information, work, and choice) while also serving as filters for the choices they provide.

Literature Review

Despite living in an information saturated age, Clay Shirky argues that we are not dealing with information overload. The real problem, he claims, is "filter failure."[6] By this he means that we are living in an era in which the cost of producing information has been drastically reduced, which in turn reduces the economic necessity of filtering for quality in advance of production and dissemination. Determining quality used to be the role of the publisher or editor, and after that critics, librarians, and booksellers. The Internet gives individuals unmediated access to massive amounts of information, which means that each individual is now responsible for determining the quality of information they encounter.

The idea of being presented with too much unfiltered information dovetails with Barry Schwartz's theory of "the tyranny of choice." Schwartz argued that without constraints to limit the freedom of choice, paralysis and chaos can ensue, becoming "a kind of self-defeating tyranny."[7] Freedom of choice becomes most problematic when faced with an abundance of options. "It is hard enough to gather the information and go through the deliberations needed to make the best choice among six options. To choose the best among 30 options is truly daunting. Therefore, rather than even try, people may disengage, choosing almost arbitrarily to get the process over with." Schwartz notes that too many choices "leaves people indecisive about what to do and why."[8] Putting the onus on individuals for dealing with the daunting problem of information abundance and filtering, also puts the blame on individuals if they cannot cope or adapt.

One way people have attempted to cope with "the tyranny of choice" is to seek technological solutions.[9] Email filters, relevance algorithms, personalization and recommendation systems are among the most common online filters. These filtering services must first build trust through consistently and reliably sorting and presenting results. Once trust is achieved, filters fade into the background. Trusting "search algorithms frees us from having to evaluate the inner workings and possible biases of tools that have become fixtures in our daily lives."[10] For most people, the outsourcing of filtering is a matter of convenience rather than something to be thoughtfully considered. Yet, a growing number of critics are warning of the dangers of relying on algorithms and other online filtering systems. For instance, Cohn argues that the ubiquity of online recommendations has "quietly replaced free choice."[11] He ominously warns that these "automated recommendations help to maintain dominant conservative ideologies and an economic status quo that continues to marginalize many."[12]

A more optimistic view of online filtering can be found when a hybrid approach is taken, combining human expertise with digital efficiency. For instance, Benedict Evans expressed his fascination with the trend of

websites culling shorter lists from longer lists. He described this as "use constraint: I don't want 500 options for restaurants, I want five." He noticed constraints being applied to a variety of industries, including food, fashion and music. At a certain point it becomes apparent that curation is necessary to deal with what Evans refers to as "the density problem" which he later equates to the "tyranny of choice." He acknowledges that presenting everything, as Amazon does, works in some cases, especially when people know what they are looking for. "But knowing what you want is not necessarily the starting point—that's what needs to happen along the funnel." In other words, discovering and then identifying what is wanted often happens through the search and filtering process. Evans convincingly argues that "a good bookshop is primarily a discovery platform. That is, it's more about the tables than the shelves. And the tables are lists, not inventory."[13] This comment connects to the challenges libraries are facing with discovery systems. Are these single search systems truly helping users discover what they need, or are we overwhelming them with our (unfiltered) inventory?

Search Filters

All discovery platforms provide faceted navigation[14] which helps to address "the universal need to narrow."[15] Faceted navigation presented a breakthrough in online searching by presenting a seamless transition between keyword searching and browsing.[16] Facets help more people construct "complex high-precision queries," more efficiently and quickly, which had previously been "beyond the skill of most users."[17]

Quite a few usability and transaction log studies have been conducted on library discovery platforms over the last seven years. For the purposes of this study, we have focused on those that look specifically at the use of facets and limiters. Kules et al. found that participants examined faceted navigation options second longest, after the results list. The researchers noted that "at some stages of the search process, participants' interaction with the facets appeared to be as important (or more important) than the results themselves." This was, in part, because students used facets to learn more about their topic and to identify "sub-topics for further investigation."[18]

Niu and Hemminger found that facets were used more often for topic than known item searches, corroborating Evans' point about searching for Amazon when you know what want. Niu and Hemminger identified one potential drawback of facets: in some searches they were criticized for presenting "too many choices."[19] These and other researchers advise that facets that cannot be easily understood by "average students" due to library jargon or terminology should be customized to ensure they are not unintentionally impeding discovery.[20] These tools that are meant to aid in discovery are being underutilized, leaving some to determine that facets don't work rather than recognizing that it's merely a design problem.[21] In contrast to the idea of facets presenting "choice overload," two other studies found that students simply ignored what they did not understand.[22] In either case, facets are not being used to their full potential.

Anxiety about over-filtering came up in Niu and Hemminger's study when "some participants remarked that they felt 'unsafe' using facets because facets narrowed the search from thousands of results to several results too quickly. During this filtering process, some valuable information might be excluded."[23] Trapido found that one of the most common causes of "failed" searches was "the selection of the wrong search index or a facet that was too restrictive to yield any results." Examination of these filter-failures "revealed several conceptual errors, typically stemming from a misunderstanding of the meaning and purpose of certain limiters."[24]

Workflow Filters

Within libraries, workflow filters often relate to Collections and Technical Services: copy cataloging, approval plans, and DDA, to name a few. Technology is crucial to the development of these filters as they tip the scale in terms of the cost-benefit advantage. Despite the benefit, workflow filters are often met with resistance, especially

if the filter is replacing work traditionally done by librarians. Filters can shift library priorities, which in turn transforms librarians' work and potentially their professional identities. Rick Anderson relayed his surprise at hearing from early-career librarians about "librarian-built, prediction-based collection[s]" being dead. Not because he wanted to preserve this type of collection, but because so many of his contemporaries had often (and loudly) rejected the idea of moving away from "traditional collection practices." If his anecdotal experience is true "it portends seismic changes to the library profession" since "historically, virtually all of the library's practices and service offerings have centered on that kind of collecting and that kind of collection."[25] This paradigm shift in collections is aligned with Steven Bell's vision for the changing role of librarians: from gatekeeper to gate opener.[26] The modern era requires different filters, and this in turn is requiring librarians to evolve and adapt.

DDA has been celebrated as a "disruptive technology"[27] and criticized for contributing to the "Amazonification of the online catalog."[28] Concerns abound regarding how DDA might impact the long term viability of library collections. Goedeken and Lawson explain that librarians "often take a longer view of the collection and its role in supporting the institution's educational mission. On the other hand, the patron is seeking information that solves an immediate problem... and any long-term research goals they may have are often not represented by the items they choose today."[29] Sens and Fonesca raised concerns about creating an imbalanced collection: "Is one patron's choice representative of general patron interest? Without the mediation of a librarian, will patrons select the best books, or the first they encounter?"[30] Price and McDonald attempted to alleviate this fear in a study that compared DDA and firm order ebook usage from eleven libraries. They found that user selected DDA ebooks were used at a significantly higher rate in terms of depth and breadth over the course of four years.[31]

There is often a misconception that DDA involves adding unfiltered content into a catalog or discovery system. DDA actually requires numerous human interventions before it is deployed. For instance, not all ebooks are DDA eligible, and not all ebook aggregators provide access to all eligible ebooks. The titles that could make up a library's DDA pool is often considerably pared down before librarians make decisions about subject, education level, or access model. Schmidt lists the areas of expertise required to develop a DDA program from Reference and Instruction as well as Technical Services librarians: "a DDA program is only as strong and effective as the intellectual work that has gone into its design."[32]

Methodology

This mixed methods study was conducted at two private institutions: the University of Southern California (USC), a large research university, and the Claremont Colleges, a medium sized consortium of seven colleges consisting of five liberal arts colleges and two graduate universities. We conducted a user study which involved interviews and a usability study, with the analysis of usage data from both institutions' discovery platforms. These two methods, analyzing usage and user testing, complement the limitations of the other.[33] Statistics related to facet usage was pulled from Google Analytics for USC's discovery system, *Summon*, from ProQuest, and Claremont's *WorldCat Discovery* (WCD), from OCLC. Since Claremont went live with WCD in July 2015, we reviewed usage for an 18 month period: July 2015–December 2016.

For our user study we recruited 10 students from USC and 17 librarians from both academic institutions. All of the students—5 graduate students and 5 undergraduates—worked in the technical services department of USC Libraries. These students had a range of majors: 2 arts & humanities (AH), 4 social sciences (SS), and 4 STEM. Even though they were student workers they did not receive formal, on-the-job training in the use of the discovery system interface, but several (4/10) disclosed that they had received course related library instruction in the past. Valentine and West's also recruited library student workers for their usability study and explained that "student library workers are surprisingly naïve researchers and can provide insights as valuable as those from the regular population."[34]

Of the 17 librarians recruited, 9 were from the Claremont Colleges Library and 8 were from USC Libraries. The breakdown by experience level was: 6 early-career librarians (1–6 years of professional experience); 5 mid-career librarians (7–17 years of professional experience); and 6 senior librarians (18+ of professional experience).

The librarians and students were asked different questions during the interview portion of the study, but all participants completed the same 4 usability tasks in their home library's discovery system (Appendix A). The pre-test was designed to encourage participants to reflect on the choices they make related to any online searching experience, not necessarily related to libraries. The post-test was designed to compare the experience of completing the usability tasks with the experience of using their preferred search tool. Both groups were asked a range of questions about ebooks. We were interested in why and when students chose to use ebooks, if at all. For librarians we were interested in their impression of ebook usage in the disciplines they supported and how they viewed DDA as impacting their work and the profession more broadly.

Results

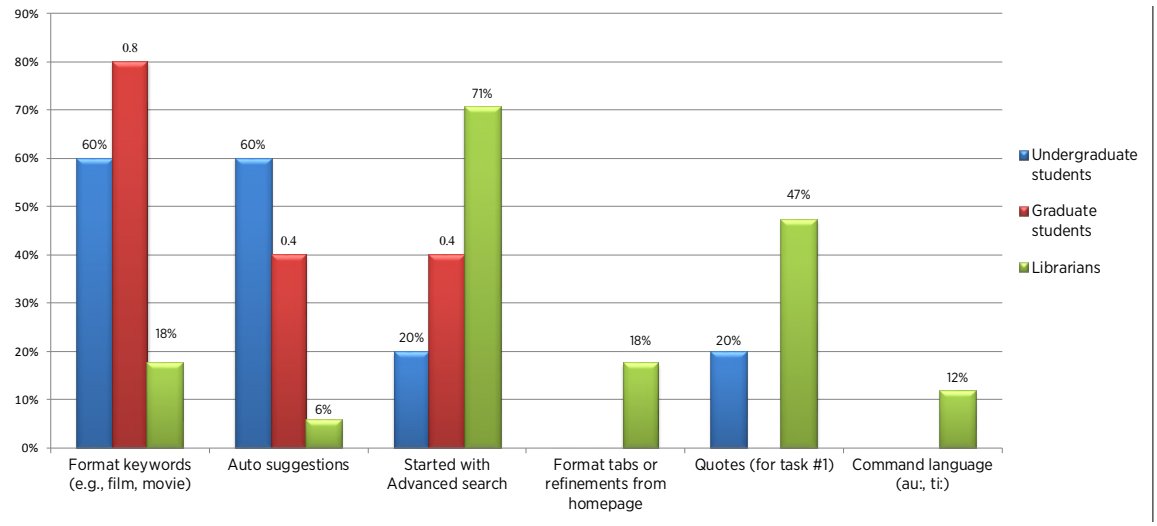
Library Discovery Systems

When launching WCD in July 2015, Claremont removed the traditional catalog from their website and set WCD's default search to return results from "Libraries Worldwide" in addition to local holdings and licensed content. This decision was aimed at harnessing the vast holdings of WorldCat to create a truly expansive discovery experience. USC, on the other hand, continues to maintain a separate catalog in addition to a discovery system. The default Summon search is set to search locally held and licensed full text content as well as records from over 100 core abstract & indexing databases. Summon does provide an option to "Add results beyond your library's collection" but users must choose this expansion option on their own.

Pre-filtering

For the purposes of this study, pre-filtering is defined as any action taken with the goal of filtering the results before hitting the search button. Post-filtering includes any action taken to filter results after deploying a search and reviewing the results. Post-filtering does not include abandoning a search and starting over. When this happened we treated it as a new search. Figure 1 provides an overview of how each user group used six different pre-filtering techniques for at least one of the four usability tasks.

FIGURE 1
Librarian and Student Use of Pre-Filters



Ninety-four percent (16/17) of librarians used pre-filtering techniques. Although not surprising, a few comments made by librarians might foretell a looming shift in attitude towards one form of pre-filtering: using the advanced search form. An early-career librarian noted, *"I prefer to do a little more work up front rather than later."* On the next search she explained that she defaults to advanced search because she *"likes to have as much control as possible from the beginning."* But then on the next two tasks, she uses the basic search box. We acknowledge that some of the librarians may have been performing "expert searching" for our benefit, which may explain this inconsistent approach. Another early-career librarian remarked: *"Advanced search is old school. Students don't use it, but librarians want to use that. Students don't want to spend a lot of time. This whole, 'let me stop and strategize' approach doesn't work with students. Their life is not about search strategies, it's about the work."*

One behavior that stood out to us was the use of format keywords by 70 percent (7/10) of the students and 18% (3/17) of the librarians for task #4 (finding the film, *Brazil*). This aligns with Georgas' study in which she observed 76 percent of students using format terms when searching Google for known items, while 59 percent included these terms when searching the library's federated search tool.[35] Georgas conjectured that students did not understand how information was "packaged" and that this packaging changes depending on context. In our study, one SS junior said she didn't want to have to apply a filter. *"If you put the word 'movie' in your search it should know that you are looking for the movie!"*

Over filtering

A senior librarian explained that he holds himself to a higher standard: *"given my background and professional expertise, I should be proficient and find something relatively easily."* He went on to say that *"I want to do the fewest clicks to get the most relevant information as possible. I don't want to fish around for stuff."* It was somewhat surprising then, when we found several librarians struggle to quickly and efficiently complete some of the tasks. For instance, Task #1 (APA article citation) was more challenging than expected for most participants since the authors inadvertently chose a citation with an error in it. Participants were not told there was an error, and many never realized there was one. Only 35 percent (6/17) of librarians and 30 percent of students (3/10) were successful in finding the article on their first attempt. Of the 11 librarians whose searches initially failed, 8 (73%) involved what we are calling "over-filtering." Of the 7 students whose searches failed, 4 (57%) involved over-filtering. By over-filtering we mean the user employed too many restrictions which hindered their effort to find the known item in question. The students who were successful in locating the article on their first attempt did not use any pre-filtering techniques. An AH graduate student captures the successful strategy that these students deployed: *"I would just type in the title and see if it came up."*

Of the 6 librarians who were successful in finding the article on the first try, 3 were more restrained in their use of search terms. They all entered only part of the title (one mid-career librarian entered only two "unique terms" from the title) and one author's last name. The other 3 librarians used a drill-down or tiered approach to find the article. They all started by searching for the journal title, then selecting the issue, then browsed to the article. Although not very efficient, they were all successful in finding the article on their first attempt.

Post-filtering

Both discovery systems provide a list of facets along the left side of the results page to help post-filter results. Summon allows for customization of these facets while WCD currently does not. Table 1 shows the order these facets are displayed on each library's discovery interface. We color-coded them to make it clear which were the corresponding facets when different labels are used. You will see that not a single facet is displayed in the same order across these two systems.

TABLE 1 Facets in Order of Display		
	Summon @USC	**WCD @Claremont**
1st	Refine your search (full text, peer reviewed)	Library (Libraries Worldwide, CRL, Claremont Colleges)
2nd	Content Type	Content (Full Text, Peer Reviewed)
3rd	Publication Date	Format
4th	Discipline	Databases
5th	Subject Terms	Author
6th	Language	Year
7th	Library Location	Language
8th	—	Topic

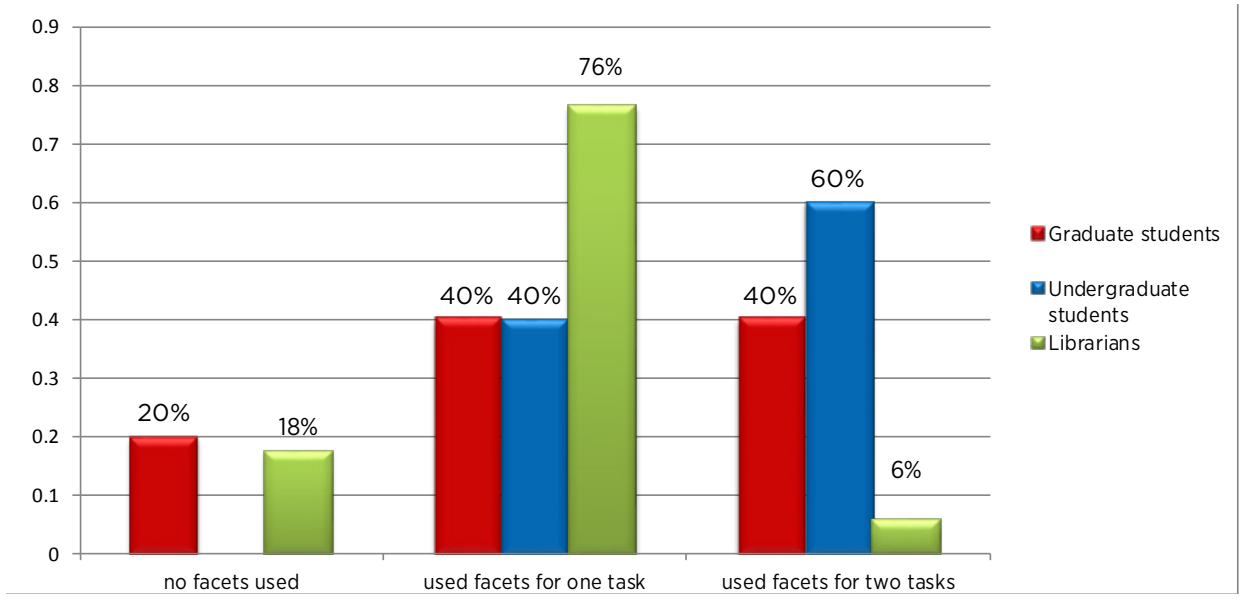
Table 2 lists the same facets but now in the order of their use, according to Google Analytics data from both institutions. With this change, two facet categories now lineup: content type/format is the most used facet at each institution, and publication date/year is the third most used. Claremont's decision to set its default search to show content from "Libraries Worldwide" is likely influencing the high use of this facet. It could also be more heavily used since there is no other option (a library catalog) for honing in on locally held content. Removing this facet, both libraries would share the same top four most used facets.

TABLE 2 Facets in Order of Use		
	Summon @USC	**WCD @Claremont**
1st	Content Type → 41%	Format → 54%
2nd	Refine your search (full text, peer reviewed) → 30%	Library (Libraries Worldwide, CRL, Claremont Colleges) → 19%
3rd	Publication Date → 18%	Year → 11%
4th	Discipline → 10%	Content (Full Text, Peer Reviewed) → 7%
5th	Language → 1%	Topic → 5%
6th	Library Location → 0.8%	Author → 4%
7th	Subject Terms → (no data)	Language → 2%
8th	—	Databases → 0.4%

The usability study revealed a lot of post-filtering facet usage, among librarians and students (figure 2).

90 percent of students (9/10) used the left navigation facets at least once, while 82 percent (14/17) of librarians did. Of the students who used these facets, 78 percent (7/9) struggled with them, either due to confusion about labels, lack of familiarity with facets, or because they failed to click the apply button after selecting a facet. All ten students expressed confusion about which facet to use or hesitated over choosing a facet, and in one case never did choose one, matching the results from several usability studies.[36] One example of this facet confusion involved task #4: finding the video, *Brazil.* 56 percent (5/9) of the students who used a facet tried several times to find the right facet to narrow their search to video, but struggled with the multiple options that looked viable: film, microfilm, streaming video, and video recording. Interestingly, two undergraduate students—a SS junior and a STEM senior—thought that videos might be in the Digital Library, a link on USC libraries' homepage.

FIGURE 2
Student and LIbrarian Use of Facets (Post-filtering)



When asked why he thought that, the senior responded as if it were so obvious, *"Because it's a movie."* On the positive side, one AH graduate student was pleasantly surprised at how straightforward it was to limit by date for task #2. He said he had never looked at the left side bar before and that he never pays attention to the publication year. The 3 librarians (2 senior and 1 early-career), on the other hand, who did not post-filter using facets all used the advanced search form for 3 of the 4 tasks. Interestingly, all three of these librarians were the ones who used the slow filtering technique of drilling-down, from journal to issue to find the article for task #1.

Ebooks

The 10 students who participated in the usability study made comments about ebooks that revealed an evenly split preference between e- and print books. Responses varied in describing when and why they used ebooks: 10 percent (1/10) preferred them for research, 40 percent (4/10) for school work, and 20 percent (2/10) used them for a variety of purposes: school work, research, and for pleasure. 30 percent (3/10) did not prefer ebooks, reluctantly using them, if at all. One SS sophomore explained, *"If I could get out of it [using ebooks], I would."*

When asked why they use or don't use ebooks, four students (2 juniors and 2 graduate students) commented on the cost and weight of print books. This reasoning comes as no surprise as the soaring cost of textbooks has led to affordability initiatives springing up across the country.[37] Carrying around heavy books is no longer necessary when a more convenient alternative is readily available to them.

The students that said they preferred using ebooks did not express much enthusiasm. Some explained that they liked dropping into a text and the ability to read a single passage or chapter. An AH graduate student explained that for research, "it needs to be quick." A SS junior said ebooks are "*cheaper and faster and easier to carry around one iPad with multiple textbooks with multiple books for different classes*." In a sense, these students use ebooks as a personal workflow filter that allows them to hone in on specific content and filter out the rest. Comments made by this sample of students suggest ebooks have a long way to go before becoming the format of choice.

Demand Driven Acquisitions

Almost all of the librarians referred to DDA as a welcome addition to the collection development process. A mid-career librarian shared his evolution of thought regarding DDA, from a rank-and-file librarian up to a management perspective. "*Initially I saw DDA as taking librarians jobs away.…But I have found, in the past few years, and starting with accepting higher managerial positions, that I like DDA more and rely on it. Time is different; the way to manage the collection is different.*" For this librarian, DDA replaced the detailed work he no longer had time to accomplish, but also changed his mindset in terms of relying on DDA as a mechanism for offering relevant content to users. This librarian goes on to say: "*It [the collection] reflects who came before me and faculty and students who used the collection over time. There is blending, a realization of plurality, of what goes into a collection and building it. You have to be open to a spectrum of people's opinions*."

Another mid-career librarian echoed a need for balance and for the value of curation: "*Buying things title by title is time consuming. [But] I don't think that I would like it if DDA was our whole collection. There needs to be some curation whether that's the pool of DDA titles or collections overall*." The amount of time collection development requires was a sticking point for two other librarians. A senior librarian said that DDA definitely helps with workload: DDA means that *"there are fewer books to order. Instruction, reference and helping faculty and students take priority over collection development*." An early-career librarian had a similar sentiment: *"having DDA takes some of that workload off*." DDA programs, operating in the background of their daily work, seem to help balance the modern demands placed on librarians.

Librarians in our study revealed that, as DDA has become more refined and more pervasive, concerns about it impacting our jobs and identities have begun to recede. Many of their comments also revealed that there is a need to keep subject librarians better informed about this invisible backend system. Librarians expressed confusion about what titles were included in the DDA pool, for instance. This study was also a reminder that librarians can and should be encouraged to give input and review DDA profiles, and be getting periodic updates about the titles being used and purchased. Lindsey Reno warns that librarian intervention in DDA is giving users "the illusion of choice." If we are pre-selecting which titles are included, it implies "that patrons cannot *really* be trusted to choose materials for the library."[38] Illusion of choice may be the hybrid approach that libraries need to make in order to balance the competing need for expanded access to information with the need for curation.

Recommendations

From our observations and analysis of usage data we have come up with a set of recommendations for how library filters can be best deployed, adapted and harnessed to address the tyranny of choice in our age of information abundance.

Un-learning

Librarians have an arsenal of strategies for searching for information. Yet, in the discovery system environment, many of these strategies can get in the way, leading to time wasted at best and failed searches at worst. Discovery was designed, in large part, for novices to be successful, but many librarians continue to rely on pre-discovery search strategies, providing more information than the system needs to return relevant results. Some un-learning of once essential approaches is necessary in order for librarians to become more effective in using these new search tools.

Learning to be Flexible

The first step in unlearning is to practice flexible searching. Two mid-career librarians embodied adaptable and

flexible searching. One stated, *"Failed or problematic searches don't faze me; clearly something I have done has caused this; it's never the system."* The second commented: *"the more I know about how a search tool works, the more I adapt myself to get what I need from it."* Although very different in their styles, both librarians approached searches with an open mind, not set on using a prescribed set of strategies. Flexible searchers rarely expressed frustration as they encountered problems, in part because they had already learned and adapted to the discovery environment, so when they did encounter problems they were minor. Approaching searching as a learning experience, taking in new information about how to be more efficient the next time, is what made these librarians more successful.

Lobbying for the User in For-Profit Environment

Libraries depend on corporations and some non-profit organizations to acquire new collections and services. A for-profit corporate ethos is intrinsic to the experience we have and with these companies and our users have with their products. Even with the best intentions, sales and market shares are what drive corporations. With this in mind, we, as customers, on behalf of our users, must lobby vendors to improve the user experience. In the case of discovery systems that means the ability to customize facet labeling and placement. For DDA vendors that means improving the overall experience of reading online so that these formats will become more preferable. As these new systems rapidly evolve, front line librarians who, on a daily basis, witness users struggle with navigating the online tyranny of resources, need to demand better systems from vendors.

Beware of Filtering Out the Margins

The prevalence of online filters begs the question: what if library filters are inadvertently filtering out important/relevant content? One mid-career librarian made this point about DDA. She expressed concern around issues of diversity and inclusivity, in regards to *"who feels empowered to make requests and what publishers are available…. What about the people not using the library? Are we narrowing the collection too much, then how do we encourage new users?*" DDA, if overly relied upon, has the potential to filter out certain groups of people or perspectives, which perpetuates the marginalization of groups who do not see themselves represented in our collections. How often do we scrutinize our systems and the way we configure them to ensure diverse perspectives are included? Setting default filters may prove helpful to some, but detrimental to others. As libraries deploy systems and tools produced by for-profit companies, we need to be vigilant and cognizant of the negative impact that filtering might have on various populations.

Trust Issues & Algorithmic Literacy

Lack of trust in discovery systems lead some librarians to pre-filter, which then lead to over-filtering, some of which resulted in failed searches. This caused frustration and in some cases motivated librarians to avoid or abandon the system altogether. Librarians from both institutions expressed different levels of frustration with their discovery systems: at the end of the user study, a senior librarian stated that her experience of searching Summon *"went the way I expected it, which is why I never use Summon [over the catalog]. Because I don't use it, then I am not as experienced in the nuances of how to use it as effectively as I should be."* An early-career librarian commented that when searching WCD she sometimes doesn't *"know why things come up"* and *"sometimes you get completely bizarre things."*

The cloud based nature discovery systems, allowing for regular updates, can create a complex, unpredictable, and inconsistent search experience. One way to build trust in the system is to ensure that reference and instruction librarians are regularly informed about improvements, and invited to make enhancements recom-

mendations. As Reidsma explains, discovery systems have made library search simpler, but at the same time, "the complex workings of our search tools have, like Google's, receded into a black box."[39] As our study shows, many librarians appear to be in the dark about how these black boxes work, just as much as students. Learning about the algorithms and processes that make discovery systems (and DDA) work will benefit librarians, helping them become better at getting the most out of these new systems, but also better at teaching students how to effectively use them.

Our side-by-side study of DDA and discovery systems reinforces the reality that changes are upon us, and will continue to be introduced at a faster rate. Librarians will need to evolve along with these changes, while staying anchored to the core mission of libraries. It is not so much how we deliver information and choices to our uses, but that we continue to provide access to information while being intentional, thoughtful, responsive, and nimble in how we provide users with the information.

Appendix A. Interview Questions & Usability Tasks

Pre-usability questions

1. What are your expectations of a search tool when searching (for anything, not necessarily for library research)?
2. What do you expect to see in your search results?
3. What is your current favorite or first place to start searching? Why?

Questions only asked of Students

1. Have you had 1 or more class sessions taught by a librarian?
2. At USC/Claremont, what types of interactions have you had with librarians?
3. Do you use or prefer ebooks?
    a. If yes, for pleasure or research (or both)?
    b. If no, why not?
    c. If no, what would make you use them?
    d. If yes, are you a recent convert to ebooks?
        i. What instigated your conversion?
    e. Does [your use or lack of use] have to do with the library's holdings in your area, e-readers available or something else?

Questions only asked of Librarians

1. What is your impression of the attitudes towards ebooks in your subject areas?
2. How did you handle ordering ebooks before DDA was implemented (if at all)?
3. What is your understanding of DDA (at USC/Claremont)?
4. What are your perceptions or opinions about DDA
5. Does DDA help or impede your collection development process?
6. (Considering the big picture) How do you think DDA has impacted libraries overall?
7. How do you think DDA has impacted librarians, users and teaching faculty?

Usability Scenarios

1. Locate the full text of this article:
   Lee, Y. M, & Greene, G. J. (2003) A teaching framework for transformative learning in social work education. *Journal of Ethnic and Cultural Diversity in Social Work*, 12(3) 1–28.
2. Show us how you would approach finding a book about the civil rights movement in 1960s America.
3. From within these results, how would you approach finding a book published within the last 5 years?
4. Show how you would go about finding a copy of Orwell's 1949 classic novel, titled *1984*.
5. Show us how you would go about finding the movie *Brazil*, first released in 1985.

Post-usability questions:

1. How do/did your expectations match up to the reality of the (Library's main) search option?
2. How do/did your expectations match up to the reality of the search results?
3. How did this experience match up to your experiences with Google, Amazon, (the library's catalog), etc.?

Notes

1. Barry Schwartz, "Self-Determination: The Tyranny of Freedom," *American Psychologist* 55, no. 1 (January 2000): 79–88, doi:10.1037/0003-066X.55.1.79.
2. Marshall Breeding, "The Future of Library Resource Discovery," A white paper commissioned by the NISO Discovery to Delivery Topic Committee (February 2015): 2–4, http://www.niso.org/apps/group_public/download.php/14487/future_library_resource_discovery.
3. Erika Johnson and Kristin E. Martin, "Discovery Layers vs. the Traditional Catalog: e-Forum Summary," *ALCTS News* (December 9, 2015), http://www.ala.org/alctsnews/features/e-forum-discovery-layers.
4. Bryan Alexander, Kim Barrett, Sioux Cumming, Patrick Herron, Claudia Holland, Kathleen Keane, Joyce Ogburn, Jake Orlowitz, Mary Augusta Thomas, and Jeff Tsao, "Report from the Information Overload and Underload Workgroup," *Open Scholarship Initiative Proceedings* 1 (2016): 3, doi:10.13021/G8R30G.
5. Steven Bell, "From Gatekeepers to Gate Openers," *American Libraries* 40 no. 8/9 (August/September 2009): 50–3.
6. Clay Shirky, "It's Not Information Overload. It's Filter Failure," *Web 2.0 Expo NY* video, 23:50. Filmed September 19, 2008, https://www.youtube.com/watch?v=LabqeJEOQyI.
7. Schwartz, "Self-Determination," 87, 81.
8. Ibid., 86–87.
9. Peter Melinat, Tolja Kreuzkam, and Dirk Stamer, "Information Overload: A Systematic Literature Review," *Lecture Notes in Business Information Processing* 194 (2014): 83.
10. Matthew Reidsma, "Algorithmic Bias in Library Discovery Systems," *Matthew Reidsma*, (March 11, 2016), https://matthew.reidsrow.com/articles/173.
11. Jonathan Cohn, "Postfeminist Technologies: Digital Media and the Culture Industries of Choice," (PhD diss., UCLA, 2013): 12, https://escholarship.org/uc/item/3tg184z1.
12. Ibid., 4–5.
13. Benedict Evans, "Lists Are the New Search," *Benedict Evans*, last modified January 31, 2016, http://ben-evans.com/benedictevans/2016/1/31/lists-are-the-new-search.
14. David Nelson and Linda Turney, "What's In a Word? Rethinking Facet Headings in a Discovery Service," *Information Technology & Libraries* 34 no. 2 (2015): 83, doi:10.6017/ital.v34i2.5629; Breeding, "The Future of Library Resource Discovery," 2.
15. Jeffery Callender and Morville Peter, "Design Patterns: Faceted Navigation," *A List Apart*, last updated on April 20, 2010, http://alistapart.com/article/design-patterns-faceted-navigation.
16. Irina Trapido, "Library Discovery Products: Discovering User Expectations through Failure Analysis," *Information Technology and Libraries* 35, no. 3 (September 30, 2016): 10, doi:10.6017/ital.v35i3.9190; Bill Kules et al., "What Do Exploratory Searchers Look at in a Faceted Search Interface?," in *Proceedings of the 9th ACM/IEEE-CS Joint Conference on Digital Libraries*, JCDL '09 (New York, NY, USA: ACM, 2009), 313, doi:10.1145/1555400.1555452.
17. Paul Hugh Cleverley and Simon Burnett, "Retrieving Haystacks: A Data Driven Information Needs Model for Faceted Search," *Journal of Information Science* 41, no. 1 (February 1, 2015): 99, doi:10.1177/0165551514554522; Nelson and Turney, "What's In a Word?" 80.
18. Kules et al., "What Do Exploratory Searchers Look at," 320.
19. Xi Niu and Bradley Hemminger, "Analyzing the Interaction Patterns in a Faceted Search Interface," *Journal of the Association for Information Science and Technology* 66, no. 5 (May 1, 2015): 1036,1042, doi:10.1002/asi.23227.
20. Niu and Hemminger, "Analyzing the Interaction Patterns," 1043; Nelson and Turney, "What's In a Word?" 78; Barbara Valentine and Beth West, "Improving Primo Usability and Teachability with Help from the Users," *Journal of Web Librarianship* 10, no. 3 (2016): 185, doi:http://dx.doi.org/10.1080/19322909.2016.1190678.
21. Nelson and Turney, "What's In a Word?" 84.
22. Valentine and White, "Improving Primo," 27–8; Nelson and Turney, "What's In a Word?" 87.
23. Niu and Hemminger, "Analyzing the Interaction Patterns," 1043.
24. Trapido, "Library Discovery Products," 15.
25. Rick Anderson, "The Death of the Collection and the Necessity of Library-Publisher Collaboration: Young Librarians on the Future of Libraries," *The Scholarly Kitchen*, November 17, 2015, https://scholarlykitchen.sspnet.org/2015/11/17/the-death-of-the-collection-and-the-necessity-of-library-publisher-collaboration-young-librarians-on-the-future-of-libraries/.
26. Bell, "From Gatekeepers."
27. Edward A. Goedeken and Karen Lawson, "The Past, Present, and Future of Demand-Driven Acquisitions in Academic Libraries," *College & Research Libraries* 76 no. 2 (2015); Jane Schmidt, "Demand-driven Acquisitions: The Hegemony of the Canon Interrupted," 2015 ACRL Conference Proceedings (2015): 168.
28. Jean-Mark Sens and Anthony J. Fonseca, "A Skeptic's View of Patron-Driven Acquisitions: Is it Time to ask the Tough Questions?" *Technical Services Quarterly* 30 no. 4 (2013): 360, doi: 10.1080/07317131.2013.81849.
29. Goedeken and Lawson, "The Past, Present, and Future," 217.
30. Sens and Fonesca, "A Skeptic's View," 365.

31. Jason Price and John McDonald, "Beguiled by Bananas: A Retrospective Study of the Usage and Breadth of Patron vs. Librarian Acquired eBook Collections," *Library Staff Publications and Research*, Paper 9. (2009): 6, http://scholarship.claremont.edu/library_staff/9.
32. Schmidt, "Demand-driven Acquisitions," 170.
33. Niu and Hemminger, "Analyzing the Interaction Patterns," 1032.
34. Valentine and West, "Improving Primo," 11.
35. Helen Georgas, "Google vs. the Library (Part II): Student Search Patterns and Behaviors When Using Google and a Federated Search Tool," *Portal: Libraries and the Academy* 14 no. 4 (2014): 511–12, 527, doi:10.1353/pla.2014.0034.
36. Niu and Hemminger, "Analyzing the Interaction Patterns," 1043; Nelson and Turney, "What's In a Word?" 78; Valentine and West, "Improving Primo," 185.
37. California Legislation Information, AB-798 College Textbook Affordability Act of 2015, http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB798
38. Lindsey Reno, "Out of the Shadows: A Public Face for Acquisitions in Academic Libraries," *Against the Grain* 24 no. 6 (2013): 22, http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=6224&context=atg.
39. Reidsma, "Algorithmic Bias."