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This study examines how individuals at the University of North Carolina at Chapel Hill engage in certain resource retrieval actions when searching for peer-reviewed scholarly literature. A campus-wide survey was distributed to students, faculty, and staff of various disciplines in order to collect information and opinions on specific retrieval methods. Responses suggest that resource retrieval actions are influenced by the user's status, their discipline affiliation, and the reason for their information need. The data also shows that the majority of UNC-CH patrons do not know how to request an electronic, peer-reviewed resource through the Library system. This study shows the need for more comprehensive outreach and education regarding electronic resources, especially as the Library continues to navigate new scholarly communication environments.

Headings:

Information Needs

Information-Seeking Behavior

Academic Libraries

Scholarly Communication

Surveys -- Information Needs

BUY, BORROW, OR STEAL: PATTERNS IN SEARCHING
FOR SCHOLARLY LITERATURE

by
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Introduction

A “serials crisis” has been developing in the academic library community for decades. Since the 1970s, and perhaps even earlier, scholars were talking about surging subscription prices for peer-reviewed academic journals (also referred to as “serials” or “periodicals”). By the 1980s, they were wondering what would happen “if present trends continue” and began saying it was “the most serious problem of librarianship in the 1980s” (Houbeck, 1988).

Looking at data from 1987, researchers sponsored by the Association of Library Collections and Technical Services (ALCTS) found that the average cost of a journal produced in the United States increased by 10%, while the Consumer Price Index (CPI) increased by just 1.9% (Knapp & Lenzini, 1987). This trend continued year after year. Ten years later, in 1997, journal prices were still increasing by 9.9% while the CPI increased by 2.3% (Alexander, 1998). Although the percentage increased has slowly levelled off throughout the years, it has consistently remained well above the annual rate of inflation.

Within 30 years, the average price of a U.S. periodical increased from \$71.41 in 1987 to \$1,265.92 in 2017. This is an increase of 1,672.75% (Aulisio, n.d.; Knapp & Lenzini, 1987). Why and how did this happen? And more importantly, how is this crisis affecting libraries and their patrons?

This research study aims to examine how individuals at the University of North Carolina at Chapel Hill (UNC-CH) are accessing digital articles and journals when they are unable to locate those resources through the Library's website. It also looks at why certain access patterns may be more prevalent than others. More specifically, the following research questions will be addressed:

1. When patrons need to access articles/journals that are unavailable in UNC-CH subscriptions, what actions do they take in an attempt to gain access?
2. Are certain actions more prevalent among specific groups in the patron population?
3. Based on patron experiences with interlibrary loan (ILL), would this service be a viable stand-in for immediate access?

Literature Review

Background

The first academic journals were published in 1665 by the Royal Society of London, marking the start of a revolution in the way scholars distributed and attributed knowledge. Prior to the establishment of academic journals, scholars communicated with each other through personal letters, society meetings, and monographs. As more scholars entered academia and contributed to the growing corpus of scientific advancements, these methods proved to be unwieldy for many; not only did it take too long to disseminate information, but it was also difficult to establish intellectual ownership of findings. Academic journals provided a feasible solution for scholarly communications, allowing scientific findings to be distributed widely and preserving the findings in a format that allowed for proper author attribution (Larivière, Haustein, & Mongeon, 2015). Journal publishing was slow to start but increased dramatically during the 1800s, going from roughly 100 published journals in 1800 to around 10,000 by 1900 (Dawson, Lintott, & Shuttleworth, 2015). For the most part, journals were refereed and published by scholarly societies, but commercial publishers also appeared during this period of rapid growth (Larivière et al., 2015).

Today, academic journals have largely been viewed as “the embodiment of scientific discovery, and as the basis of scientific authority and reputation” (Dawson & Topham, 2020). Unlike popular magazines and newspapers, academic journals get very

little – if any at all – revenue from advertisements. Instead, they rely almost solely on subscription fees (McGuigan, 2004). Another major distinction of academic journals is the rigorous peer review process that occurs when an author submits an article for publication. Review boards are typically comprised of experts in the field who analyze article submissions and determine if an article meets the journal’s standards for publication.

Although they occupy different roles in the publication process, peer reviewers and authors have two things in common: these individuals are largely employed by universities and are often motivated to participate in scholarly publications for professional recognition and tenure. Upon being hired by a university for a tenure-track position, faculty members are typically given a set of achievements they must meet within a certain time period. Houbeck (1988) stated that, beginning in the 1960s, the pressure to publish started to increase dramatically. This pressure has only intensified in recent years. In fact, as De Rond (2005) explained, junior faculty members seeking tenure “are often forced to play a numbers game...where the criteria for tenure are likely to be some function of the number of articles published and the relative prestige of their outlets.” The adage “publish or perish” has become a well-known phrase to describe this process, wherein it’s widely accepted that if a scholar fails to publish enough articles in the proper journals, the possibility of achieving tenure and succeeding in academia is out of reach. For scholars who are not seeking tenure or who have already achieved it, other markers of professional esteem, such as obtaining grants, contract renewals, and promotions, may also depend on getting published or participating as referees on peer review boards (De Rond, 2005; Meyer, 1997).

It is important to note here a very critical piece of the journal publication process: when authors submit articles for publication, and when scholars work on editorial boards as peer reviewers, they are not getting paid by the journal (Houbeck, 1988; McGuigan, 2004; Meyer, 1997; Peek, 1996). As De Rond (2005) explained, the “payment” is that publication of one’s work “affords membership to increasingly privileged societies of scholars and, ultimately, serves an existential purpose in enabling us to leave our fingerprints on the intellectual history of our disciplines.”

Over recent decades there has been a stark increase in the number of researchers seeking to publish, and there was a boom of new journals on the market in the mid-1900s as a result of increased attention to scientific advancements (Krier, Premo, & Wegmann, 2019). This has created a unique “supply and demand” relationship where the consumers demanding the product are actually the potential authors who wish to publish articles, rather than the readers who want to access journal articles.

Corporate publishers began taking note of this burgeoning industry and, during the 1970s, they began buying out or partnering with journals that had been published by smaller non-profit groups (Steinberg, 2015). In situations where scholarly societies are still currently responsible for publishing a journal, they occasionally choose to raise subscription prices in order to offset member dues to the society (Meyer, 1997). The American Chemical Society is the top example of a scholarly society operating much like a corporate publisher in this respect. However, data suggests that non-profit publishers, such as scholarly societies, tend to have much lower subscription prices; in some cases, journals produced by commercial for-profit publishers can be up to three or four times

more expensive than similar journals published by non-profit groups (Bergstrom, Courant, McAfee, & Williams, 2014; Frazier, 2001).

The subscription fee system is, at its core, very simple: publishers have one fee for individuals and another set of fees for large institutions, like university libraries. The institutional subscription fees are significantly higher because multiple people can read the article when it's available at a university library (McGuigan, 2004). This payment model ignored the fact that an individual with a personal subscription could choose to make copies of an article and share it indiscriminately, but this was expensive and time-consuming to do when journals were primarily published in print and therefore it wasn't a major threat to business. Now that journals exist primarily online, it's much easier to share articles – but it's also much easier for publishers to track when articles have been downloaded or shared (Bergstrom et al., 2014; Meyer, 1997; Peek, 1996).

Digitizing the Peer-Reviewed Article

Scholarly communications have undergone several major changes in the past 350 years: the transition from handwritten letters to printed journals, and then the transition from print journals to electronic journals roughly 300 years later, both prove that this industry can adapt as the needs of academics change. However, even though individual scholars may be liberal and innovative, academia is notoriously conservative and disinclined to change (Schmitt, 2018). The shift from paper journals to electronic journals has been a slow transition. Many incremental changes occurred only as an inevitable result of the outside world becoming digitized.

Prior to the widespread digitization of academic journals, publishers played crucial roles in the production and dissemination of articles (Meyer, 1997; Rowe, 1996). Rather than embracing the potential benefits that technology could bring to journal collections, publishers began providing electronic subscriptions as a way of protecting their roles as providers of print resources. As Boissy and Schatz (2011) explain, publishers initially only offered the online version of a journal for free when a library also purchased a subscription for the print edition. When they began offering standalone electronic subscriptions, publishers did not offer price reductions, despite the fact that they were no longer paying for manufacturing and mailing, nor did they assist librarians in learning the skills and technology needed to manage electronic resources.

Publishers have fervently defended their efforts to keep internal publishing costs low. Marks and Janke (2012) of SAGE Publications argued that several elements of digitization have been expensive: first the initial investments of setting up journal websites, followed by high costs of bringing in skilled workers with technical knowledge to publish content online, and lastly the time and expertise required to handle subscription contract negotiations (Davies, 2012).

Houbeck (1988) has noted that “as organizations grow and age, unless they have strong market incentives to police their costs, ever larger portions of their budgets are consumed in nonproductive internal activities.” In most industries, competition serves as these “strong market incentives” and it inherently forces companies to keep their prices low. However, competition is notably absent from the academic journal landscape – at least for the publishers. Though several journals may focus on the same specialties, the content (i.e., the articles) in each journal is completely unique. This gives each journal its

own distinct reputation in the field, with some journals holding more prestige than others. As Meyer (1997) stated, “every individual scholarly publication is a monopoly to some degree – there are no perfect substitutes for any given journal.” Nothing ever prevents new journals from popping up on the market – and many do, as a result of increased demand by researchers who want to publish – but these new additions are rarely able to serve as true competitors simply because they can’t publish the same content and because they don’t have the prestige of a long-established title with a high impact factor (Davies, 2012; Meyer, 1997).

Furthermore, there’s a sentiment that journals manufactured by well-known publishers are somehow more credible and trustworthy (Peek, 1996; Steinberg, 2015). This notion is particularly evident when discussing open access journals (Schmitt, 2018). As Rawlins (1993) theorized when discussing the publication of monographs, “[a]s the number of books published per day mushrooms, the value of the publisher’s editors and their reputation will increase. The publisher functions as a stamp of approval, a selector, and a collator.”

This power imbalance inevitably gives corporate publishers the upper hand. McGuigan (2004) described the situation as a “low price elasticity of demand,” wherein demand for a product isn’t necessarily indicative of its price. When two products are equal in value and quality, consumers will tend to choose the lower-priced product over the higher-priced product, and therefore there will be higher demand for the lower-priced option. When a single product exists without competition, the price of the product does not necessarily correlate with its demand; if consumers need to purchase it, they’ll purchase it regardless of what it costs.

Insofar as this relates to academic journals, a publisher may note that certain prestigious journal titles are in high demand and could choose to raise the subscription prices, knowing that the demand likely won't decrease. When this happens enough times, and to enough titles, libraries may be forced to sever subscriptions to those prestigious journals. If this mimicked other industries, the publisher might notice the decrease in subscriptions and choose to lower subscription prices in order to maintain the highest possible revenue.

However, the academic journal market is not like other markets. Rather than lower prices, corporate publishers are more likely to raise subscription prices to account for the loss of other subscriptions, knowing that some libraries with larger budgets will be willing and able to continue paying. After all, there are no suitable replacements for those prestigious journals patrons want to access (Houbeck, 1988; Krier et al., 2019). Higher costs per journal, coupled with stagnating or decreasing budgets, ultimately means libraries will be less likely to purchase subscriptions to newer, smaller journals that might otherwise become viable competitors to existing journals (Boissy & Schatz, 2011; Prosser, 2011). As Houbeck (1988) explained, “[t]he library market must be one of the few segments in the economy where a seller can freeze out competition by raising his price.”

What's the “Big Deal”?

Frazier (2001) was the first to use the phrase “Big Deal” to describe a new type of subscription package that journal publishers began offering to libraries. He defined a Big Deal subscription as “an online aggregation of journals that publishers offer as a one-

price, one size fits all package.” As defined by Bergstrom et al. (2014) and Frazier (2001)

the following points define the key features of a Big Deal subscription:

1. A Big Deal package is a collection of “core” journals, typically for a specific discipline, picked out by the publisher. Many scholars liken this “bundling” to the way cable companies have offered television channels to consumers.
2. The Deal is offered almost exclusively for online versions of journals. Initially these Deals offered libraries a financial incentive to convert from print journal subscriptions to digital subscriptions.
3. Big Deals involve multi-year contracts. Usually these contracts are for three years but some may go up to five years.
4. The price for a Big Deal subscription package is far lower than what a library would pay if they subscribed to each journal in the package à la carte. Using one of the most popular bundles, the “Freedom Collection” from Elsevier, Bergstrom et al. (2014) found that if an institution paid for each journal à la carte in 2009, it would have cost around \$3.1 million; the average cost for this package in 2009, however, was just \$1.2 million.
5. Prices for Big Deals are not the same across the board for all institutions. Bergstrom et al. (2014) found there was a wide range of prices that institutions actually paid for the “Freedom Collection” in 2009: the University of Georgia paid around \$1.9 million for the collection while the University of Wisconsin paid around \$1.2 million, despite the fact that Wisconsin had a larger patron population.
6. Prices incrementally increase each year. Literature suggests that price increases often range from 5-7% each year, although some institutions have been able to negotiate much lower increases around 1-2%.
7. Institutions that sign Big Deals are required to sign nondisclosure agreements wherein they are prohibited from sharing any information about the contract, including the price.

Big Deals were initially attractive to libraries for two main reasons. First, with a Big Deal, libraries of all sizes could provide their patrons with large collections of journals that might otherwise be impossible to access. It’s no secret that libraries have suffered massive budget cuts and funding stagnation over recent decades. Under a Big

Deal, small libraries can band together as a consortium and together their smaller budgets can pay for a Big Deal package. This allows each library to enjoy an unprecedented number of titles that they never could have afforded alone (Boissy & Schatz, 2011; Houbeck, 1988). Large libraries too can benefit and feel as though they're back in "the glory days of 'comprehensive collecting'" (Frazier, 2001). Research-intensive universities with a broad range of disciplines to support can obtain continuous, instant access to specialized journals that might otherwise be out of their price range. This is particularly important for institutions that support researchers in the health sciences and natural sciences, who generally depend far more on academic journals than scholars in the social sciences and humanities (Lemley & Li, 2015; Meyer, 1997; Peek, 1996).

Second, Big Deals allow libraries to bypass the time-consuming process of resource evaluation and selection. Traditionally, librarians involved in collection development have had to research and evaluate each potential title before subscribing to it. This skilled labor is highly expensive for libraries. With a Big Deal, the publisher has done the arduous work of determining which journals are "essential" for specific disciplines (Lemley & Li, 2015).

However, over the years, scholars and librarians have discovered that there are many disadvantages of Big Deals. First, a Big Deal is an all-or-nothing subscription. These Deals do not allow for libraries to discontinue subscriptions to specific journals that are included in the package. Second, corporate publishers develop these packages in a way that bundles highly coveted journal subscriptions with inexpensive titles that, given the choice, libraries likely wouldn't pay for. As Frazier (2001) explained, "the principal hazard of the Big Deal [is that] it bundles the strongest with the weakest publisher titles,

the essential with the non-essential.” Because of this, libraries have realized that after they have subscribed to a Big Deal package, it becomes virtually impossible to leave it once the contract is up: If a library can no longer afford the Big Deal package in its entirety, it cannot simply cut subscriptions that get little use and keep those that get high use. Its only option is to leave the Big Deal altogether and return to à la carte subscriptions, resulting in a much smaller body of accessible literature for patrons.

The Present-Day Serials Crisis

All of these factors have combined into one overarching problem in the academic library world: libraries simply cannot afford to pay what are now exorbitant subscription fees, and so they end up cancelling subscriptions, causing their patrons to lose access to important resources. Many institutions have begun pushing back against publishers and Big Deals. The University of California library system, which serves libraries across ten campuses, chose to end its annual \$11 million “ScienceDirect” bundle with Elsevier in 2019 in an act of defiance that sent shock waves through academic library communities and into the popular media (Kell, 2019; Resnick & Belluz, 2019). Elaine Westbrook, University Librarian at the University of North Carolina at Chapel Hill, has been very vocal about standing up to commercial publishers and discouraging the practice of “double dipping” – i.e., charging institutions multiple times for the same content (The Well, 2019). In early April 2020, Westbrook and others on the Library leadership team announced that UNC-CH, too, would be ending its Big Deal with Elsevier because the annual price increases of \$2.9 million were simply untenable moving forward. The Library went from subscribing to approximately 2,000 Elsevier journal titles to just 395

subscriptions, effectively demonstrating how expensive subscriptions can be when purchased à la carte and why libraries often feel that they have no option but to pay exorbitant annual price increases (Blouin & Westbrook, 2020).

The most common strategy for mitigating title losses is to turn to interlibrary loan (ILL), although ILL has held a tenuous spot in library services over the years. Initially seen as a minor complementary offering to core library services, it has since evolved into an essential service that keeps libraries functional and relevant. Initially, most libraries deployed their ILL services for physical items that other libraries held in their collections. Today, academic libraries regularly use ILL partnerships to send and receive digital PDF copies of single articles. This allows libraries to give patrons access to a wider range of literature on demand.

As the digital age drew nearer, many scholars in the late 1990s-early 2000s issued prophecies about where the future of ILL was headed. One predominant theory – and one that has manifested clearly over the past two decades – was that ILL would continue to be relevant but patron satisfaction would begin to wane (McHone-Chase, 2010). New technology has enabled greater information sharing than ever before. Scholars conducting research have virtually unlimited resources at their hands. This sounds like something every library professional would be applauding, but as Mchone-Chase (2010) explained, “[i]ncreased use of databases, WorldCat, Google, and the like... [are] finding more obscure or esoteric citations, and because those citations were found so easily, users believe that the physical items must also then be easy to obtain.”

Not only are scholars able to access a greater body of potential sources; they’re also able to locate many of these sources instantaneously. Now that many libraries offer

electronic document delivery for digital articles, research suggests that patrons expect (or at least want) these digital ILL services to produce results as fast as possible – ideally instantly, as though the document were in the library’s collections. Furthermore, patron satisfaction of ILL services appears to be connected to their prior Web experiences, and most notably to Google (Kenefick & DeVito, 2013). Widespread use of simple and prompt search engines like Google have transformed the way patrons approach information searches in library databases and catalogs; they seem to be most pleased when these offerings mirror the designs of popular search engines while still providing advanced search capabilities (Ponsford & vanDuinkerken, 2007). According to one research study, users systematically failed to complete ILL requests even after they were directed straight to the ILL request form. Authors Knowlton, Kristanciuk, and Jabaily (2015) of this study theorized that this may have been for one of three reasons: either patrons needed immediate access to the article, they found the library’s ILL webpage too confusing or cumbersome to navigate, or they didn’t want to “impose” on library staff.

For many library professionals, however, the major downfall of interlibrary loan is neither speed nor design – it’s the price tag. As library budgets decline, libraries are required to do more with less and they increasingly rely on services like ILL to fill content coverage gaps. Cutting journal subscriptions and decreasing monograph purchases often leads to an increase in ILL usage, and the library must pay for the manpower to process item requests in addition to the cost of the content itself (McCaslin, 2010). Overreliance on ILL can be a tremendous burden on a library: Even if some of the resources requested end up being in the library’s collections, the library needs to have staff on hand who can determine that (Leon & Kress, 2012).

UNC-CH appears willing and able to make this investment. Upon announcing that it would be ending its Big Deal with Elsevier, the university released plans to expand existing ILL services. According to the announcement, this entails 24-hour document delivery and 2-4 hour automated delivery for faculty and graduate students (Blouin & Westbrook, 2020).

However, long before this was an option (and it should be noted that in many other libraries, this type of expedited service still isn't available), researchers learned that there could be other ways of accessing and sharing digital resources. The advent of the internet ushered in years of technological advancements that compounded, seemingly overnight, into a web of virtual repositories that have threatened to subvert the entire scholarly publishing ecosystem.

They are called academic networking sites, and they followed closely on the heels of social media websites and brought scholarly communications into the 21st century. ResearchGate and Academia.edu are currently the most popular, followed closely by Mendeley and Faculty Opinions (previously F1000Prime). These websites facilitate a unique mix of social networking, citation tracking, and free online “publishing” of one’s own works. Similar to other social networking sites, these websites allow users to create professional profiles and engage with one another; unlike other sites, users can upload digital copies of their articles, essentially creating a personal archive that may be accessed by anyone (Mangan, 2012). Although this affords authors unprecedented visibility, it also unintentionally encourages authors to violate copyright agreements on their own articles – unknowingly, in most cases – by making those articles freely available online. Many higher education institutions have created their own institutional

repositories where their researchers can deposit their scholarly work, and in these repositories, the institutions focus a great deal on making sure every resource complies with the publisher's copyright restrictions. On academic networking sites, the authors themselves are responsible for copyright compliance (Jamali, 2017).

Other websites have opted to bypass social networking and focus solely on housing freely accessible peer-reviewed literature. ArXiv.org is one of the more popular digital repositories of this nature. The purpose of arXiv.org was to give authors a platform where they could share their research quickly and receive timely feedback from peers prior to publication. It was originally a discipline-specific repository for physics but has since expanded to include many disciplines, primarily within the natural sciences. Unlike on academic networking sites where users often post the final published versions of their articles, users on arXiv.org generally upload preprints of their articles. Preprint versions are typically marginally different from the final published versions and are often exempt from publishers' distribution restrictions (Van Noorden, 2014).

The idea of making peer-reviewed academic literature available for free is a relatively new one. Previously, when articles were published in print, it would have been impossible to produce and distribute articles for free. Technology in the 1990s changed that. Although there are still costs associated with producing scholarly literature and making it available to the public, there is virtually no cost difference between making a digital article available to a single subscriber and making it available to a thousand subscribers. Furthermore, the majority of the costs involved are financed by the institutions that pay researchers and peer reviewers. This is the premise of the open access movement.

Academic networking sites carefully straddle the boundaries of legality, but other groups of researchers have been more willing to take drastic approaches to further the cause of open access initiatives. Sci-Hub is the most notorious – and successful – of these endeavors. Founded in 2011 by Kazakhstani scholar Alexandra Elbakyan, Sci-Hub makes peer-reviewed literature available online, free of charge, to anyone who has internet access. At the time of writing, it houses over 78 million articles in an illegal online repository that changes web domains faster than publishers can file lawsuits against Elbakyan. It's unknown just how Sci-Hub manages to acquire articles. It's largely theorized that it uses login credentials belonging to various academic institutions – either by stealing them, by obtaining through phishing campaigns, or by having individuals “donate” their institutional credentials – and it uses those credentials to download articles that are otherwise blocked by paywalls (Banks, 2016; Peet, 2016).

Rather than operating as visibly as Elbakyan, many other academics operate through private groups and messages on social media websites like Twitter and Facebook. The process is simple: a user first posts the citation they need, either in a private group or accompanied by a hashtag like “#icanhazpdf,” which makes the request publicly available. Other users who see the request can check if they have access to the resource through their own institutional subscriptions. If they do, they can send a private message to the requestor to facilitate the transfer of the full text PDF (presumably either through the social media application itself or through private email). Although the initial request may be public, the actual resource transfer is private – meaning that publishers have no evidence to press charges for copyright infringement (Gardner & Gardner, 2015).

Summary

With all of these options available, it's easy to see why libraries may struggle with how to proceed. Should they turn a blind eye toward the use of questionably legal repositories, or should they encourage the use of their own expensive interlibrary loan services? Institutions like the University of California and University of North Carolina at Chapel Hill have made it clear that they're willing to play the long game, but until more institutions start breaking Big Deals and forcing publishers play fairly, they need to have measures in place that can effectively triage information needs at (or near) the speed that patrons have come to expect. In order to make these initiatives work, libraries need to understand how their patrons are accessing peer-reviewed literature and they need to be mindful of the ever-changing factors that influence a patron's decisions when seeking an article. As Peters (2001) explained, "we [librarians] no longer can claim with much confidence that it is possible to know 'a priori' the information needs of a community of users."

The lingering problem is that many institutions don't really know how their patrons are accessing articles when those access methods fall outside the library's catalog. Digitization may have made it easier for publishers to monitor and restrict how libraries provide access, but the rapid growth of the internet has also made it easier to subvert the traditional serials subscription model – both in ways that are legal and illegal, and all of which occur in places that are difficult, if not impossible, for libraries to measure. This research study aims to fill in that gap.

Methods

Overview

This study was carried out using an anonymous online survey hosted on the Qualtrics platform. As Babbie (2003) stated, “[s]urvey research is probably the best method available to the social researcher who is interested in collecting original data for describing a population too large to observe directly.” Additionally, “[s]urveys are also excellent vehicles for measuring attitudes and orientations in a large population.”

This survey measured the attitudes and actions of a sample population of students, faculty, and staff as representative of the larger population at the University of North Carolina at Chapel Hill. The survey questions can be found in Appendix A.

Participants

Study participants were recruited with paper flyers and through several emails to department-specific listservs and to a campus-wide listserv. The survey was open to active students, faculty, and staff members of all levels at the University of North Carolina at Chapel Hill.

To increase the likelihood of student participation, undergraduate and graduate students were given the option to enter a raffle to win one of ten \$20 gift cards upon completing the survey. Email addresses were collected and stored in a separate form to

ensure that no email address could be connected to an individual's survey responses. All responses were collected anonymously. Participants were informed of their rights to remain anonymous prior to taking the survey and were not asked to provide information that could potentially identify them. The survey was made available to take on both computers and mobile devices. Advanced settings in Qualtrics were set to prohibit the survey from being indexed by search engines and to prohibit users from taking the survey more than once.

Survey Design

The length of the survey was dependent on answers provided, ranging from five questions to 11 questions long. Survey content was divided into three sections.

Section One collected basic demographic information. Participants were asked to state their status in UNC-CH (e.g., undergraduate student, graduate student, faculty member, etc.) and the school, department, or institute in UNC-CH they are primarily affiliated with for work or school. Participants provided affiliation responses in a free text box and these responses were subsequently coded to ensure consistency. This concluded Section One.

Section Two asked participants about their experiences searching for an electronic article at UNC-CH. Participants were first asked if they had attempted to search for an article at least once in the past year. Those who answered "No" were taken to Section Three and did not complete the remaining questions of Section Two. Participants who answered affirmatively were asked if they had been unable to access an article or a journal. Those who answered "No" – i.e., those who had been able to find and access the

resource(s) they needed —were taken to Section Three and did not complete the rest of Section Two. Participants who answered affirmatively were asked to provide more information about their search query process. These participants were presented with a list of actions (comprised of eight specified actions and a ninth “Other” option) that might be taken after being unable to access a resource online, and they were asked to select any actions they had taken. A multiple selection question format was used in order to make the survey easier and faster for participants. Each participant’s selected actions were then carried forward to the next question, where they were asked to rank the actions numerically to indicate the actions they were most likely and least likely to take. Choices that had not been selected in the previous question were not carried forward or placed into this ranking. This concluded Section Two.

Section Three asked participants about their experiences with interlibrary loan at UNC-CH. Participants were asked to indicate their familiarity with UNC-CH’s ILL system. If they had heard of the ILL system and had used it to obtain electronic articles, they were subsequently asked to describe their experiences in a free text question box. If they had heard of the ILL system but hadn’t used it for electronic articles, they were asked to explain why in a follow-up question. This follow-up question was formatted as a multiple selection format with five answer choices and a sixth “Other” option, and participants were asked to select all choices that applied. Again, this question format was used in order to make the survey easier and faster. The final question was an optional free text box where participants were invited to leave additional comments.

Results

Overview

Total responses for the survey numbered 509. Of these responses, 453 were complete and used in data analysis. The remaining 56 incomplete responses were set aside and no portions of those responses were used. The survey was open for a duration of two weeks. Participants could choose to begin the survey at any time and once they began the survey they were given 24 hours to complete it. Of the complete 453 responses, average completion time was 10.17 minutes and median completion time was 3.43 minutes.

Of the 453 responses, 429 individuals (94.7%) stated they had conducted an online search for an article or journal at least once in the past year, and 24 individuals (5.3%) stated they had not. Of the 429 individuals who had conducted a search for an article or journal, 398 individuals (92.77%) stated they had been unable to find the resource they needed through the UNC-CH Library website, while 31 individuals (7.23%) stated they had been able to find everything they needed.

Participant Demographics

In total, 76 individuals identified as undergraduate students, 151 individuals identified as graduate students, 11 individuals identified as post-doctoral researchers or

fellows, 114 individuals identified as faculty members, and 101 individuals identified as staff. This data can be found in Table 1.

Status Group	Responses
Undergraduate Students	76 (16.78%)
Graduate Students	151 (33.33%)
Post-Doctoral Researchers and Fellows	11 (2.43%)
Faculty	114 (22.16%)
Staff	101 (22.3%)

Table 1. Participant breakdown by status

For the purposes of data analysis, participants were also asked to provide information about their primary affiliation within UNC-CH. Affiliations have been coded and broken down into nine discipline groups: Library and Information Science, General Arts & Sciences, Fine Arts & Humanities, Natural Sciences, Social Sciences, Health Sciences, Other Academic Programs (encompassing various pre-professional and professional schools), Other Clinical and Health-Focused Programs, and Other Interdisciplinary & Administrative Programs.

This structure is based on school and departmental classifications as determined by UNC-CH. Participants were instructed to write one primary affiliation. In cases where participants wrote multiple affiliations, the first affiliation listed was the affiliation used. Due to the nature of this research study and the unique knowledge that may influence their responses, participants belonging to the School of Information and Library Science and the UNC-CH Library were placed in a group separate from other professional/pre-professional schools and staff disciplines.

Table 2. Participant breakdown by discipline

Disciplinary Group	College, Department, or Institute	Responses
Health Sciences	Dentistry Pharmacy Public Health Medicine Nursing	152 (33.55%)
Library and Information Sciences	School of Information and Library Science UNC Libraries	60 (13.25%)
Natural Sciences	Applied Physical Sciences Biology Computer Science Exercise and Sport Science Psychology & Neuroscience	52 (11.48%)
Other Academic Programs	School of Business School of Education School of Government School of Journalism and Media School of Social Work	43 (9.49%)
Fine Arts & Humanities	American Studies Art and Art History Classics Dramatic Art English Linguistics Music Philosophy Religious Studies Romance Studies	36 (7.95%)
Other Interdisciplinary & Administrative Programs	Various	33 (7.28%)

Social Sciences	African, African American and Diaspora Studies Anthropology Economics Geography Global Studies History Political Science Public Policy Sociology	32 (7.06%)
General Arts & Sciences	Unspecified / Prefer not to answer	24 (5.3%)
Other Clinical and Health- Focused Programs	Various	21 (4.64%)

Section Two Results

Q3. Have you tried accessing a journal or article online at least once in the past year?

Section Two of the survey addressed participants' actions and experiences with locating articles/journals. Of the 429 individuals who stated they had conducted an online search for a peer-reviewed article or journal, 73 individuals identified as undergraduate students, 150 individuals identified as graduate students, 11 individuals identified as post-doctoral researchers or fellows, 112 individuals identified as faculty members, and 83 individuals identified as staff members. This data can be found in Chart 1.

Breakdown of this group by discipline affiliation was as follows: 151 individuals in Health Sciences, 52 individuals in Library and Information Sciences, 50 individuals in Natural Sciences, 39 individuals in Other Academic Programs, 36 individuals in Fine

Arts & Humanities, 34 individuals in Other Interdisciplinary & Administrative Programs, 32 individuals in Social Sciences, 18 individuals in Other Clinical & Health-Focused Programs, and 17 individuals in General Arts & Sciences. This data can be found in Chart 2.

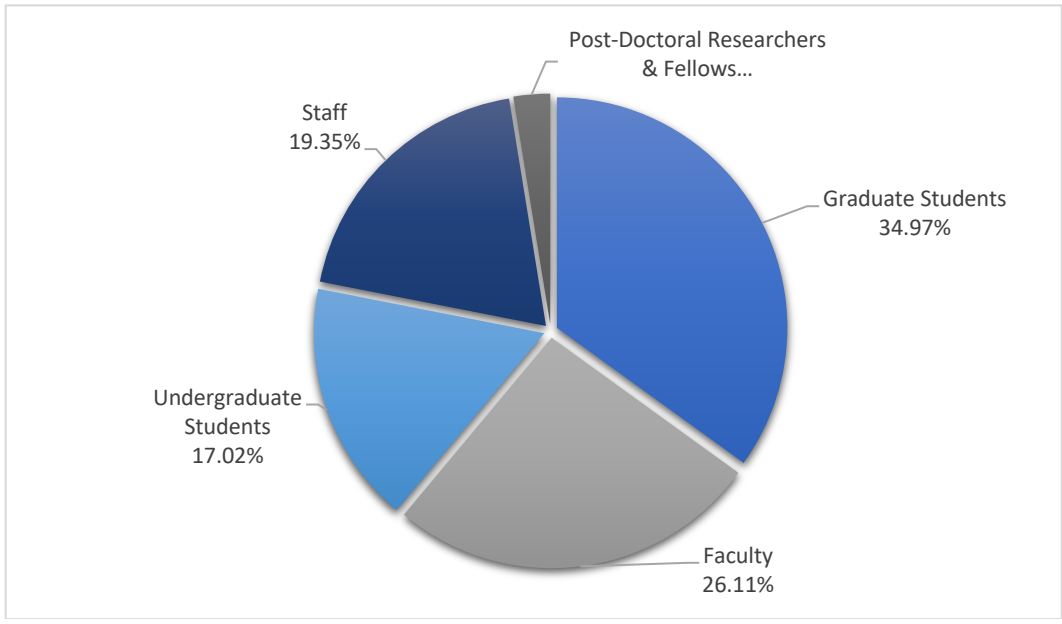


Chart 1. Study participants who conducted a search for an article/journal; Breakdown by status

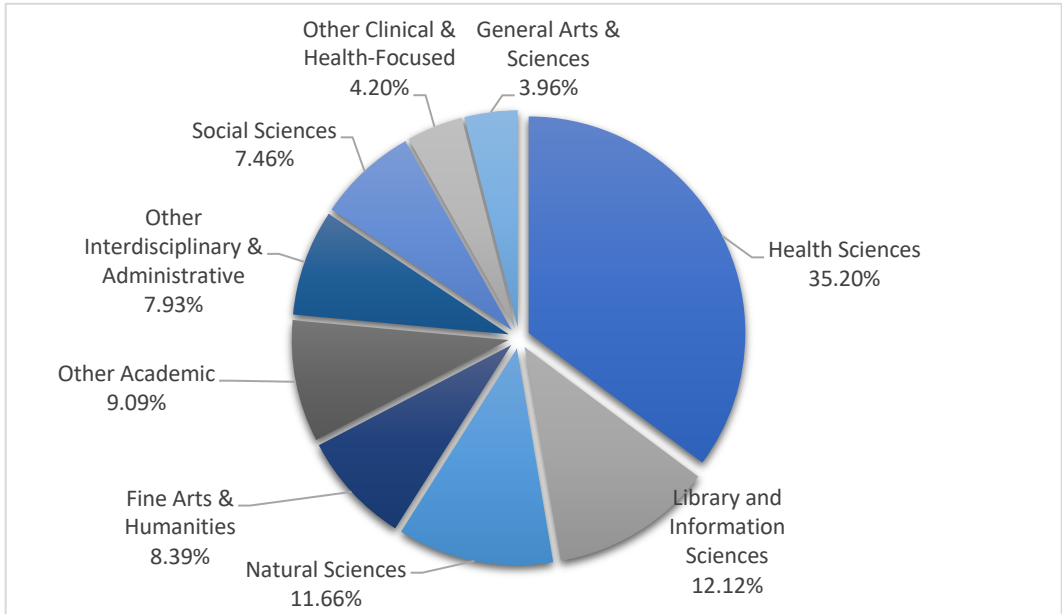


Chart 2. Study participants who conducted a search for an article/journal; Breakdown by discipline

Q4. When searching for a journal or article during the past year, have you ever been unable to access the journal or article you need?

Of the 398 individuals who stated they had been unable to locate the article or journal they were searching for, 71 individuals identified as undergraduate students, 140 individuals identified as graduate students, 11 individuals identified as post-doctoral researchers or fellows, 103 individuals identified as faculty members, and 73 individuals identified as staff. This data can be found in Chart 3.

Breakdown of this group by discipline affiliation was as follows: 143 individuals in Health Sciences, 52 individuals in Library and Information Sciences, 44 individuals in Natural Sciences, 37 individuals in Other Academic Programs, 33 individuals in Fine Arts & Humanities, 31 individuals in Social Sciences, 30 individuals in Other Interdisciplinary & Administrative Programs, 16 individuals in General Arts & Sciences, and 12 individuals in Other Clinical & Health-Focused Programs. This data can be found in Chart 4.

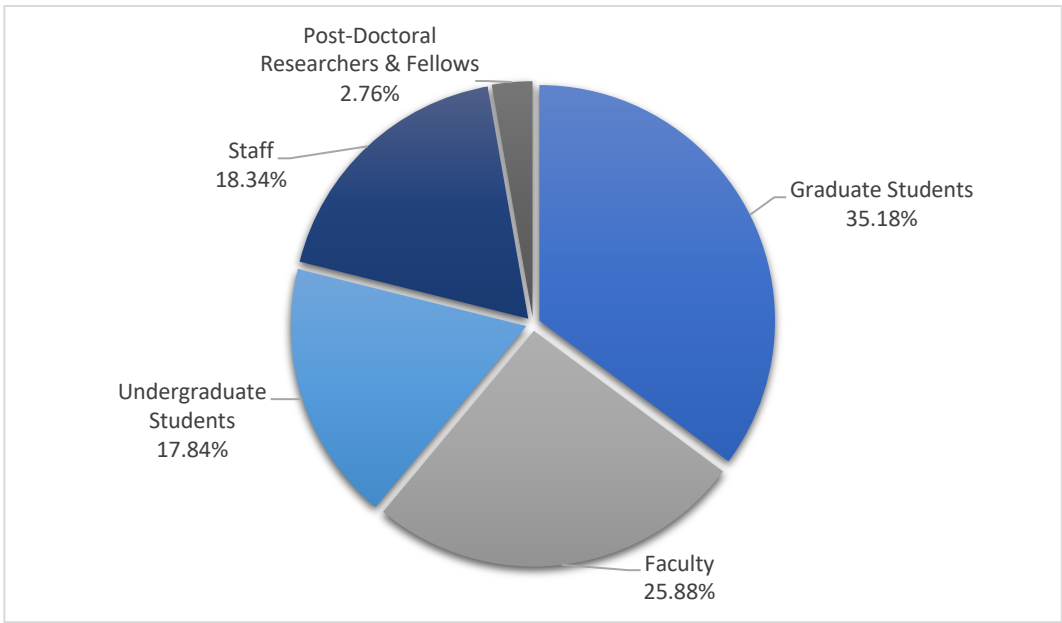


Chart 3. Study participants unable to locate the article/journal they needed; Breakdown by status

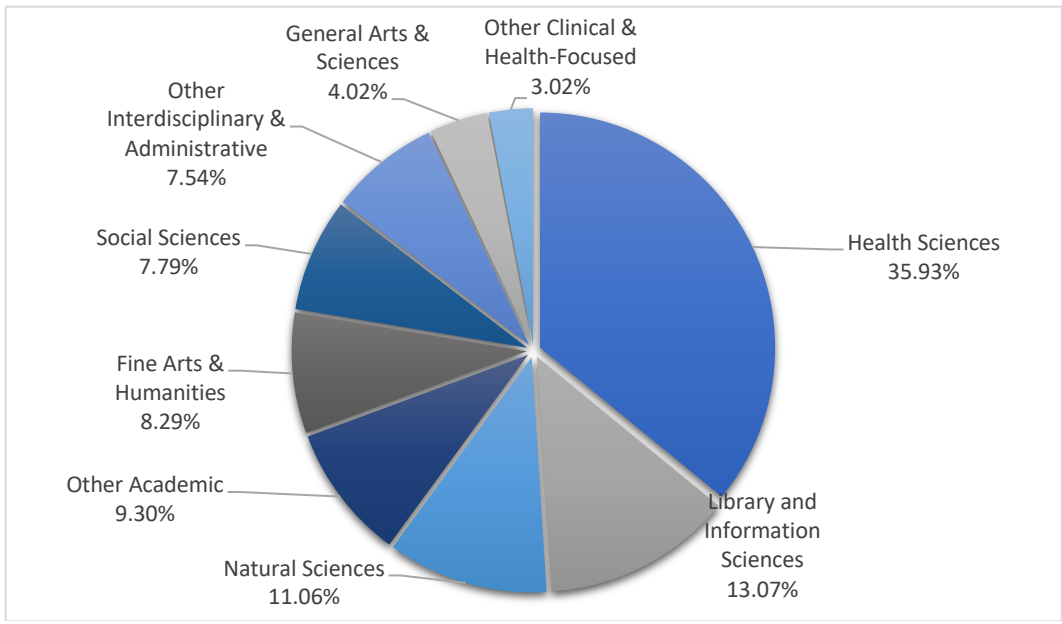


Chart 4. Study participants unable to locate the article/journal they needed; Breakdown by discipline

Q5. Which actions have you taken after finding that you could not access a specific article?

Participants were given a list of nine actions that they might take. After collecting and coding the responses, free text answers from two action choices were numerous and similar enough to produce an additional two categories: some participants noted they were affiliated with one or more institutions outside UNC-CH, and other participants stated they turned to Google and/or Google Scholar to search for articles and journals.

After selecting all of the actions they were likely to take, participants were asked to rank their choices. Several participants opted not to rank their choices and explained in a follow-up free text box that their ranking would depend on the nature of their information need, or that their search process varied greatly each time they conducted a search. An additional category was created for these participants.

The average number of actions taken after being unable to locate an article through the UNC-CH Library website was 2.37, and the mode was 2. Breakdown of this data by status can be found in Table 3 and breakdown by disciplinary affiliation can be found in Table 4. A dataset of these total ranking responses can be found in Table 5. A visual comparison of action selections can be found in Chart 5 and a visual comparison of actions designated as first choices can be found in Chart 6.

	Average Number of Actions Taken	Mode of Actions Taken
Undergraduate students	1.99	2
Graduate students	2.44	2
Post-doctoral researchers & fellows	3.45	3
Faculty	2.46	3
Staff	2.34	2

Table 3. Participant retrieval actions; Breakdown by status

Table 4. Participant retrieval actions; Breakdown by discipline

	Average Number of Actions Taken	Mode of Actions Taken
General Arts & Sciences	2.13	1
Fine Arts & Humanities	2.33	3
Health Sciences	2.5	2
Natural Sciences	2.25	1
Other Academic Programs	2.11	2
Other Interdisciplinary & Administrative	2.32	2
Other Clinical & Health-Related	1.92	1
Library and Information Sciences	2.48	2
Social Sciences	2.48	3

Table 5. Retrieval action rankings

Action Choice	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice	Total Selections
Look for another article	96	81	30	12	4	223
Request through ILL	98	65	27	6	1	197
Ask a friend	10	25	26	4	1	66
Contact library	15	13	11	4	2	45
Purchase from publisher	0	2	4	2	1	9
Contact the author	7	14	16	14	2	53
Academic networking site	74	51	32	5	0	162
Social media / other website	10	6	1	0	1	18
Google / Google Scholar	48	13	4	3	2	70
Multiple affiliations	2	0	1	0	0	3
Other	9	5	3	1	0	18
No preference / differs	29					29

Chart 5. Total number of selections for each retrieval action

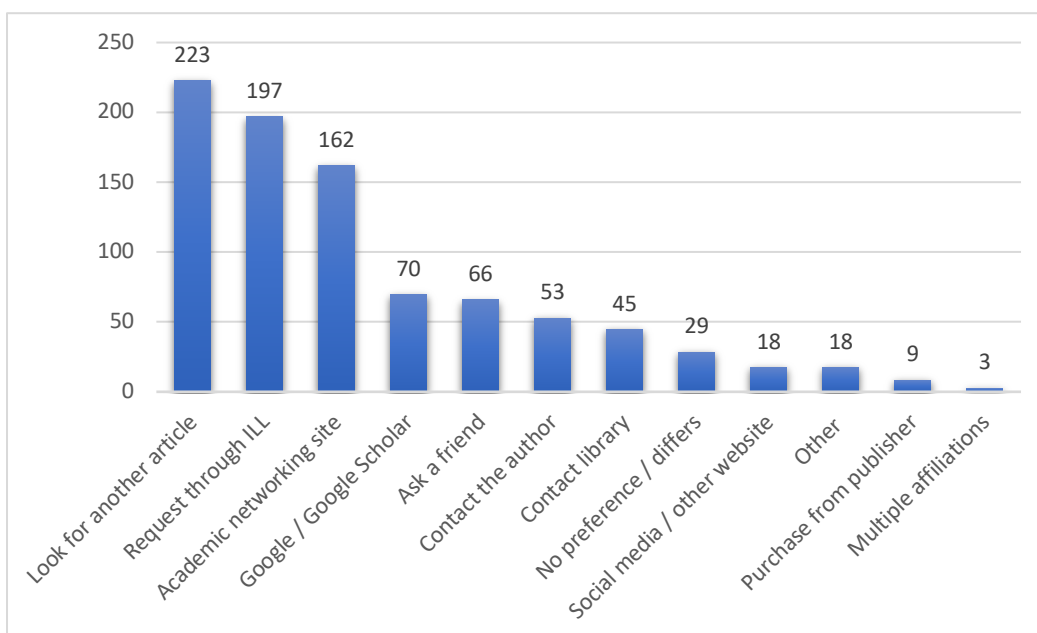
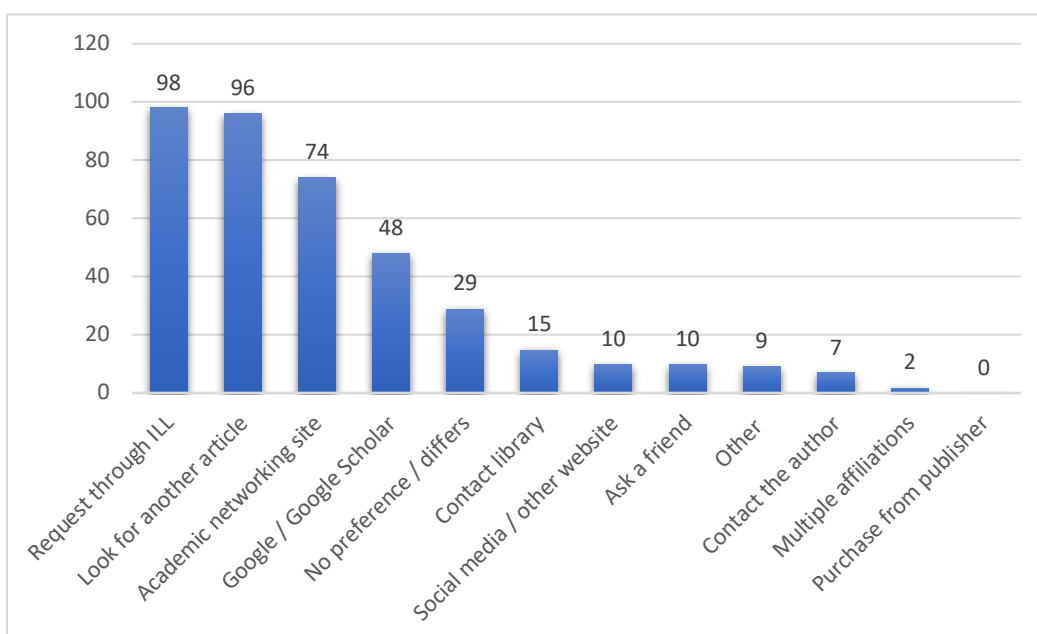


Chart 6. Number of selections designating the action as first choice

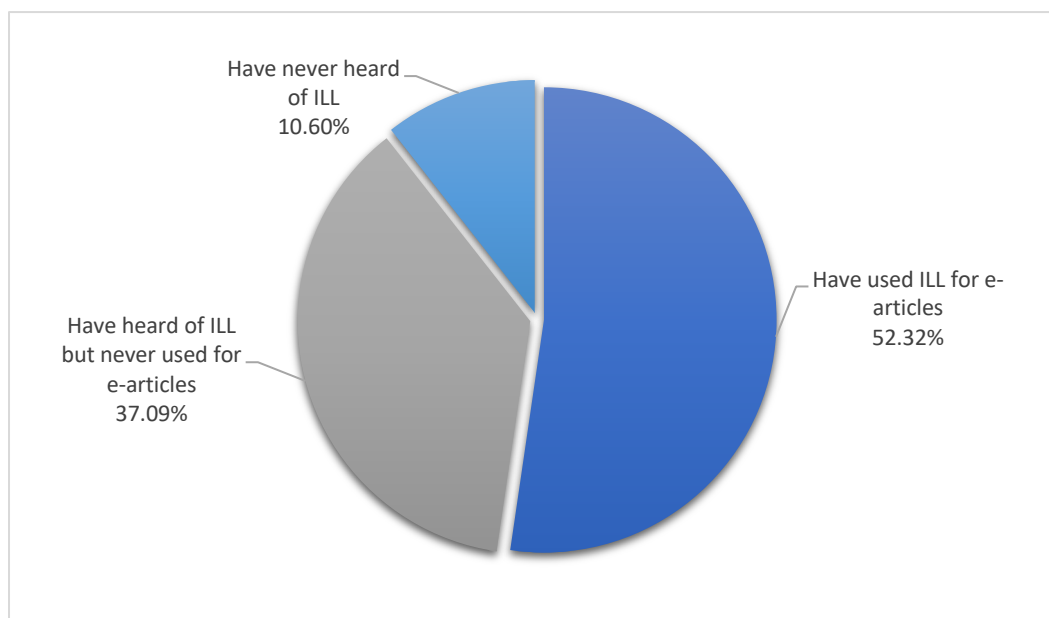


Note: Several participants indicated an "Other" action but did not provide details on what this action would be. Comments from these participants suggest they may be using other online repositories or using only the abstract without trying to find the full text.

Section Three Results

All participants, regardless of their answers to the questions about accessing articles online, were subsequently asked about their experiences with interlibrary loan for electronic articles at UNC-CH. Of the 453 participants, 237 individuals (52.32%) indicated they had heard of the service and used it, 168 individuals (37.08%) indicated they had heard of the service but never used it, and 48 individuals (10.60%) indicated they had never heard of the service before. It should be noted here that 3 participants indicated they had used ILL to request electronic articles, but upon being asked to describe their experience it was evident they had only used ILL to request physical books. During analysis the data was adjusted to account for this, and the numbers presented here reflect that adjustment.

Chart 7. Participant knowledge of interlibrary loan (ILL) services



Of the 429 participants who had searched for an article at least once in the past year, 42 individuals (9.79%) had never heard of UNC-CH's ILL service, 155 individuals (36.13%) had heard of UNC-CH's ILL service but had never used it, and 232 individuals (54.08%) had used the ILL service.

Of the 398 participants who had searched for an article at least once in the past year *and* had been unable to find what they needed, 38 individuals (9.55%) had never heard of UNC-CH's ILL service, 142 individuals (35.68%) had heard of UNC-CH's ILL service but had never used it, and 218 individuals (54.77%) had used the ILL service.

Participants who had heard of UNC-CH's ILL service but had never used it for electronic articles were asked to state why they hadn't used it. Participants were given five choices and a sixth "Other" choice with an accompanying free text explanation box. The free text answers were numerous and similar enough to yield two additional categories. Participants were asked to select as many choices as applicable. Data from these answers can be found in Table 6. Full datasets broken down by status and by affiliation can be found in Appendices B and C, respectively.

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	33
I don't know how to request an article through ILL	72
I don't want to bother library staff	25
The ILL request process is too long / confusing	27
The ILL department usually can't find what I need	2
Haven't needed to use ILL	30
Didn't know ILL could be used for electronic PDFs	15

Table 6. Attitudes toward Interlibrary Loan (ILL) services

Participants who had used UNC-CH's ILL service were asked to provide free text responses describing their experiences, and all participants were invited to provide additional comments at the end of the survey. The majority of comments focused on the time it takes to process and receive an ILL request. Of the 237 individuals who had used ILL, 60 participants noted that the process was quick, while 42 participants noted that it was slow. Other frequent complaints included the cumbersome request system and the inability of the ILL department to locate certain items.

Discussion

The clearest takeaway from this research study is that there's an overwhelming sense of confusion among patrons, even if they aren't aware of it, regarding multiple parts of the information search and retrieval process.

When asked to describe where they find online articles outside of the Library's website, 70 participants listed "Google" and/or "Google Scholar" in one of the two free text boxes (Table 4). Most participants wrote in these answers under "Social media or other website," perhaps suggesting that they viewed Google and/or Google Scholar as the source of an article rather than the search engine to retrieve an article. At the very least, this signifies that participants didn't know which websites their articles are actually coming from; it's very likely that a number of articles found via Google/Scholar are coming from authors' websites or other academic networking sites, and users simply aren't paying attention to the source.

Furthermore, several participants explained that they *begin* their searches on Google Scholar, PubMed, or a general Google search, and they only turn to the Library's catalog if they are unable to locate a free copy of the article online. This information retrieval method could certainly be beneficial for the Library in terms of cost-savings, and some of the study participants explained they didn't want the Library to pay for an article if they were able to obtain it themselves for free. However, the major shortcoming of this search process is that, when patrons bypass the Library entirely, it has an

incomplete picture of which serial titles are actually searched for and accessed most frequently because it has no way of measuring actions that occur outside of the library's system. Therefore, its subscriptions might not accurately fill the actual needs of its patrons.

The popularity of Google and Google Scholar among participants suggests that patrons do prefer to use search engines with which they are familiar, as Ponsford and vanDuinkerken (2007) stated. These two options were popular across all status groups, even among graduate students and faculty members who are more likely to be doing in-depth research and might benefit from an academic database with advanced search capabilities.

There was a small but still significant number of participants who stated that the actions they would take to locate a resource would depend on why they needed that resource (Table 4). Graduate students and faculty members were the most likely to indicate that their search process isn't always the same each time. The tendency to try different approaches seems to be most prevalent among individuals who hold multiple roles within the university community, such as a faculty member who also works as a clinician, or a graduate student who works as a research assistant. A small number of comments also suggested that individuals' actions had changed during their time spent studying and/or working at UNC-CH, particularly that they had begun using ILL more often once they became aware of it.

As a whole, the most popular action options were to search for a different article, request the article through ILL, and search for the article on an academic networking site (Table 4). These three actions were popular across all status groups and disciplines.

One might assume that looking for another article would be the last choice – i.e., that patrons would only resort to this when they have exhausted all other options – but that is not the case. Of the 223 individuals who indicated that looking for another article would be one of their actions, 88 individuals (39.46%) ranked this action first or preceding at least one other action, while the remaining 135 individuals ranked this action as their only action choice or their last action choice upon exhausting other options. This means more than a third of all patrons recognize that another resource may fit their information needs and they are actually willing to spend time searching for another resource before they spend time looking for that *specific* resource. Several participants explained that time is the driving factor in this decision. Undergraduate students, for example, regularly noted that they only search for peer-reviewed literature when they are writing papers, and in these cases they rarely need access to a specific article. They were far more likely than other groups to indicate their first choice would be to look for another article: roughly 58% of undergraduates said this would be their first choice, while 16% of graduate students and 10% of faculty members said the same.

According to the data, there is no significant difference between discipline groups when discussing an individual's likelihood to engage in a certain action (Appendix B). This suggests that discipline alone cannot predict which actions an individual may take. Participants from the Health Sciences were just as likely to search for another article as were those from the Fine Arts and Humanities; individuals from the Natural Sciences were as likely to search in an academic networking site as those from the Social Sciences. The one exception, according to the data, is that individuals from the Health Sciences and Natural Sciences are marginally more likely than other groups to use social media sites or

other repositories. This is not surprising, given that individuals from these two groups are, overall, more likely to use peer-reviewed journals, and repositories (like arXiv.org and Sci-Hub) are more likely to house a greater number of articles from these disciplines.

Although a majority of individuals in the Fine Arts, Humanities, and Social Sciences stated they would take up to three actions to locate a resource while the majority of Health Sciences individuals stated they would take up to two actions, the average number of actions was higher in the Health Sciences than in the other discipline groups (Table 2).

Based on this data, it's likely that an individual's discipline is a factor in their likelihood to engage in certain actions, but discipline alone is not the driving factor. Instead, an individual's tendency to choose certain resource retrieval actions over others may be viewed as a product of three pieces: their status, their discipline affiliation, and the reason behind their information query. This is perhaps what makes it so difficult for institutions to provide resource fulfillment services that adequately meet the needs of patrons without going *above* that need. Providing too many resources and providing resources faster than is truly necessary is costly for institutions and overwhelming for patrons. Institutions are moving towards e-resource collections that are "just enough" and "just in time," but this study shows that these are moving targets. Status and discipline affiliation remain fairly static for a given individual, but the reasons behind their information searches are likely to vary with each search.

Along with the question prompts, the free text responses in Section Three provided valuable insight into what patrons think of interlibrary loan at UNC-CH and why they choose not to use this service. A lack of timeliness was one of the more

common complaints among participants who had used ILL before. Several participants noted in their free text comments that they can't wait for the ILL team to process a request and attributed this to their own procrastination than to the Library's service. "I'm sure the ILL service is great and easy to use, I just usually need the article immediately and if I can't find it, I move on. I don't usually have the foresight to request via ILL" one participant explained.

There is also the general sense, even among patrons who haven't used ILL at UNC-CH before, that it would take too long. "ILL generally seems like it's more effort than it's worth, but I am not sure how easy it is because I've never tried it" one participant commented. "Since I haven't done it here, I'm not sure if that's true. This was the case at my previous institution so I tend not to use it anymore" another participant explained after stating that they haven't used ILL because it takes too long.

Additionally, it is clear that individuals have very different perceptions of what "fast" and "slow" mean for ILL services. One participant, for example, commented that ILL was "Great! I always receive articles in a timely manner (usually within 5 business days)" while another participant commented that "I have always received articles I requested, although sometimes it takes a couple days (which is not great)." This discrepancy was present even within disciplines: one faculty member in the School of Medicine commented that ILL was "Great, usually 1-3 day turnaround" while another commented that it was "Ok but sometimes takes couple [*sic*] of days." Yet another faculty member commented on time constraints and shed light on a different problem: "I am an adjunct and am hardly paid anything for my work, so I don't want to spend too much time tracking down materials."

Ultimately, the expectation – or at least the desire – for instant access was evident among participants. Many of those who commented favorably still noted that ILL can't replace instant access. As the literature suggested, technology has made instant access so commonplace that patrons just aren't satisfied with anything less (Kenefick & DeVito, 2013; McHone-Chase, 2010). As one participant summed it up, "The nature of my research now is such that I usually need information quickly and if I don't have an article immediately I don't want it."

Another interesting theme in the comments was that some patrons attributed the efficiency and success of the ILL process (or lack thereof) to Library staff, rather than on the request system itself. Although very few participants indicated that they would contact the UNC-CH Library directly if they had trouble locating an electronic resource, it appears that those who do rely heavily on Library staff in this way may have inaccurate perceptions of how the Library processes ILL requests.

Some participants, for example, made comments that suggest they turn to Library staff for help, even when they know they'll have to make an ILL request, because they believe their request will be processed faster. One participant noted that "I wasn't sure how to access it the ILL service [*sic*]. One of the librarians did it for me. Fortunately, she did the request quickly and so I actually received the article within a few days. Otherwise, I would not have had the article in time." Another commented that "some on library staff are go getters and some are moving at snails [*sic*] pace." Several participants commented that they had to "remind" the ILL staff about their request in order to get the resource they needed. One participant commented that their experience with ILL in the past has been "Pretty blah, I often have to submit multiple requests because no one

responds to my first request.” While it’s possible that requests may get lost in the system, it seems equally possible that the UNC-CH ILL staff had begun processing the request or had already fulfilled the request and the patron was unaware of this progress.

This leads into a related problem that several participants noted in their free text comments: Even when the ILL retrieval process works, the interface that patrons use can be confusing and cumbersome. Authors Knowlton et al. (2015) theorized that even when patrons are taken directly to an ILL website, they might fail to complete a request because they either want immediate access to a resource, they find the request system too confusing, or they don’t want to burden library staff. This study seems to support that hypothesis. Among patrons who have needed an inaccessible digital resource, all three of those reasons were selected frequently and regularly appeared in participants’ comments.

Out of 142 participants who had heard of ILL but never used it in the past year, only two participants indicated they don’t use it because the ILL team would likely be unable to find the resource they requested and seven participants commented that they are not always able to get what they need through ILL. This suggests a fairly high vote of confidence for the ILL team’s ability to retrieve the correct documents, particularly when considering that 27 participants selected the confusing request system as a reason for not using ILL and 20 participants commented on this. One participant stated, “Sometimes I find navigating the online request system a bit confusing. It also hasn't been clear to me in the past how to figure out the status of my request and how long it could potentially take to receive access to the article.” Another said, “I wish ILL could email the article directly to me via an email attachment, rather than me having to log back into the ILLiad platform to retrieve it.”

Despite all of the barriers to using ILL that participants noted, the data clearly suggests that patrons aren't using ILL simply because they don't know how. An overwhelming number of participants in this study selected that as one of the reasons they haven't used ILL in the past. Of the 72 individuals who selected this reason, 50 individuals listed it as their only reason for not using ILL. This trend was consistent across all disciplines – perhaps most surprisingly, even within the Library and Information Science group. This small sample group could certainly be an aberration, but one might also wonder if this is an area where the Library and Information Science school at UNC-CH could improve as it continues to educate future librarians.

A large number of comments show that many patrons have a great deal of appreciation for those who make the ILL service possible, and several other comments, primary from faculty members and those associated with the Library or UNC-CH library school (SILS), indicate a growing awareness of the “serials crisis.” Much of this understanding is likely due to the increased efforts of University Librarian Westbrook and others on the Library leadership team to educate the UNC-CH community. One participant said, “I am deeply appreciative of the UNC library services and the excellent efforts [they] are putting forth on the behalf of the UNC faculty. I think regular communication will be important as the realities of publishing are changing at the core.”

As that participant noted, increased awareness that a problem exists will lead to increased expectations that the Library will be acting to solve the problem. It is clear that the UNC-CH Library has begun taking action, but they may see louder calls for accountability and transparency moving forward. There are still many patrons who aren't aware of the current situation, as became evident from some comments in this study. “I'm

annoyed at the number of articles that haven't been available at a prestigious school like UNC," said one participant. "It's pretty strange and should be looked into so we don't need to use ILL as much." Another participant stated that "Access to peer-reviewed information is critical for our research mission... UNC needs to broaden title access as much as possible, potentially at the expense of other services."

Speed – one of the more common inhibitors of ILL usage – was clearly an important factor of the UNC-CH Library's decision to expand ILL services after choosing to break its Big Deal. It seems likely that, with improved efficiency, more patrons will be willing to try using ILL if this was previously their main reason for avoiding it. However, this study has shown that the biggest roadblock for successful ILL usage is that many patrons simply don't know how to use it and, in some cases, don't even know it exists. If UNC-CH hopes to use interlibrary loan as a substitute for immediate full text access, it may need to focus just as much on outreach and education as on improving the ILL system itself.

Limitations

This survey was designed to take around five minutes to complete in order to maximize the completion rate and, therefore, it did not ask about several related factors that might have provided a more robust understanding of how UNC-CH patrons conduct article/journal searches. Most notably, the survey did not thoroughly account for differences in how participants begin their online searches. It is entirely possible that a substantial number of patrons bypass the Library's website altogether when searching for digital resources. Furthermore, in most cases it was nearly impossible to know if participants fully understood how journals, databases, and institutional subscriptions work together to produce a seamless search experience. Some free text answers suggested that those respondents do not have an accurate understanding of how databases and journals operate – which is certainly a valuable conclusion on its own – but which suggests that user-reported data may be inadvertently incorrect.

Additionally, this survey did not ask participants what type of internet connection they primarily used for their searching. Four possible options are: on campus using UNC-CH's wi-fi network or Virtual Private Network (VPN), on campus using a non-UNC-CH internet connection or VPN, off campus using UNC-CH's VPN, or off campus using a non-UNC-CH internet connection or VPN. All four of these options may produce different results, depending on the user's understanding of how they can gain full access to UNC-CH electronic subscriptions. For example, the researcher's personal anecdotal

experience suggests that many UNC-CH patrons are not aware of the extra login steps they need to take in order to gain full access to subscriptions when conducting a search off campus.

Lastly, survey questions did not differentiate between searches for specific articles and searches for specific journals, nor did it specify the purpose behind searching for either of these resources. An individual's search process for a specific article may be very different from the way they locate a journal to browse through. As several participants noted, the actions they might take upon being blocked from a resource would depend heavily on why they were searching for that resource in the first place.

Additional circumstantial and environmental factors may have an impact on this study. First, the study was conducted during the early stages of the COVID-19 pandemic outbreak in the United States. It's very likely that this influenced response rates and answers, despite the survey topic not being connected to the pandemic in any way. Second, UNC-CH was in the midst of a Big Deal negotiation with Elsevier while this study occurred. UNC Libraries had previously been raising awareness of the "serials crisis" around campus because of this. It's possible that, due to increased awareness, some groups were more likely to respond than others.

Finally, there were several inherent and unavoidable limitations present due to the nature of this research study. Not all schools, departments, and institutes within the UNC-CH community were represented equitably in this study, with respect to overall enrollment. Acquiring a more accurate representation of the UNC-CH patron community would require a much larger outreach campaign than was possible for this study. Despite this "low" response rate, a substantial amount of quantitative and qualitative data was

collected, and it may not have been analyzed to the fullest extent possible. Qualitative data like free text answers, in particular, required manual coding, which may have resulted in misrepresentation of some answers. Roughly 900 free text comments were collected; it is almost inevitable that valuable pieces of information were overlooked, misclassified, or otherwise not represented as thoroughly as possible.

In addition, all responses were completely voluntary and were completed remotely, i.e., not under the supervision of the researcher. It's possible that some participants did not answer questions truthfully, either purposefully or accidentally. This survey was only administered in English and no foreign language translation support was provided to individuals who may have needed it. Participants may have also chosen to withhold answers if they felt that divulging information about illegal activity (i.e., using Sci-Hub to obtain articles). For these reasons, it may not be accurate to generalize the findings of this study to the entire UNC-CH population or to other higher education institutions.

While some shortcomings may be more difficult to account for, the vast majority of limitations listed here could be – and should be – considered opportunities for further research.

Conclusion

The “serials crisis” in academic libraries is not going to disappear anytime in the near future. Institutions like the University of North Carolina at Chapel Hill can begin changing the landscape of academic publishing, but in order to do this without sacrificing the scholarship of its students and employees, it needs to have a strong understanding of how these individuals are actually using – or not using – Library resources. Above all else, this research study shows that the factors motivating UNC-CH patrons in their information searches are not as different as one might think.

This research also suggests that activities such as outreach and education, which are core to the library profession, will be key to ensuring that patrons are supportive of the Library and feel equally supported *by* the Library. It is impossible to dictate exactly how individuals conduct their information searches – nor should the Library want to – but it seems very possible to extend enough assistance to those who want it and need it. Interlibrary loan services will likely play a larger role in Library operations as it continues to navigate its Big Deal packages. It will need to continue improving upon these services, as it has recently done, to address some of the lingering concerns and reservations of its patrons. It is strongly suggested that the Library continue to engage in direct, honest conversations with its patrons and conduct further research on access patterns so the entire UNC-CH academic community can be involved in solving this crisis.

Appendix A: Survey Questions

SECTION ONE

Q1. What is your status at UNC Chapel Hill? (*select one*)

- Undergraduate student
 - Graduate student
 - Post-doc or fellow
 - Professor
 - Hospital staff
 - Other faculty or staff: _____
-

Q2. Which school, department, or institute are you primarily affiliated with at UNC Chapel Hill?
"Primary affiliation" refers to the school, department, or institute where you devote the majority of your class time or work time.

SECTION TWO

Q3. Have you tried accessing a journal or article online at least once in the past year? (Select one)

- Yes
 - No
-

Display if

"3. Have you tried accessing a journal or article online at least once in the past year?"

=Yes

Q4. When searching for a journal or article during the past year, have you ever been unable to access the journal or article you need?

- Yes
 No

Display if

"3. Have you tried accessing a journal or article online at least once in the past year?"
 =Yes

Q5. Which actions have you taken after finding that you could not access a specific article?
 (Select all that apply)

- Look for another article
- Request the article through UNC Library's interlibrary loan (ILL) service
- Ask a friend or colleague at another institution if they can access the article and share it
- Contact the library or a UNC librarian directly (by chat, email, or in person) to request the article
- Purchase the article from the publisher
- Contact the author(s)
- Search for the article on an academic networking site (e.g., *Academia.edu*, *Semantic Scholar*, *ResearchGate*, *Mendeley*)
- Use a website or social media forum to search for the article - *Please describe what you have used:* _____
- Other: _____
-

Display if

"3. Have you tried accessing a journal or article online at least once in the past year?"
 =Yes

Carry Forward Selected Choices - Entered Text from

"5. Which actions have you taken after finding that you could not access a specific article? (Select all that apply)"

Q6. Listed below are all of the actions you have taken when you search for an article and it's not available in the UNC catalog.

Please rank your answers. The top spot indicates the action that you use most often or try first, and the last spot indicates the action that you rarely use or use only after trying other options.

Rank your answers by dragging and dropping each box.

- _____ Look for another article
- _____ Request the article through UNC Library's interlibrary loan (ILL) service
- _____ Ask a friend or colleague at another institution if they can access the article and share it
- _____ Contact the library or a UNC librarian directly (by chat, email, or in person) to request the article
- _____ Purchase the article from the publisher
- _____ Contact the author(s)
- _____ Search for the article on an academic networking site (e.g., Academia.edu, Semantic Scholar, ResearchGate, Mendeley)
- _____ Use a website or social media forum to search for the article - *Please describe what you have used:* _____
- _____ Other: _____

Display if

"3. Have you tried accessing a journal or article online at least once in the past year?"
=Yes

Q7. Please explain your thought process when you are engaging in those article retrieval actions. For example, do you prefer some retrieval methods over others for a specific reason?

SECTION THREE

Q8. Are you aware of UNC Library's interlibrary loan (ILL) service, where you can request a PDF copy of any article for free? (*Select one*)

- Have never heard of interlibrary loan
- Have heard of interlibrary loan but have never used it for electronic articles
- Have used interlibrary loan to request electronic articles
-

Display if

"8. Are you aware of UNC Library's interlibrary loan (ILL) service, where you can request a PDF copy... = Have heard of interlibrary loan but have never used it for electronic articles"

Q9. Why have you chosen not to use the library's interlibrary loan (ILL) service for electronic articles? *(Select all that apply)*

- It takes too long to get articles delivered through ILL
- I don't know how to request an article through ILL
- I don't want to bother library staff
- The ILL request process is too long / confusing
- The ILL department usually can't find what I need
- Other:

Display if

"8. Are you aware of UNC Library's interlibrary loan (ILL) service, where you can request a PDF copy... = Have heard of interlibrary loan but have never used it for electronic articles"

Q10. What has been your overall experience with UNC Library's interlibrary loan service?

Q11. Thank you for your participation in this survey.

If you have any other comments about how you access articles/journals or how you use interlibrary loan, please leave them in the box below:

Appendix B: Datasets

Part A: Action Rankings Broken Down by Status

Table A1. Action Rankings of Undergraduate Students

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	41	15	2	0	0
Request through ILL	3	12	2	1	0
Ask a friend	0	2	4	0	0
Contact library	1	0	1	1	0
Purchase from publisher	0	1	0	1	0
Contact the author	0	1	2	3	1
Academic networking site	14	11	5	0	0
Social media / other website	0	0	0	0	0
Google / Google Scholar	8	3	0	0	0
Multiple affiliations	0	0	0	0	0
Other	0	0	0	0	0
No preference / differs	3				

Table A2. Action Rankings of Graduate Students

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	23	35	14	5	3
Request through ILL	43	25	9	1	0
Ask a friend	6	12	9	2	0
Contact library	2	7	8	0	0

Purchase from publisher	0	0	1	0	0
Contact the author	1	2	0	4	1
Academic networking site	31	18	13	2	0
Social media / other website	4	4	0	0	0
Google / Google Scholar	17	4	3	1	0
Multiple affiliations	1	0	0	0	0
Other	4	2	1	1	0
No preference / differs	8				

Table A3. Action Rankings of Postdoctoral Researchers/Fellows

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice	#6 Choice
Look for another article	3	0	1	2	0	0
Request through ILL	1	1	1	0	1	1
Ask a friend	0	3	3	0	0	0
Contact library	0	1	0	1	0	0
Purchase from publisher	0	0	1	0	0	0
Contact the author	1	1	1	1	0	1
Academic networking site	3	3	1	0	0	0
Social media / other website	0	0	0	0	0	0
Google / Google Scholar	2	0	0	0	2	0
Multiple affiliations	0	0	0	0	0	0
Other	0	0	0	0	0	0
No preference / differs	1					

Table A4. Action Rankings of Faculty

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	10	18	7	2	1
Request through ILL	37	14	9	3	0
Ask a friend	3	6	8	1	0
Contact library	5	2	1	0	1
Purchase from publisher	0	0	1	1	1
Contact the author	4	9	9	5	0
Academic networking site	14	7	8	2	0
Social media / other website	3	2	1	0	1
Google / Google Scholar	11	2	0	0	0
Multiple affiliations	0	0	0	0	0
Other	4	2	1	0	0
No preference / differs	12				

Table A5. Action Rankings of Staff

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	19	13	6	3	0
Request through ILL	14	13	6	1	0
Ask a friend	1	2	2	1	1
Contact library	7	3	1	2	1
Purchase from publisher	0	1	1	0	0
Contact the author	1	1	4	1	0
Academic networking site	12	12	5	1	0
Social media / other website	2	0	0	0	0
Google / Google Scholar	10	4	1	2	0
Multiple affiliations	1	0	1	0	0

Other	1	1	1	0	0
No preference / differs	5				

Part B: Action Rankings Broken Down by Status

Table B1. Action Rankings in Health Sciences

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	33	27	9	3	0
Request through ILL	37	25	13	2	1
Ask a friend	6	10	11	2	1
Contact library	7	5	3	2	0
Purchase from publisher	0	1	2	1	1
Contact the author	2	8	9	8	0
Academic networking site	21	22	14	3	0
Social media / other website	4	1	0	0	2
Google / Google Scholar	16	1	2	1	0
Multiple affiliations	0	0	0	0	0
Other	5	1	2	0	0
No preference / differs	11				

Table B2. Action Rankings in Library & Information Sciences

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	5	16	6	5	2
Request through ILL	14	11	5	1	0
Ask a friend	2	2	2	1	0
Contact library	3	0	4	1	1
Purchase from publisher	0	0	1	0	0

Contact the author	1	0	0	1	1
Academic networking site	12	5	4	0	0
Social media / other website	1	2	0	0	0
Google / Google Scholar	13	4	0	1	0
Multiple affiliations	0	0	0	0	0
Other	2	1	0	1	0
No preference / differs	7				

Table B3. Action Rankings in Natural Sciences

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	12	9	2	1	1
Request through ILL	5	4	5	1	0
Ask a friend	1	5	2	0	0
Contact library	0	1	1	0	1
Purchase from publisher	0	0	0	0	0
Contact the author	0	3	2	3	0
Academic networking site	16	3	2	0	0
Social media / other website	4	2	1	0	0
Google / Google Scholar	4	0	0	0	1
Multiple affiliations	0	0	0	0	0
Other	0	0	0	0	0
No preference / differs	2				

Table B4. Action Rankings in Other Academic

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	15	6	3	0	0
Request through ILL	9	10	1	1	0

Ask a friend	0	2	0	0	0
Contact library	1	0	0	1	0
Purchase from publisher	0	0	0	0	0
Contact the author	1	0	1	1	0
Academic networking site	4	4	4	1	0
Social media / other website	0	1	0	0	0
Google / Google Scholar	6	1	1	0	0
Multiple affiliations	0	0	0	0	0
Other	0	1	0	0	0
No preference / differs	0				

Table B5. Action Rankings in Fine Arts & Humanities

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	8	4	2	1	1
Request through ILL	15	7	1	0	0
Ask a friend	0	1	4	1	0
Contact library	1	2	1	0	0
Purchase from publisher	0	1	0	0	0
Contact the author	0	1	1	0	0
Academic networking site	4	7	3	0	0
Social media / other website	0	0	0	0	0
Google / Google Scholar	2	0	1	0	0
Multiple affiliations	0	0	0	0	0
Other	0	0	0	0	0
No preference / differs	3				

Table B6. Action Rankings in Other Interdisciplinary Programs

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	5	8	1	1	0
Request through ILL	5	2	0	1	0
Ask a friend	0	0	0	0	0
Contact library	2	3	0	0	0
Purchase from publisher	0	0	1	0	0
Contact the author	0	0	1	1	0
Academic networking site	4	1	2	0	0
Social media / other website	1	0	0	0	0
Google / Google Scholar	4	3	0	1	0
Multiple affiliations	0	0	1	0	0
Other	0	1	0	0	0
No preference / differs	1				

Table B7. Action Rankings in Social Sciences

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	7	6	6	1	0
Request through ILL	9	4	0	0	0
Ask a friend	1	3	3	0	0
Contact library	1	2	2	0	0
Purchase from publisher	0	0	0	0	0
Contact the author	1	2	0	0	0
Academic networking site	5	2	3	1	0
Social media / other website	0	0	0	0	0
Google / Google Scholar	3	4	0	0	0
Multiple affiliations	1	0	0	0	0

Other	1	0	1	0	0
No preference / differs	2				

Table B8. Action Rankings in General Arts & Sciences

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	6	4	1	0	0
Request through ILL	2	2	1	0	0
Ask a friend	0	1	4	0	0
Contact library	0	0	0	0	0
Purchase from publisher	0	0	0	1	0
Contact the author	1	0	0	0	1
Academic networking site	6	3	0	0	0
Social media / other website	0	0	0	0	0
Google / Google Scholar	0	0	0	0	0
Multiple affiliations	1	0	0	0	0
Other	0	0	0	0	0
No preference / differs	0				

Table B9. Action Rankings in Other Clinical Programs

	#1 Choice	#2 Choice	#3 Choice	#4 Choice	#5 Choice
Look for another article	5	1	0	0	0
Request through ILL	2	0	1	0	0
Ask a friend	0	1	0	0	0
Contact library	0	0	0	0	0
Purchase from publisher	0	0	0	0	0
Contact the author	1	0	2	0	0
Academic networking site	2	4	0	0	0

Social media / other website	0	0	0	0	0
Google / Google Scholar	1	0	0	0	0
Multiple affiliations	0	0	0	0	0
Other	0	0	0	0	0
No preference / differs	1				

Part C: Attitudes Toward Interlibrary Loan (ILL), Broken Down by Status

Table C1. Attitudes toward ILL of Undergraduate Students

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	7
I don't know how to request an article through ILL	20
I don't want to bother library staff	6
The ILL request process is too long / confusing	5
The ILL department usually can't find what I need	1
Haven't needed to use ILL	2
Didn't know ILL could be used for electronic PDFs	1

Table C2. Attitudes toward ILL of Graduate Students

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	13
I don't know how to request an article through ILL	21
I don't want to bother library staff	9
The ILL request process is too long / confusing	11
The ILL department usually can't find what I need	1
Haven't needed to use ILL	9
Didn't know ILL could be used for electronic PDFs	6

Table C3. Attitudes toward ILL of Postdoctoral Researchers/Fellows

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	1
I don't know how to request an article through ILL	2
I don't want to bother library staff	0
The ILL request process is too long / confusing	1
The ILL department usually can't find what I need	0
Haven't needed to use ILL	0
Didn't know ILL could be used for electronic PDFs	1

Table C4. Attitudes toward ILL of Faculty

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	9
I don't know how to request an article through ILL	10
I don't want to bother library staff	3
The ILL request process is too long / confusing	4
The ILL department usually can't find what I need	0
Haven't needed to use ILL	10
Didn't know ILL could be used for electronic PDFs	1

Table C5. Attitudes toward ILL of Staff

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	3
I don't know how to request an article through ILL	19
I don't want to bother library staff	7
The ILL request process is too long / confusing	6
The ILL department usually can't find what I need	0
Haven't needed to use ILL	9
Didn't know ILL could be used for electronic PDFs	6

Part D: Attitudes Toward Interlibrary Loan (ILL), Broken Down by Discipline

Table D1. Attitudes toward ILL in Health Sciences

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	14
I don't know how to request an article through ILL	28
I don't want to bother library staff	8
The ILL request process is too long / confusing	8
The ILL department usually can't find what I need	1
Haven't needed to use ILL	6
Didn't know ILL could be used for electronic PDFs	3

Table D2. Attitudes toward ILL in Library & Information Sciences

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	5
I don't know how to request an article through ILL	7
I don't want to bother library staff	4
The ILL request process is too long / confusing	5
The ILL department usually can't find what I need	0
Haven't needed to use ILL	6
Didn't know ILL could be used for electronic PDFs	4

Table D3. Attitudes toward ILL in Natural Sciences

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	7
I don't know how to request an article through ILL	8
I don't want to bother library staff	4
The ILL request process is too long / confusing	3
The ILL department usually can't find what I need	0
Haven't needed to use ILL	5
Didn't know ILL could be used for electronic PDFs	2

Table D4. Attitudes toward ILL in Other Academic Programs

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	6
I don't know how to request an article through ILL	7
I don't want to bother library staff	2
The ILL request process is too long / confusing	2
The ILL department usually can't find what I need	0
Haven't needed to use ILL	3
Didn't know ILL could be used for electronic PDFs	0

Table D5. Attitudes toward ILL in Fine Arts & Humanities

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	0
I don't know how to request an article through ILL	5
I don't want to bother library staff	0
The ILL request process is too long / confusing	1
The ILL department usually can't find what I need	0
Haven't needed to use ILL	1
Didn't know ILL could be used for electronic PDFs	0

Table D6. Attitudes toward ILL in Other Interdisciplinary Programs

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	2
I don't know how to request an article through ILL	9
I don't want to bother library staff	3
The ILL request process is too long / confusing	5
The ILL department usually can't find what I need	0
Haven't needed to use ILL	5
Didn't know ILL could be used for electronic PDFs	3

Table D7. Attitudes toward ILL in Social Sciences

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	3
I don't know how to request an article through ILL	8
I don't want to bother library staff	2

The ILL request process is too long / confusing	2
The ILL department usually can't find what I need	1
Haven't needed to use ILL	0
Didn't know ILL could be used for electronic PDFs	1

Table D8. Attitudes toward ILL in General Arts & Sciences

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	3
I don't know how to request an article through ILL	6
I don't want to bother library staff	1
The ILL request process is too long / confusing	3
The ILL department usually can't find what I need	0
Haven't needed to use ILL	3
Didn't know ILL could be used for electronic PDFs	1

Table D9. Attitudes toward ILL in Other Clinical Programs

Reason for not using ILL	Number of selections
It takes too long to get articles delivered through ILL	1
I don't know how to request an article through ILL	6
I don't want to bother library staff	1
The ILL request process is too long / confusing	1
The ILL department usually can't find what I need	0
Haven't needed to use ILL	1
Didn't know ILL could be used for electronic PDFs	1

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