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Cancelling the "Big Deal" at a Public University: A Discussion of STEM Faculty Perceptions of Cancellation and an Examination of Post-Cancellation Usage Data

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Abstract

This article discusses how faculty, staff, and students at the University at Buffalo (UB), a public Carnegie R1 university, were impacted by the cancellation of the Elsevier ScienceDirect Big Deal package. After the cancellation, UB participated in a multi-site study which included interviewing faculty about the effect of the cancellation on their research and teaching. In general, the faculty were supportive of the cancellation. There was frustration expressed with the current structure of the publishing industry, particularly with the exorbitant pricing of journal subscriptions. Later analysis of usage data at UB post-cancellation was conducted; unsurprisingly, the data showed a

decrease in usage on the ScienceDirect platform and an increase in requests for unavailable articles. Although the cancellation of ScienceDirect had a direct impact on UB, the initial outcome was not exceedingly harmful and could be addressed through mitigating measures such as the quick fulfilment of requests for unavailable articles.

Keywords: Big Deal; collection development; STEM faculty

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Introduction

The term "Big Deal" is used to describe the large and expensive scholarly journal subscription packages that are acquired by university libraries (Frazier, 2001). The packages are meant to provide access to a wide range of journal titles in one bundle, theoretically saving librarians time in selecting individual journals. Since these types of subscription deals are large (hence why they are referred to as "big") in terms of scope and cost, they are often negotiated as multiple year contracts with an agreed-upon annual percentage increase. Generally, Big Deal subscription costs take up a sizable portion of a library's annual budget.

Although these Big Deals were popular as journals moved from print to electronic access, they have been subjected to increased scrutiny over the past 15 to 20 years as libraries have faced budget cuts. Many libraries' budgets have declined significantly over this time, yet the Big Deal packages continued to increase from a few percent per year to 10% or more. As Coghill (2019) pointed out, "the increases in electronic resource renewals far outstrip a library's ability to cope with increased costs" (p. 122).

In 2018, a Big Deal contract between the State University of New York (SUNY) system and publishing company Elsevier came up for renewal. The product at issue was ScienceDirect, a large database containing prominent journals and books focused on the health sciences, physical sciences and engineering, and life sciences. At the time of the negotiation, the contract cost SUNY over $10 million per year. The parties negotiated for over a year to reach a new agreement. At the conclusion, SUNY announced that it would not be renewing its "Big Deal" contract with Elsevier and instead would be contracting for a delineated list of 248 titles that would be provided to member libraries. Those 248 titles were selected based on usage statistics across all 64 SUNY campuses but focused on usage at the SUNY R1 institutions. Reported annual savings to SUNY were $5–$7 million, representing about 50%–70% of the cost of the original contract.

The University at Buffalo (UB), the focus of the present study, is one of SUNY's R1 institutions that was affected by the renegotiated contract. The university is a SUNY flagship and is home to over 30,000 students pursuing degrees ranging from undergraduate to professional/doctoral. The faculty at UB are active in research and publication; the research spending at UB recently reached $422 million (Rey, 2022). News of the ScienceDirect cancellation was delivered to UB faculty, staff, and students in April 2020 by the UB University Libraries (Wolfe, 2020).

After the cancellation, the UB Libraries were asked to participate in a multi-site study led by Ithaka S+R, a not-for-profit group researching issues in academia, which was intended to explore the impacts of cancelling the Big Deal on universities. As part of the Ithaka study, UB Libraries interviewed faculty from the UB Departments of Geology, Chemistry, and Civil, Structural and Environmental Engineering during fall 2020 to inquire how the ScienceDirect cancellation impacted their research and their teaching. Findings from the multi-site study were published in a report by Ithaka S+R in June 2021 (Cooper & Rieger, 2021). The authors of the present study conducted the interviews.

After the Ithaka study ended, we continued to be interested in the impact of the ScienceDirect cancellation on UB, particularly in our roles as science and engineering librarians. For example, what changes in ScienceDirect usage could be seen after the cancellation? How were UB researchers adapting to the shift in resource availability? In other words, what story was the quantitative data telling? We first presented on these topics at the June 2021 SUNY Librarians Association Annual Conference. Subsequently, we were invited to present our findings at the annual United Kingdom Serials Group Usage Data Online Seminar in October 2021, which we were invited to update during November 2022 and September 2023 presentations.

This article shares our analysis of (1) how UB researchers were affected by the cancellation of the Big Deal package and (2) the subsequent impact on ScienceDirect usage at the UB Libraries. We explore how UB faculty access, use, and value the scholarly content to which the UB Libraries subscribe. We also examine data both from Elsevier and the UB Libraries to assess changes in usage of the ScienceDirect platform, ranging from pre-cancellation to 2022. We conclude with a summary of the mitigating measures taken by the UB Libraries to minimize the effects of the cancellation.

Literature Review

The idea of electing to cancel or leave a Big Deal contract began appearing in the literature in 2001 when Frazier (2001) coined the term "Big Deal" and wrote about the associated costs of such packages—financial and otherwise. Frazier (2001) noted then that librarians should be investigating other methods of publishing, including open access, as the Big Deal packages could become too expensive over time. Following that pivotal article, the literature began to shift from mere talk of cancelling Big Deals to leaving or, at a minimum, preparing to leave these contracts. This was not an insignificant change in the library collections landscape. As Jurczyk and Jacobs (2014) note, nearly 90% of North American libraries subscribed to one or more Big Deal subscription packages. Indeed, the topic of Big Deals has been discussed frequently

enough in the literature that Sjoberg was able to conduct a literature review in 2017 of the published literature (Sjoberg, 2017).

Researchers commonly publish case study examples of their experiences with Big Deal cancellations. In January 2004, four North Carolina institutions (forming the Triangle Research Libraries Network or TRLN) walked away from two Big Deal contracts for several reasons, including budgetary concerns and the increasing costs of journal titles (Gibbs, 2005). Gibbs (2005) pointed out that the "inability to cancel journal titles [from the Big Deals] in order to subscribe to new titles" (p.89) was another leading cause of the cancellation. This was an important point of consideration due to the growing and evolving needs of researchers.

At Northern Illinois University, researchers found that disassembling their Big Deal package resulted in limited impact on the collection (Millhorn, 2018). As Millhorn (2018) states, their "usage data remained constant or even increased for each of the platforms involved" but that the "rise and demise of the Big Deal" was a nuanced discussion. Two Big Deal cancellation experiences from the University of Oregon and Southern Illinois University Carbondale were reported in Nabe and Fowler's (2012) research. In both cases they found that interlibrary loan requests did not increase significantly, nor did they experience more than a handful of complaints from users. Parang and Whitt (2021) also share a case study experience from Pepperdine University. That university has relied instead on alternative means of access including aggregator databases, as well as open access options like Google Scholar and Unpaywall (Parang and Whitt, 2021).

Beyond individual case studies, there are some authors that have declared that Big Deals are "dying" or already "dead" (Boissy et al., 2012; Bulock, 2023; Maranville & Diaz, 2021). As Bulock (2023) argues, the death of the Big Deal is imminent with the increased focus in publishing on open access. However, if the Big Deal is dead or if death is imminent, what is the alternative? Carlson and Pope (2009) surveyed libraries to determine the effect Big Deals have on budgets, as well as to explore alternatives to these contracts. The term "compromise" is one that generally appears in the literature as librarians navigate budgets, space, staffing needs, and access issues.

"Transformative agreements" are also studied in the literature as libraries seek new ways to establish partnerships with publishers and vendors (Schlak & Macklin, 2022). Transformative agreements, also known as "read and publish agreements," are a way for libraries or a group of libraries to "maintain access to scholarly content available only through subscription, while supporting the transition to open access publishing" (USC Libraries, 2022). Transformative agreements essentially redirect funds

to pay for open access article processing charges instead of journal or database subscription costs. However, as the blog "The Scholarly Kitchen" notes, just as it has been difficult to create one true definition of "open access," such is the challenge with transformative agreements (Hinchcliffe, 2019). Therefore, there is not a typical transformative agreement template. Borrego et al. (2021) reviewed 36 transformative agreements and found a great deal of diversity in the agreements that exist. The authors concluded that despite that diversity, the agreements are at least more transparent, something that wasn't seen in the Big Deal agreements. They further argued the need to focus on ensuring authors retain copyright in their work.

Utilizing patron usage statistics has been pivotal for librarians to determine the true value of these Big Deals (Bergstrom et al., 2014; Blecic et al., 2013; Bucknall et al., 2014; Bucknell, 2008; Gagnon, 2017; Ivanov et al., 2020; Jones et al., 2013). The impact of cancelling Big Deals on interlibrary loan services has also been studied in the literature, as librarians cope with the need for funding and staffing to fulfill the increased number of requests. For example, a literature review from 2020 found that many academic libraries that have cancelled their Big Deals have seen budget savings but also need to invest in maintaining services to provide alternative means of access for their patrons (Simard et al., 2020). The authors emphasized the importance of access to usage data but also the need to include relevant stakeholders in the decision-making process, such as staff, faculty, and students.

There are few papers that examine how faculty (researchers and instructors) feel about "Big Deal" contracts. Olsson et al. (2020) provided insights from Swedish researchers following the cancellation of their institutions' Big Deal with Elsevier. Ithaka S+R also set out to understand the researcher perspective in their multi-site research study in 2020 (Cooper & Rieger, 2021). (Note that the authors of this paper were part of that multi-site study.)

Methods

The present study was part of a larger effort coordinated by Ithaka S+R (Ithaka), a not-for-profit research and consulting firm that specializes in higher education research. Eleven academic libraries partnered with Ithaka to participate in a report that examined the implications of cancelling Big Deal subscription packages at research institutions in the United States and Germany. The participating libraries had either recently cancelled a Big Deal package or were considering cancelling such a package. In particular, the study sought to understand faculty practices and perceptions of their respective libraries' subscription decisions. The research questions were:

(1) How do significant shifts to journal access, such as Big Deal cancellations, affect the research experiences of users and their perceptions of the library?

(2) What are users' strategies when their access to journal content changes?

(3) How do libraries project, assess, and monitor the potential impact of changes to what journal content they help to make available, such as through Big Deal cancellations? (Cooper & Reiger, 2021)

UB's participation in the project was a result of its April 2020 cancellation of SUNY's contract with Elsevier. Each participating institution was asked to obtain ethics/institutional review board (IRB) permission for the study and then conduct semi-structured interviews with faculty members. Ithaka provided a semi-structured interview guide used to conduct one-on-one interviews with UB faculty members (Appendix A). IRB approval was sought and granted on August 17, 2020 (UB STUDY 00004697). We chose to interview faculty members from UB's science and engineering departments because many of the journal titles cancelled from ScienceDirect "Big Deal" package were science and engineering focused.

Emails were sent to faculty members in each department requesting a confidential interview and participation was voluntary. In the Department of Civil, Structural, and Environmental Engineering, seven faculty members were solicited, but two declined and two did not reply. In the Department of Chemistry, nine faculty members were solicited, but one declined and three did not reply. In the Department of Geology, five faculty members were solicited, but two declined and one did not reply. The UB team interviewed three faculty members from the Department of Civil, Structural, and Environmental Engineering, four faculty members from the Department of Chemistry, and two faculty members from the Department of Geology. We included faculty from all levels—from assistant professor to full professor. Academic departments were chosen based on several factors, including feedback from the department after the cancellation and the number of disciplinary titles removed from the new package. This resulted in nine interviews conducted in Fall 2020 via Zoom. The interview transcripts were transcribed and de-identified, and then sent to Ithaka S+R for coding and analysis. Selected findings from this analysis were published by Ithaka S&R in June 2021 (Cooper & Rieger, 2021).

Table 1

Interview Participants

Rank	**Department**
Professor	Geology
Associate Professor	Geology
Associate Professor	Chemistry
Assistant Professor	Chemistry
Assistant Professor	Chemistry
Associate Professor	Chemistry
Professor	Civil, Structural, & Environmental Engineering
Associate Professor	Civil, Structural, & Environmental Engineering
Assistant Professor	Civil, Structural, & Environmental Engineering

Under the agreement with Ithaka, this study's authors were permitted to use the interview transcripts in future research and analysis, such as this study. Because the project's goal was to generate insights that could be used to inform and improve library services at UB, it was designed to be exploratory and small-scale. Thus, due to the small number of participants interviewed on UB's campus and the homogeneous sample population (i.e., those impacted by the cancellation), a formal qualitative analysis was not conducted (Hennink & Kaiser, 2022). The interviews, however, were analyzed for common themes and patterns, which are reported in this article.

Next, to further explore the impact of the ScienceDirect cancellation at UB, we gathered and analyzed data using descriptive statistical methods. This enabled us to view the impact on faculty as well as students. We collected this data in phases due to the timing of our conference presentations. The first phase of data collection and analysis occurred in October 2021, approximately one year after the contract was cancelled. This data was retrieved upon request from the UB Libraries Discovery & Delivery Services unit, which monitors interlibrary loan requests by user category, financial cost, and time to delivery from request. Additional data was retrieved from reports provided by Elsevier including general usage data, access denials, and access by publication year. This second phase of data collection and analysis occurred in 2022, months after cancellation. Like the first phase of data collection, requests for data were made to UB's Discovery & Delivery Services unit and Elsevier's reports were analyzed. Even though we collected the data in phases, the data presented in this article is detailed by year and we will discuss the results by year as well.

Results

Faculty's Perceptions of the Big Deal Cancellation & Research Practices

UB faculty were asked several questions in a semi-structured interview. The questions were drafted by Ithaka and the interviews were conducted by this research team.

Communication of ScienceDirect Cancellation

Communication was a major theme in the semi-structured interviews. We asked participants about how they heard about two key components: the discussion about the possibility for cancellation before it occurred, and the announcement about the cancellation. Prior to the cancellation, faculty were invited to town hall meetings on campus hosted by the UB Libraries. The faculty interviewed were mostly aware of the town hall meetings. Faculty shared that they "understood" the cancellation and were cognizant of the significant cost: "I went to one or two of the town hall meetings that were held when they were negotiating the contract and I completely understand why the university made the decision that they did, and it's extremely expensive." Additionally, the faculty interviewed were largely in favor of the cancellation. Many pointed out how well Delivery+ (UB Libraries' inter-library loan (ILL) system) works and that the cancellation ultimately had minor impact on them personally because they were still able to get what they needed through Delivery+. Faculty noted that they attempt to explain to students the excessive cost of journal packages and that libraries are constrained financially. Faculty further shared that they encouraged the students to use Delivery+ to request needed articles.

Access to Items Not Available in the UB Libraries

After the cancellation, UB Libraries encouraged faculty and other researchers to use UB's Delivery+ service to request items to which we no longer had access. This series of findings is a result of questions we asked faculty about how they would go about accessing an article when we did not own it.

Faculty were first asked about UB's Delivery+ services. Interviewed faculty were complementary about the service, particularly the speed of request delivery. However, faculty were slightly irritated about the "number of clicks" it takes to put in a request on the UB Libraries' webpage. Interviewed faculty will not use Delivery+ if they are under a research time crunch (e.g., grant application deadlines). One faculty member stated that they would find a different article citing similar research to fill a gap: "Very rarely

have I ever found chemistry that's solely in one place. . . Research is iterative, and people do the same research, or some other group is doing similar research."

Faculty also reflected that they might move on to another article for reasons of convenience. This quote shares a bit of that thinking:

> "So truthfully, I'm a little bit torn about removing journals, but saving money is also something to consider. I also, like every academic on the planet, think the whole model is just beyond absurd - I'm giving them my work, begging them to publish it, and then they are selling it. So, I'm kind of all over the place in my opinions here and I don't know what's best. And so rather than try to, you know, come up with a solution, I just move on to a different paper."

Faculty shared concerns that graduate students do not have the patience to use Delivery+. One faculty member shared how he used to come to the library to request articles and then wait a week until it arrived at his desk and reflected on the change in the pace of research over his career.

Alternative Models for Accessing Research

The interview next turned to the use of alternative websites that faculty may use to conduct research. For instance, most of our faculty have not attempted to access SciHub due to copyright and legitimacy concerns. Almost all our faculty have used the website ResearchGate, and a few have a profile with linked papers. Moreover, our faculty noted the time-honored tradition of simply asking an author for a copy of their paper. During this series of questions, faculty members expressed concerns regarding equitable access to research and whether these websites provided researchers in less wealthy countries an avenue for access.

We also asked faculty to consider the use of "preprints." In the study, preprints were defined as versions of academic articles published in online repositories (e.g., arXiv, ChemArxiv or bioRxiv) before they have gone through formal peer review. Within the context of preprint research, faculty shared differing viewpoints and usages, which did not fall neatly within academic disciplines. One faculty member shared bluntly: "It's not real [research] until it goes through peer review." Another would consider using preprints but would first email their colleague to ask the publishing status of the preprint or they would spend time reviewing the science themselves, trusting that a scientist would not risk their reputation by posting research in a public forum. One faculty member noted that preprint publications could be useful to avoid getting "scooped" by another author: "When I have an article that's having trouble getting published and believe that the article is of the highest scholarly standard, then I

will submit it to the ChemArxiv so that it's available to the broader scientific community. I don't want to get scooped." We had one faculty share that they cite preprints in NIH grant applications to show that the research is new and innovative.

The only area regarding preprints with some consensus was teaching. Interviewed faculty were not using preprints in teaching. One explained:

> "I don't use them in teaching [… in order] to emphasize the peer review process. So, like, it seemed like kind of a weird message to send to students to say peer review is an important part of what we do and here's a non-reviewed article, I'd like you to look at it because it's fresh. So, I have trouble with how to deal with that, so I don't [] actually spend a lot of time with that literature."

Faculty were concerned that students would not have enough background knowledge to distinguish the research in preprints from published articles.

Post-Cancellation Usage of ScienceDirect at UB

Elsevier/ScienceDirect Data Reporting on UB Libraries' Usage of the Platform

To examine how usage of the ScienceDirect package at UB changed after the cancellation, we first looked at the COUNTER report data provided by Elsevier to UB. A COUNTER report, short for **C**ounting **O**nline **U**sage of Network **E**lectronic **R**esources, is a standardized report developed by a non-profit standards organization for capturing usage statistics at libraries. The definitions for the reports and terminology detailed in this section are taken from the online handbook published by the Counter Organization in 2019, "The Friendly Guide to Release 5 for Librarians."

There are several different COUNTER reports available. The details in Figure 1 are taken from title master report J2 ("TR_J2") which illustrates denials of access to journal titles within ScienceDirect. A denial of access indicates that UB did not have a license to that journal title at the time of user request. For example, in the calendar year 2019, users were denied access to journal titles over 42,000 times. The specific titles are listed in the TR_J2 report but we do not report that information here as it is not relevant to our broader analysis. The years 2020 to 2022 show a steady increase in the number of denials.

Figure 1

Denials of Access to Journal Titles in ScienceDirect 2019-2022

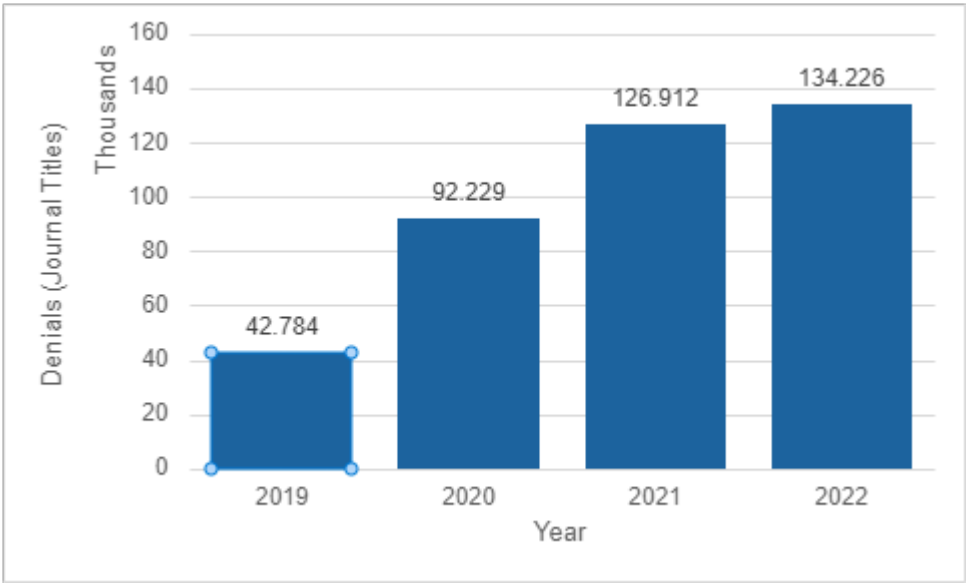


Figure 2 illustrates how usage of ScienceDirect at UB has changed from 2019 to 2022, again using COUNTER data provided by Elsevier in the platform usage report ("PR_P1"). This figure captures searches on the ScienceDirect platform as compared with unique item requests. "Searches" are defined as the count of user-initiated searches using the ScienceDirect publisher platform. "Unique Item Requests" are defined as the first user click to retrieve a certain item, excluding future clicks on that item by a user. An item may be either an article, ebook, book chapter, or multimedia file. This figure illustrates a decrease in both searches on ScienceDirect and user requests on ScienceDirect between 2019 (pre-cancellation) and 2020-22 (post-cancellation). There is a slight uptick in platform usage between 2021 and 2022.

Figure 2

ScienceDirect Searches & Requests 2019-2022

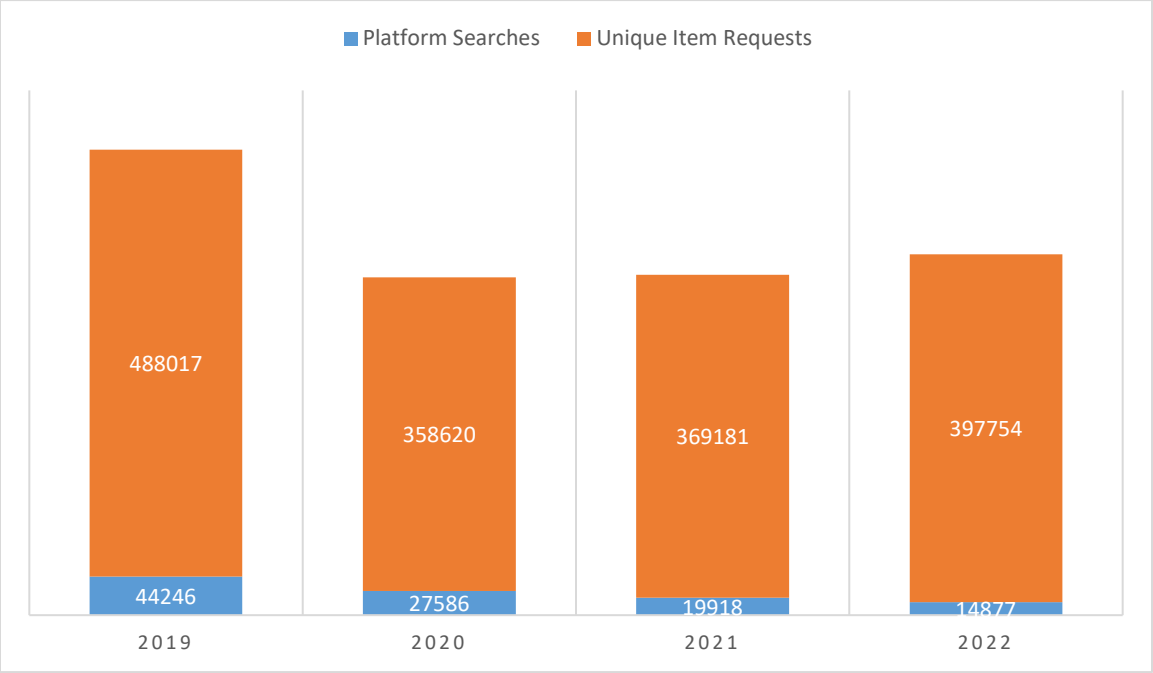
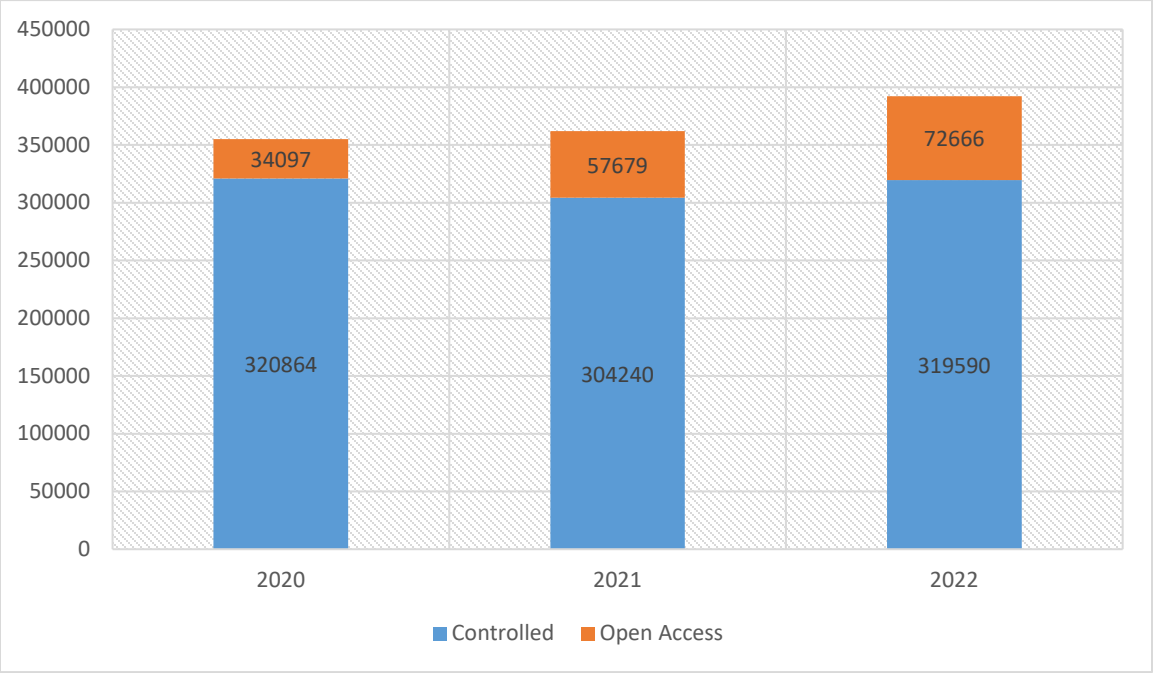


Figure 3 displays the unique item requests for journals, illustrating the contrast between controlled items (blue) and open access items (orange) from 2020 to 2022. Data for this figure was compiled using the COUNTER title master report ("TR"). As detailed in the "Friendly Guide," this data is useful "if you want to see what proportion of usage from Hybrid journals is from OA_Gold articles and what proportion is from articles funded by subscription" (Mellins-Cohen, 2019, p. 16). OA, or open access, article requests steadily increased from 2020 to 2022.

Figure 3

ScienceDirect Article Usage by Controlled and Open Access 2020-2022 (%)



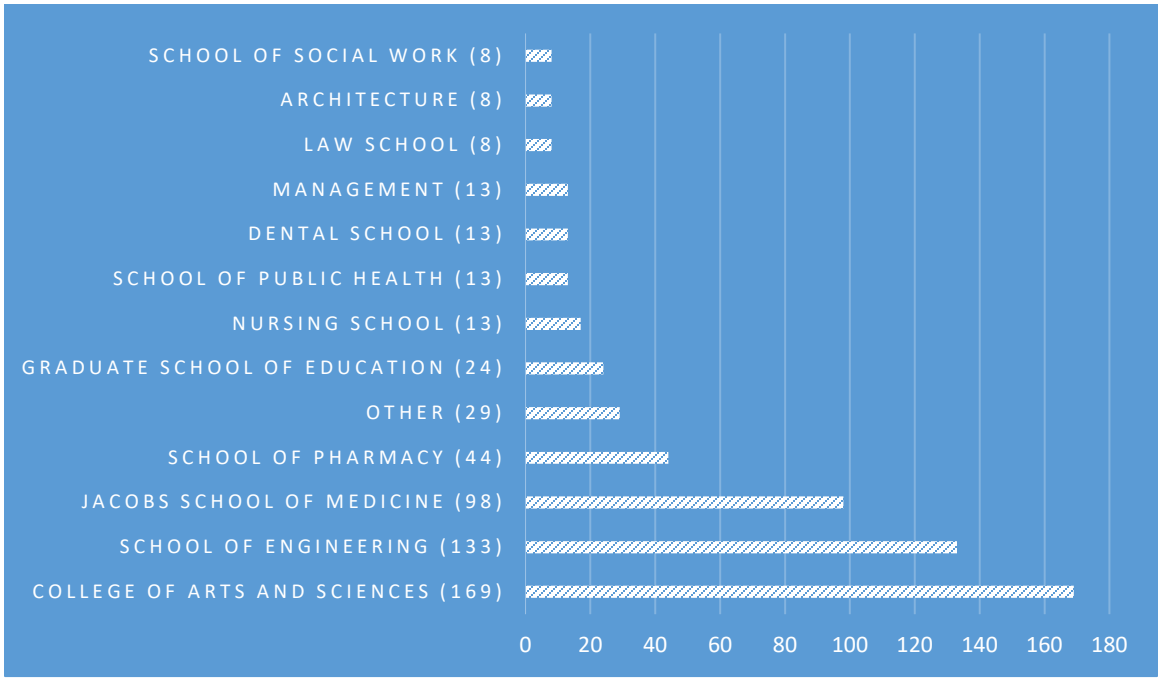
UB Libraries' Internal Data on ScienceDirect Usage

The following data were collected with assistance from UB Libraries' Discovery & Delivery Services team. The timeline of this data runs from cancellation (April 2020) to the middle of the Fall 2022 semester at UB (September 2022), approximately 2.5 years.

Figure 4 illustrates the number of distinct patrons who submitted requests for articles in journals that were cancelled after the new contract with ScienceDirect. This includes faculty/staff, graduate students, and undergraduate students, all of whom are sorted by school affiliation. The "other" category captures students with undeclared majors and requests made by non-school based units (e.g., UB's Research Institute on Addictions).

Figure 4

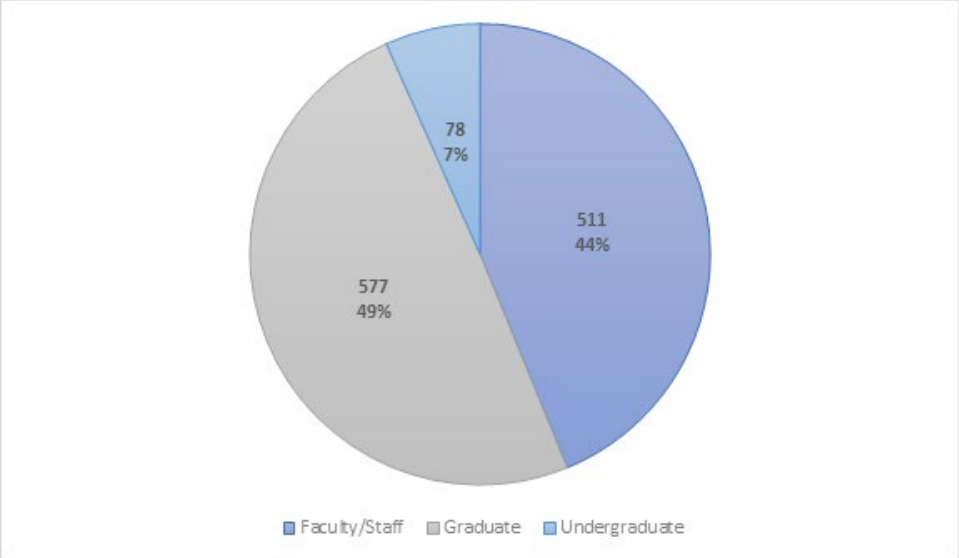
Requests by UB School Affiliation (April 2020-September 2022)



Most requests were from the categories of faculty/staff and graduate students, as illustrated below in Figure 5.

Figure 5

Requests by UB Affiliation (April 2020-September 2022) (count, %)

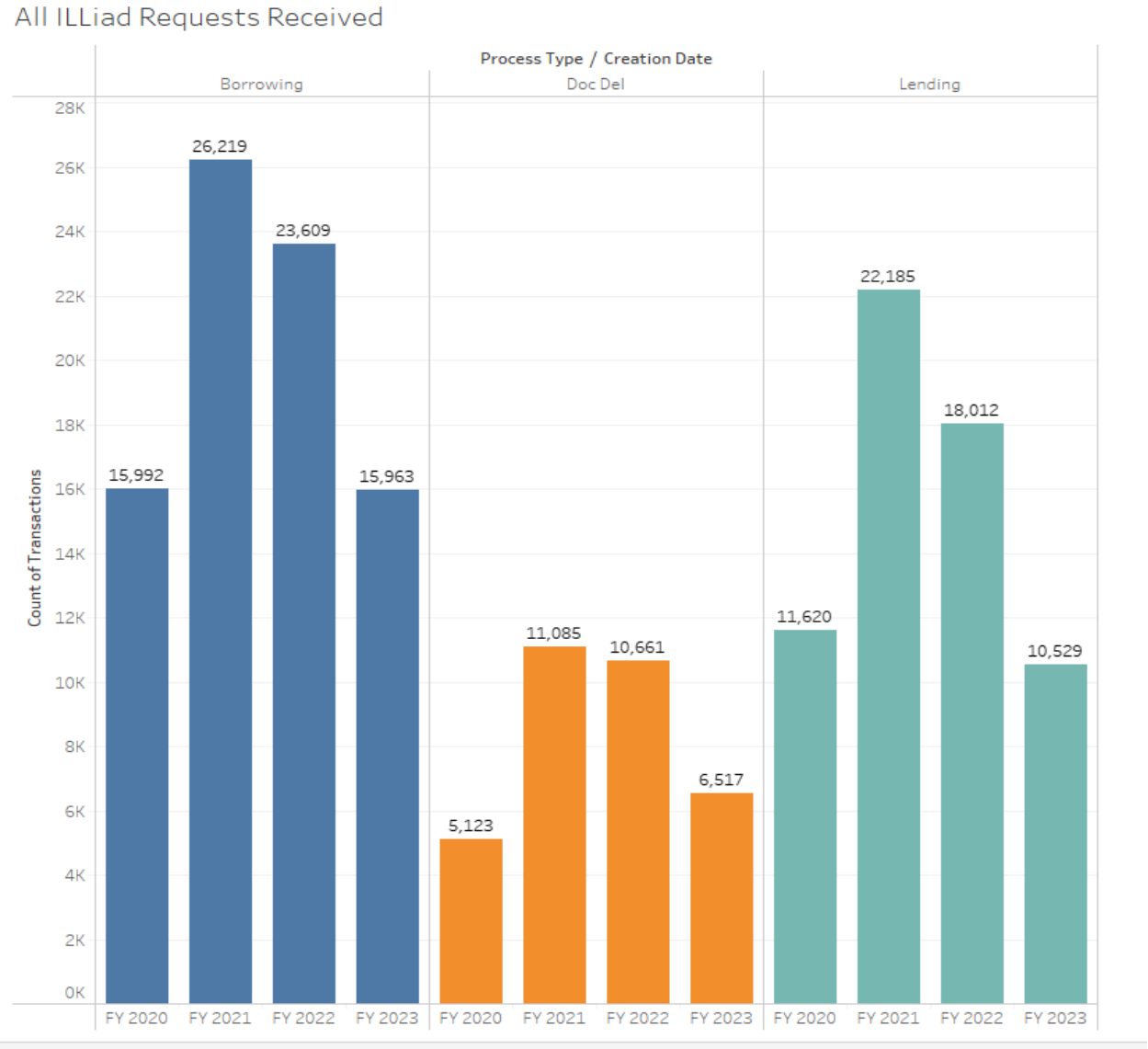


Depending on the external interlibrary loan service utilized by UB's Discovery & Delivery Services team, turnaround time after a Delivery+ request ranged from 0.1 hours to 14 hours. The average time for article delivery was 1.6 hours. UB utilized four different document supplier services over this period, relying heavily on the following providers: Rapid, Reprints Desk, OCLC, and Docline. Most of UB's requests were filled by Rapid.

Figure 6 illustrates the overall number of ILLiad requests received over a time span of 4 years. The UB Libraries use ILLiad software (an OCLC product) to manage resource sharing workflows. Document delivery requests through Delivery+ spiked during FY 2021 and FY 2022, and then returned to a lower number in FY 2023. Spikes in borrowing and lending were also seen in FY2021 and FY 2022, with a corresponding return to lower numbers in FY 2023.

Figure 6

Borrowing, Document Delivery, and Lending Requests at the UB Libraries from 2020-2023



Discussion

Faculty's Perceptions of the Big Deal Cancellation & Research Practices

Communication of ScienceDirect Cancellation

The majority of faculty interviewed were aware of the SUNY-wide ScienceDirect cancellation, which had happened six months prior to the time of the interviews. One would hope that this meant most UB faculty knew of the cancellation, but anecdotally we can attest otherwise. Therefore, we think that there may be a correlation between who agreed to be interviewed and who was aware of the cancellation. It is also likely that the faculty that agreed to be interviewed wanted to speak about the ScienceDirect cancellation because they were either staunchly in favor of the action or upset by the change in access. However, it was important to learn these opinions firsthand, as librarians do not always have the opportunity to talk with faculty about cancellations. We would be remiss not to mention that the timing of this cancellation (and interviews) corresponded to the global COVID-19 pandemic, which may have affected our response rate to interview requests.

Access to Items Not Available in the UB Libraries

Learning that the faculty we interviewed are aware of UB's Delivery+ service was unsurprising as we often hear from faculty directly that they use it. Usage statistics from the Delivery+ team also confirm that faculty remain heavy users of the service. However, again, conversations with faculty about Delivery+ tend to be brief or related to an issue they are experiencing. This interview allowed us the opportunity to dig a little deeper and unearth other thoughts and concerns related to the service and access to items in general. For instance, we learned that faculty are frustrated with the number of "clicks" or buttons/links that must be selected to submit a request. This allowed us to provide some insights to our Delivery+ team about our users' perceptions. (Although some "clicks" cannot be helped due to the out-of-the-box software used on the Libraries' website, it did lead the team to add a new field to the article request form. Users can now enter an article DOI (digital object identifier) and the rest of the form is automatically populated with information such as author name, title, etc.) We hope that this feedback continues to encourage discussion about the tools and services we offer.

Alternative Models for Accessing Research

When speaking to faculty about alternative means for accessing scholarly literature, it was helpful to learn how they obtain the full text of papers needed for their research. In some cases, faculty shared that it was easier to ask colleagues and fellow

researchers for copies of articles we do not have access to at UB. This raised concerns for us. When faculty go outside of the Libraries' systems, we lose valuable usage data which is then used by the Libraries to make collections decisions. Without this usage data (which includes ILL requests and blocked access attempts), it is hard for librarians to know what users truly need for research and teaching.

Preprints were another topic that the faculty were asked about. We were especially intrigued by the faculty members' responses that some preprints were not "real" research. These were the same faculty that stated they did not use preprints in teaching because they preferred to "emphasize the peer review process." If anything, this shows a unique opportunity for greater collaboration between librarians and faculty to educate students on preprints and how they are a part of the scholarly literature landscape. This teaching would be best suited for graduate or upper-level undergraduate students who are taking research-based courses. Without education regarding the purpose preprints serve, students may stumble across them during their own research and not understand that while they are valuable, they are not the finalized version of the paper. It could also allow for conversation about the research and publication process, and where the Libraries fit in that paradigm. This could be especially useful for PhD level students who may have careers in academia and will need to understand the process for their own tenure and promotion purposes.

Post-Cancellation Usage at UB

Elsevier/ScienceDirect Data

Before we discuss the COUNTER data, it should be noted that although the data is considered to be reliable, some do cite concerns about comparing data across platforms (e.g., comparing usage statistics from COUNTER5 and the OpenURL link resolver in an academic libraryor examining how vendor platform design impacts how COUNTER5 data usage is counted) (Echeverria & Bustamante, 2023; Getsay & Chen-Gaffey, 2021). In this study, we are comparing data within one database over years, so this concern is not applicable.

The increase in denials for ScienceDirect journal titles displayed in Figure 1 was expected, especially in the year that the contract was cancelled (2020) and year after (2021). Denials, however, continued to increase even in 2022. The reason for this increase is difficult to determine. It could be that 2022 is still close enough to the 2020 cancellation date that the after-effects of that cancellation are still evident. The increase could also be related to new students and faculty at UB who were unaware of the cancellation and attempted to access blocked journal titles. Based on these observations,

we think that librarians at UB need to continue communication regarding the ScienceDirect cancellation and alternative access options for these journal titles.

Similarly, the decrease in platform usage and user requests was also expected post-cancellation (Figure 2). Despite the slight increase in platform usage seen in calendar year 2022 (398,000), the platform usage is nowhere near the 2019 number (488,000). It is unclear where these users are now conducting research. Again, as more UB users leave our subscription platforms to do research elsewhere, the odds of UB Libraries capturing usage data for our collection management decisions decreases.

The report illustrated in Figure 3, detailing the use of open access and controlled access articles, is interesting. It is difficult to ascertain if this increase of OA article usage was a conscious researcher choice, or if the journals are publishing more OA articles overall, or if there is another reason altogether. However, this data could be used as a point of discussion with faculty and students when speaking about publishing and access options. This may be an area that requires further investigation.

UB Data

Beyond the COUNTER data regarding usage supplied directly from Elsevier/ScienceDirect, we felt it was imperative to include data from the UB Libraries. Figure 4, showing the number of distinct patrons who submitted requests for ScienceDirect articles following the cancellation announcement in April 2020, depicted what we felt was the reality—our users in sciences and engineering were impacted the most by the cancellation. However, as users in the sciences fall under the large College of Arts and Sciences (CAS) umbrella, it is not possible to ascertain a specific number of requests specifically tied to "science" faculty and students. Nevertheless, the CAS was the largest group requesting ScienceDirect items (n=169), followed by the School of Engineering and Applied Science (n=133).

The results also show that researchers in the CAS and the School of Engineering and Applied Sciences are utilizing UB's Delivery+ service more frequently than other disciplines. Users from the School of Medicine (n=98), the School of Pharmacy (n=44), and other health science-related areas (n=39) were impacted to a lesser extent. Although SUNY retained select journal subscriptions from ScienceDirect after the Big Deal cancellation, most of those titles were health science focused. This data, together with the information learned from the faculty interviews, however, begins to build a case as to why UB may need to resubscribe to select ScienceDirect titles in the future or investigate alternative options for access. One of those alternative options, a service called Article Galaxy Scholar, will be discussed in more detail in the following section.

We also found it useful to see that requests originated from many different schools and colleges on campus, including the Law School (n=8), School of Management (n=13), and the School of Architecture and Planning (n=8). This demonstrates the interdisciplinary nature of scholarship and the broader reach of ScienceDirect titles. We posit that if other "Big Deals" or major multidisciplinary databases ever needed to be considered for cancellation, the impact would be equally far-reaching.

The information gleaned from Figure 5 was not surprising to us, nor would we expect it to be surprising to many other librarians. Most of our Delivery+ requests came from faculty (n=511, 44%) and graduate students (n=577, 49%) due to their teaching and research needs. This data was imperative when we made the argument to purchase and launch a new service at UB Libraries aimed specifically at reducing wait time for users requesting ScienceDirect (and other) articles. Figure 6, illustrating the overall number of ILLiad requests received over 4 fiscal years, shows how the Libraries experienced increases in borrowing, document delivery requests, and lending in 2021 and 2022. These numbers quite likely reflect the impact of the COVID-19 pandemic on the Libraries' services. The Libraries were closed for a period which corresponds to the spikes in demand. Like other universities, it took a while for normalcy to return, corresponding to the 2023 numbers.

Efforts by UB to Mitigate Cancellation Effects

There were limited complaints about the cancellation, but enough that the UB Libraries investigated how to mitigate the effects of the cancellation on our researchers. In March 2023 the Libraries launched a pilot project with the vendor Reprints Desk for the Article Galaxy Scholar (AGS) service. This project was meant to specifically address the ongoing concerns and needs of faculty and students regarding delays in article access. The AGS service allows users to request journal articles and receive the full PDF text via email in seconds. AGS appears almost seamless to the user; there is a simple click of a button to obtain the PDF of the article. From the backend, it is an automated request where the library pays for the individual article. This is the same cost the library would incur if the patron requested the article through the traditional interlibrary loan service. A small additional fee per request is added to the library's cost as a convenience fee. There is also a reasonable annual cost to maintain the service.

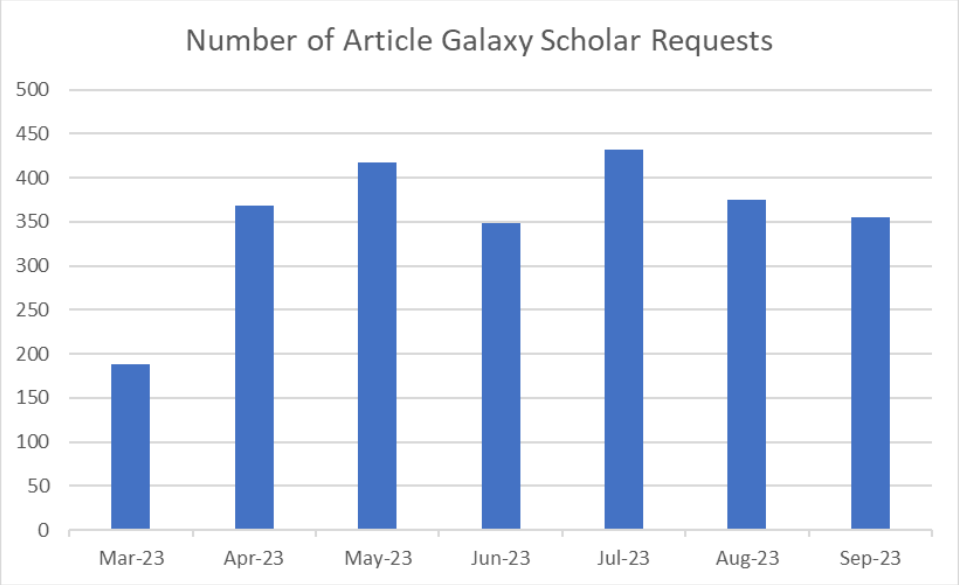
The AGS service itself is completely customizable in that it allows the library discretion in selecting a specific journal title or many titles, for one individual user or all users, for one publication year or all—and anywhere in between. For the pilot, UB Libraries decided to provide access for all faculty and graduate students to selected

journal titles, including all the titles in the science and engineering disciplines that were originally part of the ScienceDirect Big Deal package.

This service was launched without a major announcement, as it was a pilot project. Instead, liaison librarians were relied upon to spread the word to individuals or small groups/classes. Even with this very limited announcement of the service, it was quickly discovered by users and has been actively utilized. From mid-March through the end of September 2023, 2,485 total requests have been fulfilled (Figure 7).

Figure 7

Number of Article Galaxy Scholar Requests by Month



AGS requests were evenly split between graduate students (n=398) and faculty/staff (n=362), with one request from an approved undergraduate student (Figure 8). Requests have been fulfilled for users from all schools and colleges within UB, with the three largest schools having the highest number of requests: the School of Engineering and Applied Sciences (876 requests), the College of Arts and Sciences (414 requests), and the School of Medicine and Biomedical Science (349 requests) (Figure 9).

Figure 8

Number of Requests by User Group

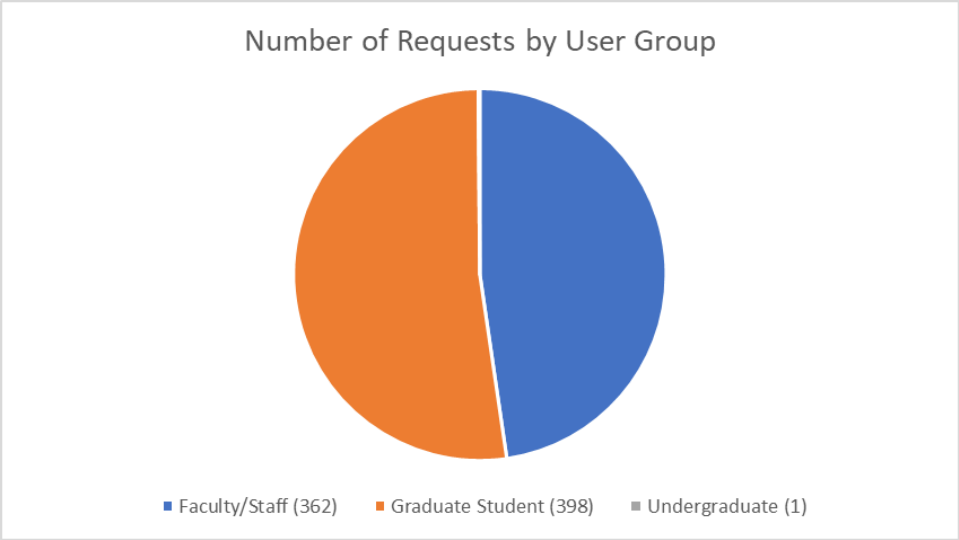
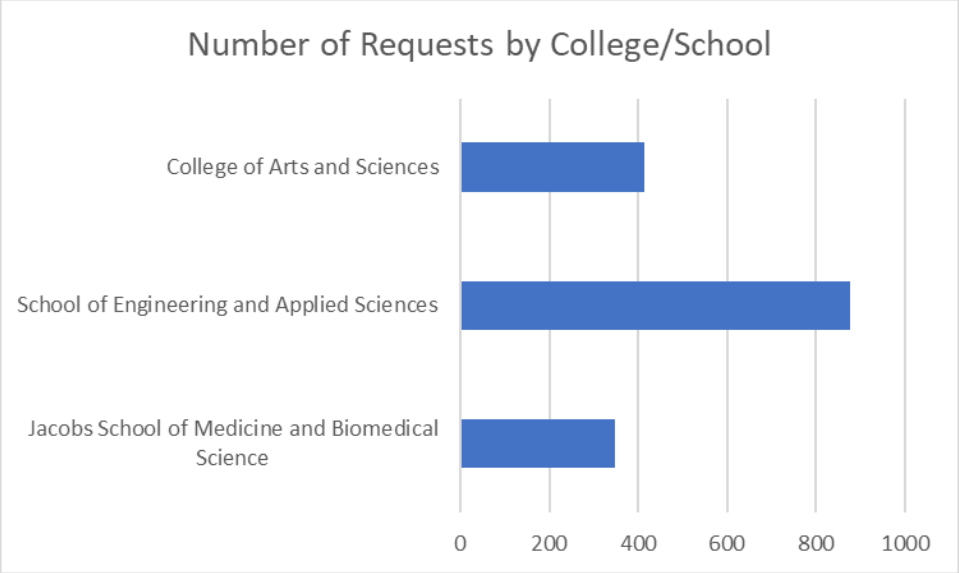


Figure 9

Number of Requests by College/School



While this service is still relatively new and more data needs to be gathered and analyzed, preliminary information indicates this is worthwhile for UB Libraries' users.

However, the overall budget must be examined before any future actions can be taken, such as adding additional journal titles or expanding the user population to undergraduate students. Another major consideration will be the decision to advertise this service. In the current pilot project, liaison librarians explain the service in specific circumstances. It might prove difficult to explain this option to a broader audience, especially if it is only available for select journals and for select populations (i.e., faculty and graduate students). Lastly, it should be noted that while AGS saves library staff time in fulfilling interlibrary loan requests, it does require additional work in adding or removing journal titles and specific users (i.e., approved undergraduate researchers), as well as gathering and analyzing data.

Limitations

The small sample size of interviewees was a limitation in this study, especially considering the size of UB and its College of Arts and Sciences and School of Engineering and Applied Sciences. Several faculty members contacted indicated they would have liked to participate but were unable to due to the timing of the request. Additionally, the interviews were conducted during the COVID-19 pandemic.

Conclusion

Although the cancellation of the ScienceDirect Big Deal package had a direct impact on UB, the initial outcome was not exceedingly harmful and could be addressed through mitigating measures such as the quick fulfilment of requests for unavailable articles. Even though most faculty are supportive of efforts to curb library expenses, researchers do need direct access to peer-reviewed research. Our paper shows one way that juggling the demands of faculty research, budget constraints, shifting subscription packages from publishers, and institutional priorities can be approached by academic libraries.

Looking ahead, we endeavor to study the impact of a Big Deal cancellation on student research behavior. We have noticed students are often confused by database user interfaces, especially when a change in access occurs. We want to explore how student users interpret the database platform and how that impacts their research. We hope to collaborate with the UB Libraries' User Experience team to conduct this research. Another goal of such a study would be to share the results with database vendors to improve the user experience. Additionally, we would like to focus on graduate students and the impact of a Big Deal cancellation on their research. We think understanding the cancellation's impact will inform how academic librarians can support graduate students in their research.

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Appendix

Interview Guide: Inquiring after a change to journal access

Introduction

The availability of alternative mechanisms for accessing scholarly content and expectations around financial stewardship is growing. Within this context, the library is conducting a study to understand the best strategies for managing subscriptions. I'd like to ask you questions about the way you access scholarly articles, as well as your views on open access publishing models and the role of the library more broadly.

Discovery and Access Process

To begin, I'd like to focus on your own use of academic journal articles.

1. How do you identify articles to use for your research or teaching? (Examples: citations in articles, Google Scholar, Web of Science)

- Walk me through your process of finding and accessing the article step by step. Do your processes vary depending on your goals for searching (e.g. keeping up with the literature vs. conducting a formal literature review)?
- How does your process of finding and accessing articles relate to common practices in your discipline?

2. Now I'd like you to think about a time when you identified an article you wanted to look at but found that [*name of institution*] doesn't subscribe to the journal ("hit a paywall").

3. Did you continue to try to obtain the article elsewhere?

- *If yes,* How? (Examples: look on ResearchGate, submit an ILL request, email the author or a colleague)
- Are there any other strategies you have used in the past to find articles you wanted but couldn't get access to?
- *If no* Have there been other times when you have continued to look for an article after realizing that you don't have institutional access? (*Continue with the prompts following If yes*)

4. What factors influence your decision on how to proceed when you don't have institutional access to an article?

5. Do you have any perspectives on the use of sites like SciHub?

6. Have you noticed any changes to what journal content is available through the library in the last three years?

7. Are there any other issues or thoughts about accessing scholarly articles more broadly that you would like to raise?

Other Access Mechanisms

Next I'd like to get your thoughts on some alternative models for publication and access.

"Preprints" are versions of academic articles before they have gone through formal peer review and publication. Some researchers make preprints of their work available through online repositories, such as their institutional repository, or websites like ResearchGate [*if appropriate, add an example in the interviewee's field such as ChemRxiv, arXiv, bioRxiv*].

8. Do you use preprints in your research or teaching?

- Would you consider a preprint an acceptable substitute for the published version of an article if the published version isn't available? Why/why not?
- Has your use of preprints increased in the past three years?

9. Another way in which articles can be available without a subscription is if the article is open access. As interest grows around making content openly available there is serious debate about the best models for how those efforts can be sustained financially. Some of the current models include:

- Researchers paying article processing charges (APCs) to make their articles open access, usually out of grant funding or from university-provided funds
- Libraries negotiating paying APCs for the whole institution in bulk
- Institutions investing in institutional repositories where pre-prints are made available

Do you have any perspectives on which, if any, of these models is preferable?

10. Have you reflected on how the ability of other scholars to read your work without a subscription might impact how it is used and cited?

- If so, how does this play into your decision making process when deciding where or how to publish your research? Examples: choosing to publish in open access journals, depositing the non-version of record into an institutional repository

11. Are there any other issues or thoughts about the sustainability of publishing models, preprints, or open access that you'd like to raise?

About the Cancellation

In [*month, year*], the library canceled its subscriptions to a number of [*publisher*] titles, including [*insert a few that are associated with this person's department*]. Issues published before [*month, year*] are still available through our institution, but any issues published since then aren't.

12. Were you aware of this cancellation?

- How did you find out about it?
- Do you feel you understand the library's rationale for canceling these titles?
- Given that you still have access to articles published before [*month, year*], can you explain at which point this archive will be too out of date to still be useful to your research?

13. Has this cancellation affected your or your colleagues' research or teaching? How?

- I know that others (e.g. grad students) may be tasked with conducting literature reviews to support faculty-led research projects. What impact, if any, has this cancellation had on the work of your students in this capacity?
- What impact, if any, does a lack of institutional access to certain journals have on the work of your students in other capacities? *Examples: your ability to assign course readings, students' ability to conduct independent research for class assignments*
- Has the cancellation affected the reputation of your department within your field, or of [*institution*] more broadly? If so, how?

14. Has the cancellation affected your perception of the library? If so, how?

15. In the past few years, several universities have chosen to cancel large journal subscription packages. For example, last year the University of California system ended its agreement with Elsevier, which means that their scholars do not have access to new content available via ScienceDirect.

- Are you aware of these or similar kinds of changes at other universities?
- Do you have any perspectives on these universities' actions or their strategies?

16. Is there anything else that is important for me to know regarding the cancellation, the role of the library or the other topics we've discussed?