



Improving access to standards

Ms. Susan B. Wainscott, University of Nevada, Las Vegas

Susan Wainscott is the Engineering Librarian for the University of Nevada, Las Vegas University Libraries. She holds a Master of Library and Information Science from San Jose State University and a Master of Science in Biological Sciences from Illinois State University. As liaison librarian to several departments at UNLV, she teaches information literacy for many students, provides reference assistance to the campus and community, and maintains the collection in assigned subject areas. Her research interests include information literacy instruction and assessment, the notion of threshold concepts, the effect a student's emotional state has on their learning, and improving access to technical literature.

Mr. Richard J Zwiercan, University of Nevada, Las Vegas

Richard holds both a BA in Psychology and a MA in Counseling from Chapman University located in Southern California. In 2018, he obtained his MSIS degree from the University of North Texas, with a focus on archival studies/digital technologies, and Graduate Academic Certificate (GAC) in archival management. Richard is a long-term employee and supervisor within the UNLV University Libraries. He served as the Resource Sharing & Access Manager, leading the Interlibrary Loan Unit from 2012-2018. During his graduate work at University of North Texas, Richard also interned at the Marjorie Barrick Museum of Art on the UNLV campus, where he initiated the archival program, which features the Art-Press collection. At the start of 2019, Richard became the Art, Architecture & Design Librarian at the UNLV Libraries, including overseeing the Architecture Studies Library. At nine months into the position, Richard has collaborated with both the School of Architecture and Department of Art to review services, programs and collections to meet the current needs of primary users.

Improving Access to Standards

Abstract

Engineers, as well as other professionals, researchers and students in many disciplines, will occasionally need to use standards documents from a wide variety of standards developing organizations. As our university aims to simultaneously increase research productivity and graduation rates, the need for rapid access to full text standards documents will only increase. In the past, most standards were provided by the library in bound, print format, with the exception of digital IEEE standards, just-in-case they were needed. It was, and remains, cost-prohibitive to acquire all of the standards that a public, doctoral-degree-granting university community might need. Several actions were taken to improve access for faculty, staff, and students. We anticipate that the number of standards documents requested by faculty and students will increase as outreach about standards documents was implemented. We expect an increase in fulfillment rates for standards documents requested through interlibrary loan after the university licensed a standards aggregator service and after outreach in the form of staff training was provided to interlibrary loan staff. Further, we expect an increase in the use of standards already in the collection as well as those acquired via the aggregator after each outreach intervention was implemented. Several outreach interventions, including staff training, were implemented over the course of the study period. A workflow for on-demand acquisition of standards documents was developed, with three potential starting points for requests and several decision points about acquisition method and funds used. De-identified interlibrary loan request data and collection use data were analyzed for request and fulfillment trends and correlation with outreach interventions. Recent updates to the on-demand workflow are described. The data show an increase in requests for standards documents. Increased fulfillment rates for standards document request suggests that outreach for interlibrary loan staff was successful. Success of outreach to patrons was shown in an increased number of interlibrary loan requests for standards documents and in increasing use of subscribed standards sets such as IEEE and ASTM. The data support continuing some outreach methods, streamlining workflows to exclusively use interlibrary loan as a request and fulfillment system, and the need to periodically train interlibrary loan staff. We also recommend that discoverability of standards in our collection should be improved through cataloging improvements and creation of finding aids for different audiences.

Introduction

When designing something for human use, there is often a free-wheeling, creative phase that is unbounded by reality. However, at some point in the implementation of the design, constraints become a part of the creator(s) process, whether it be the laws of physics, available materials, or an agreed-upon convention, ethical limit, or rule. Standards documents represent one form of constraint that can be incorporated into the design process. Created by committees of experts and other stakeholders, standards documents describe the constraints for a particular endeavor, from a set of material properties for use in a particular construction application, to a definition of the frequency or pitch of the musical note “A”. To highlight the vast realm of purposes for which standards may be formed, we have compiled a working list, which we encountered through research consultations and/or our work as information professionals:

- Design (color reproduction in paint, print, digital)
- Musical Acoustics
- Product
- Process
- Testing (e.g. psychological)
- Procedural (archival, digital assets)
- Educational (e.g. Information Literacy Outcomes)
- Schema/Terminology (metadata)
- Combination (preservation, e.g. digital assets)
- Building/construction codes
- Technical reference
- Calibration instrument/substance in which to calibrate a tool or device
- Programming languages
- Statistical gathering standards (e.g. COUNTER...)

One standards developing organization (SDO), the American Society of Testing and Materials (ASTM), organizes their standards with these types: Classification (groupings by material makeup or similar services) Guide (information related to a topic but does not indicate specific actionable steps), Practice (a list of specific actionable steps), Specification (requirements fulfilled by the addressed subject), Terminology Standard (definitions of words, phrases, or other symbology), and Test Method (actionable steps that lead to a specified result) [1]. This demonstrates the wide variety of topics that are addressed by standards documents. Standards started as consensus on units of weights and measures, but today standards are used in a wide variety of professions to ensure the safety of products and materials as well as the reliability of goods and services [2]. Due to the potential utility of this information format, academic libraries often provide some standards to their patrons.

Given the vast array of topics addressed by standards, students engaged in research or other design projects in a variety of disciplines may have a need to identify and obtain full text standards documents. Faculty may also need standards to respond to grant applications, complete research projects, or design course materials. The accreditation body for U.S. engineering colleges' undergraduate degrees requires a capstone design course that incorporates use of constraints, such as standards, in the design process [3]. While the engineering college is the most likely to need standards documents due to the nature of their design and research projects, standards exist for a wide variety of topics, including documentation (e.g. ISO 21127), education (e.g. CAS standards), and engineering (e.g. ASME B18.2.8). Additional institutional users of standards include those who design, build, maintain, and operate the physical plant (facilities), provide events (galleries), and conduct other activities for the institution [4].

Our institution seeks to both increase research productivity and the number of graduates from our undergraduate and graduate programs, so it is likely that our patrons' need for timely access to full text standards documents will increase. Prior to 2015, our institution provided a few commonly used engineering standards in print format and cataloged them at the bound-volume level (e.g. Annual Book of ASTM Standards and ASME Boiler and Pressure Vessel Code, each edition comprising a multi-volume set) or had full-text electronic access to some that were included in content packages with item-level indexes (e.g. IEEE Xplore). In early 2015, the

engineering librarian initiated outreach to the engineering college faculty about grey literature and started an enhanced collaboration with acquisitions, in particular the head of interlibrary loan (ILL), about the importance of this format type to the college. As conversations between the engineering librarian and engineering faculty focused on the needs of undergraduate students, it became apparent that increased access to standards documents would be beneficial to a larger, interdisciplinary audience than research faculty. By the end of 2015 we had selected and initiated a subscription to a standards aggregator database, Techstreet, that provided a full-text index to many SDOs' standards and allowed a license that combined on-demand pre-paid access to a predetermined set of SDOs and a request system that library staff mediated. Over time our definition of standards broadened to include other potential users and non-engineering SDOs, and our collection expanded as we tracked use of this format. This case study examines our acquisitions workflow and associated assessment data through the end of 2018.

Literature Review

As Phillips notes, standards are an important part of the engineering design process, and are also useful outside of the engineering field to other professionals and members of the public making informed purchasing decisions [5]. In an analysis of cited standards documents in scholarly literature indexed in the Web of Science database, Rowley and Wagner [6] found that while the vast majority of citations to a selected set of industry standards were from articles in the engineering and materials science disciplines, other science disciplines were represented. The SDOs selected for analysis (ASTM, ISO, and CEN approved) do publish standards that apply to other disciplinary areas, such as CEN/TS 16163:2014, which is concerned with the design of lighting for indoor exhibition displays of cultural heritage objects. This is one example of a standard document that might be used frequently, and by non-engineers, but not appear in a citation within a database such as Web of Science.

The challenge of standards collection management and cataloging is not new to libraries [5] In 1990, Piety and McCormick [7] described challenges faced by the Cleveland Ohio public library that are similar to challenges still faced by academic and other libraries that maintain standards access for patrons: which sets to purchase versus subscribe, which formats to select, which indexes are most useful, choosing an aggregator service, training library workers, maintaining a separate finding aid of the local collection for internal use, and determining how frequently to weed superseded versions. Some of these persistent challenges are discussed below.

Some libraries encourage patrons to attempt an ILL for standards documents not in the collections. Use of ILL for standards documents was more common and more successful prior to SDOs preferencing e-formats with restrictive rights management features [5]. Mathews [8] found that when faced with a patron request for a standard not in their collection, 28% of libraries serving highly-ranked engineering schools would refer a patron to try ILL, and 63% would attempt to purchase a copy for the patron if needed. Pellack describes some of the challenges faced by ILL staff when seeking a loan of a standards document:

- ILL staff found it hard to locate standards item by item in OCLC,
- many print volumes/items are housed in non-circulating collections, so by design or not, they won't lend them through ILL

- many staff will not copy one standard item due to interpretation of fair use that it is too much of a volume, or is the whole of the item [9].

However, some academic libraries instead attempt using an aggregator database vendor (to mediate purchases with several SDOs) to purchase rather than attempt ILL due to a low likelihood of success [10]. In libraries with a license to an aggregator database, using ILL might instead be a last option before suggesting the patron purchase the item on their own [11].

A variety of collection philosophies are used in academic libraries for materials like standards documents. Pellack conducted a 2003 survey of 35 librarians at Association of Research Libraries member libraries with engineering collections that showed 21 of the institutions provided some form of on-demand purchasing, primarily mediated by a library worker, with a few charging the cost of acquisition back to the patron [9]. Many academic libraries choose to license entire sets from a few SDOs, as this offers patrons immediate full text access without case-by-case library mediation [4], [11]. Some libraries also continue to acquire sets of some standards in print format, but may not purchase every updated set, due to budget constraints [9]. Some libraries adopt both strategies, but limit on-demand to a subset of patrons or reasons for the request [4], [12]. Dunn and Xie describe an approach and share their collection policy document which encourages faculty with research funding to purchase individual standards or cost share with the library if possible [13].

Once a standard is acquired or licensed by an academic library, the decision to catalog that item remains. Some libraries catalog all item by item [12], others will catalog a set or series. Dunn and Xie document a decision by their academic library to undertake an item by item update of their cataloging of their existing Canadian Standards Association (CSA) print collection, resulting in 3,735 new catalog records [13]. However, many libraries do not have the staffing capacity to keep up with the rapid change in these collections, and on-demand acquisition workflows often emphasize the speed of fulfilling the patron request. These acquisition workflows may use an aggregator database or SDO-provided indices, which are not designed to work with library link-resolvers [5] to mediate acquisition or requests. These publishers and aggregator databases do not provide catalog records to support cataloging even for on-demand acquisition purposes as academic libraries have come to expect from e-book providers providing demand-driven acquisitions programs. Thus, many standards do not receive item-by-item level cataloging [4], [10]. Additionally, some SDOs offer their standards online for free, and others like ISO and ANSI provide some commonly used standards in read-only online versions [14]. There is no library or other organization responsible for tracking these open access standards and maintaining OCLC records.

As there is often limited or a lack of catalog records for standards owned or licensed to a library, an expert-level search and use of finding aids [10] is necessary to determine if an ILL request or on-demand purchase is warranted. Most library workers who encounter standards documents learn on-the-job about this format and how to search their home institution's holdings [5]. Patrons may be unable to navigate the library's catalog and other finding aids without assistance, and if persistent may reach out to a library service point for assistance. At this point, the library reference and ILL staff need to be aware of this format type and how to search the library holdings. Mathews [8] did find that 79% of libraries at institutions with highly ranked graduate

engineering programs were able to correctly assist patrons with a reference question about a standard. However, it is possible that library workers will learn from their peers that these documents are expensive, serve few patrons, and that maintaining this part of the collection requires too much extra and constant effort [11].

Once a decision is made to include standards documents in the collection or as an on-demand service, library colleagues in a variety of departments will need to be involved in collection, cataloging, and user service decisions related to standards documents [13]. To assist both colleagues and patrons, academic library workers have created a variety of local finding aids to supplement their catalogs and the searchable indices available [15]. Mathews [8] found that of the library websites for schools with highly ranked engineering departments, 67% contained a mention of standards documents, and only 35% included information about how to request standards. Melgoza [11] describes a subject guide included a list of print standard sets in the collection and links to licensed and public standards indexes, including the aggregator through which a patron could request an item. Dunn and Xie [13] mention a library guide about standards in their case study. Kozak [10] describes creation of a list of standards in the collection or available through an on-demand aggregator for internal use. There are clearly a variety of mechanisms used for outreach to patrons and library colleagues, which likely reflect the communication modes familiar and available to each library.

Academic libraries' various approaches to providing information about and access to standards documents will likely continue to proliferate. While the engineering librarian tracked the literature and conference discussions about standards, our institution, unsurprisingly, created a somewhat unique system that is a product of our staffing and funding constraints. Our system is responsive to the requests of our faculty and students and we are assessing it to adjust our collection holdings and manage costs. Phillips discusses *de jure* and *de facto* standards and distinguishes between them in part based upon formal publication of *de jure* standards by standards organizations versus *de facto* standards produced by standards consortia or individual companies [5]. Our current approach is that if a standard is formally published (fee or open access) it is a potential item to provide to our patrons. Our collection philosophy for standards and other grey literature is to help our patrons obtain the full text of information resources that they need, even if the purchasing process is special and the cost is more than minimal. We currently extend this service to our undergraduate students because of an increasing emphasis on high impact practices in assignment and course design [16] such as design projects and assignments that mimic professional practice, particularly in capstone and other required courses. It is our hope that sharing our library's approach and rationale for our decisions will be a useful comparison for other libraries.

Our Goal and Assessment

Our goal was to build on existing tools and workflows with the addition of an aggregator database to increase the probability that standards requests would be fulfilled. We also increased outreach about this format in order to ensure we were receiving these requests and patrons knew to seek out and use standards already in our collection. We had three main expectations.

1. We expected an increase in the use of standards already in the collection as well as those acquired via the aggregator after each outreach intervention was implemented.
2. We anticipated that the number of standards documents requested by faculty and students would increase as outreach about standards documents was implemented.
3. We expected an increase in fulfillment rates for standards documents requested through interlibrary loan (ILL) after the university licensed a standards aggregator service and after training was provided to ILL staff.

Our workflow included a check with a collections selector (liaison librarian) before use of more-limited discretionary funds, so we did not track overall costs.

We analyzed the following datasets for each question.

1. Use of standards in the collection.
 - a. IEEE Xplore use data, includes standards as an item type.
 - b. ASTM Digital Library use data, includes primarily standards.
 - c. (Print collections data was not available due to colleagues' workload associated with a catalog migration.)
2. Requests for standards not located by patron.
 - a. ILL data
 - b. Techstreet data
1. Fulfillment rate for ILL requested standards
 - a. ILL data

Methods/ Case Study

We initiated outreach to potential users of standards as well as outreach and training for our library colleagues, including ILL staff. The engineering librarian worked with collections and ILL staff to develop a workflow for on-demand acquisition of standards. The workflow addressed multiple intake routes for requests and several decision points.

Outreach began in the spring of 2015 with a survey sent to engineering college faculty about use of standards documents and most useful standards developing organizations. This survey was used to determine which standards developing organizations to focus on for establishing vendor or aggregator purchasing relationships. Outreach continued in fall 2016 with creation of a resource guide describing what standards resources the libraries provide as well as a prominent prompt to use ILL to request additional items. The guide serves both our patrons and library staff who want to learn more about standards documents and the standards development process with links to books in our collection and SDO educational webpages and resources. It is also included within discipline-specific engineering resource guides. Since 2017 this guide has been regularly promoted in fall and spring semester welcome back emails to engineering college faculty and staff, welcome emails to new engineering graduate students, and in engineering senior design courses and associated resource guides. A workshop about the format type and best practices for use of the aggregator search tool was offered for graduate students in fall of 2017. Standards documents were also mentioned as an important information resource type used by practicing engineers in first-year seminar library sessions.

Workflows

While we acknowledge that there is a staff cost to providing standards documents on-demand, we have sought workflows that streamline the process for the patron and for library workers. In particular, we aim for a streamlined purchase option to minimize the work of collections staff. Techstreet is assumed to be the best route to acquire on-demand single-seat use and multi-user subscription access due to the streamlined invoicing. Without an aggregator database such as Techstreet, each new SDO would need to register as a vendor with the university purchasing system, and the motivation for them to do so quickly is minimal with an order for a single standard document. ASTM and IEEE standard sets are available via subscriptions, and those have been suppressed in the Techstreet database index. The Techstreet pre-paid tokens for subscription access to single standards, known as *building blocks*, were also used for several SDOs until this option was discontinued for our license by Clarivate in fall of 2019. Our workflow currently has three intake routes for patron requests: ILL processing, subject librarian direct requests, and Techstreet direct requests.

With the ILL processing workflow, we have tried to eliminate roadblocks and frustrations for patrons by creating a multi-decision workflow that is behind the scenes. Therefore a patron only needs to know to submit an ILL request if they cannot find/access the full text of a standard on their own. Figure 1 depicts our ILL workflow. Upon receipt of the patron's ILL webform for a standard document, ILL staff first must correctly identify that a standards document is being requested, as there is no request form tailored for this material type. Staff check the collection, including any applicable standards-containing database (ASTM, IEEE), and if the item is available, a pdf copy of it will be sent to the patron using the document delivery system. Next a lend request will be sent via the ILLiad system. If none of the prior routes are successful, the ILL manager will determine if Techstreet can provide a single-seat use purchase of the standard. In the past, building blocks may have been used to acquire documents when available, but use of these was inconsistent. The ILL manager is one of two purchase administrators for our Techstreet license. If the single-seat use price is \$150 or less, the ILL manager purchases the item using ILL funds. If the price is more than \$150, the ILL manager will request authorization from the subject librarian to use a discretionary fund for that discipline, and once approved will initiate the purchase. In both cases, the payment process is similar to payment of other ILL invoices. ILL staff will use the document delivery system to provide a patron with a pdf copy of the standard. As with other ILL-delivered materials, these standards are not added to the library's collection and thus are not cataloged. Note that the subject librarian is involved only when discretionary funds are sought for an item over \$150.

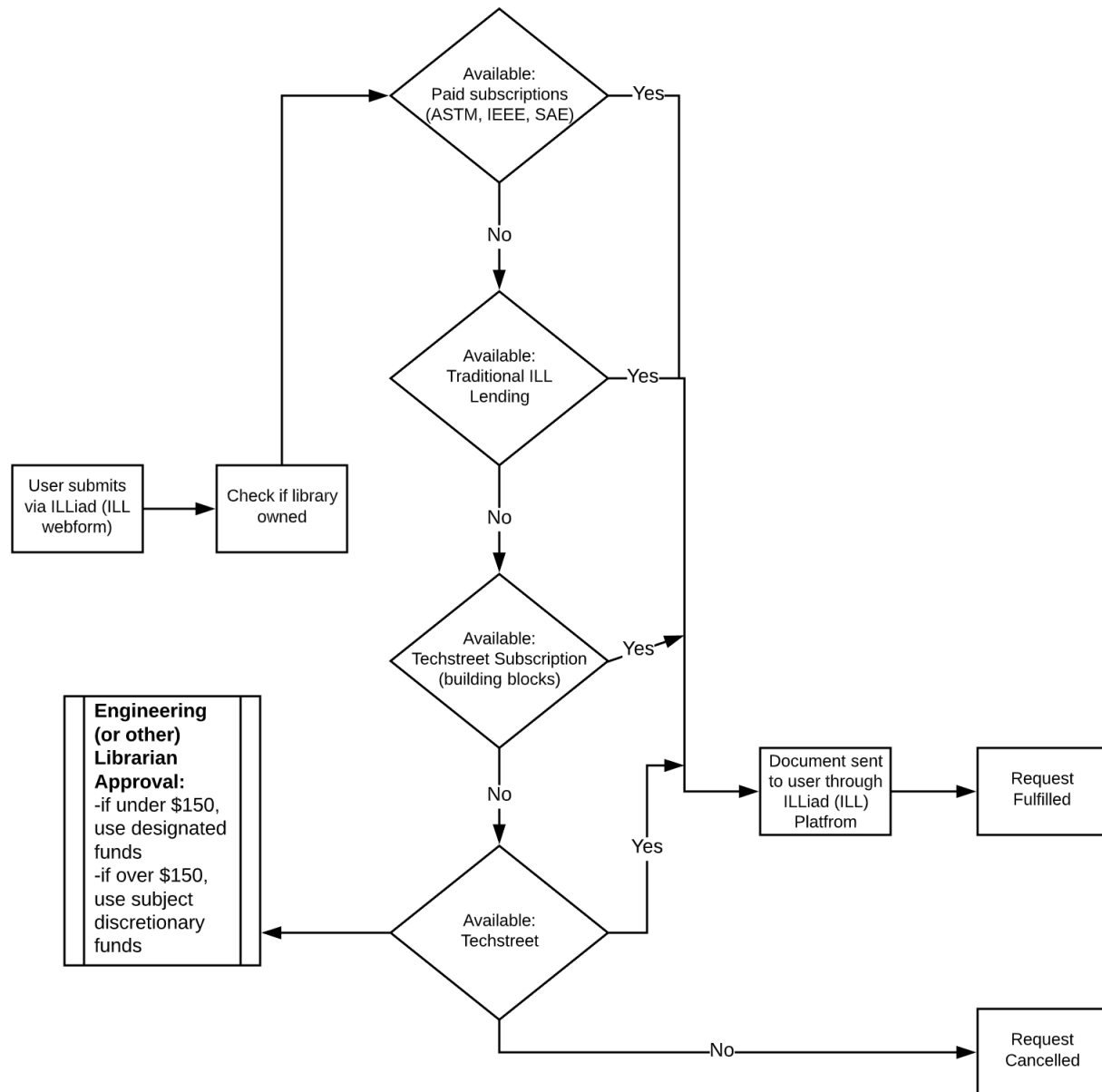


Figure 1. ILL Processing Workflow

Subject librarian direct requests are initiated when a patron requests purchase of library materials via direct communication with their subject librarian or by using the request purchase of an item form on the library website. Subject librarians serve as selectors for their assigned disciplines and have discretionary dollars to spend as well as opportunities to request serials and large one-time purchases. In practice, direct requests have thus far only been received by the engineering librarian, who also administers all user accounts within the Techstreet system. On receipt of a request for a standards document, the subject librarian communicates with the patron to determine end use (classroom or research lab use requiring a multi-seat license, or single-seat use), and to resolve any additional reference needs. The subject librarian also determines if the requested item is in fact a standard, and not a monograph (manual, handbook, or technical report)

that should be purchased for the main collection and cataloged. If the requested item is a standard, the subject librarian checks for available building blocks in Techstreet for that SDO, and if available uses one to add the item to the subscription. Building blocks are used to add multi-user subscription access even if the patron requested use for themselves alone. Use of these pre-paid tokens does not require a modification to the Techstreet license. If needed, the engineering librarian creates a Techstreet user account for the patron. The patron is then notified that the item can be downloaded within the Techstreet system.

If a building block is not available, the subject librarian submits a purchase request (single-seat license) or a quote request (multi-seat license) within the Techstreet system. If a single user purchase is possible, the subject librarian emails the head of continuing resources (a Techstreet purchase administrator) to communicate which discretionary fund to use, and the payment workflow is completed by the collections department. If a multi-seat license quote is requested, once received it is evaluated by the subject librarian. The subject librarian then forwards the quote via email to the head of continuing resources with a note about the applicable discretionary fund code. The head of continuing resources then reviews and routes the quote form, which entails a modification of the Techstreet license agreement, to the dean of the libraries for approval. The subject librarian is also involved in the delivery of the requested items to the patron, by creating a user account for each patron within the Techstreet system for products with digital rights management and/or other licensing restrictions, and checking the Techstreet system to notify the patron when an item is available. Currently none of the standards subscribed within the Techstreet interface are cataloged, nor are they indexed by the discovery layer.

In practice, each of the communication steps in the subject librarian direct request workflow can add a business day of wait due to time zone differences with Techstreet staff and the multitude of other duties performed by the subject librarian, head of continuing resources, and approver calendars. Unlike the interlibrary loan team, if any one of these persons are unavailable, there may not be a backup approver in place.

The third workflow, for Techstreet direct requests, is similar to the subject librarian direct request workflow. Access to items subscribed within the Techstreet account by patrons requires use of a university email account for each patron. Once a patron has an individual Techstreet account, they can submit a request via the Techstreet database interface. Purchase administrator level Techstreet users receive a notification email for each such direct request and can view the requests within Techstreet. Currently the head of continuing resources and the ILL manager are the only purchase administrators for our Techstreet subscription, and these requests are addressed by the head of continuing resources. The head of continuing resources determines the subject librarian or other selector with responsibility for the patron's academic (or other unit) on campus, and routes the request information to the subject librarian to review and determine the best acquisition option on a case-by-case basis. While this appears to the patron to be a more seamless request route compared to contacting their subject librarian directly, it actually adds a communication step between the purchase administrator and the subject librarian to initiate the subject librarian direct request process. Discretionary funds are used to either purchase a single-seat copy or a multi-user subscription, and these items are not added to the collection or library catalog.

Periodically, the head of continuing resources and the engineering librarian review subscribed standards on the Techstreet license and remove those without recent downloads, unless the standard is known to be used by an upcoming course.

Results

We obtained use data (full-text views plus download) at the item level for the years 2015-2018 for IEEE Xplore, ASTM Digital Library, and Techstreet. We did see an increase in overall standards use (Table 1), in part due to an increase in ASTM documents used in June and July of 2018. An examination of these two months did not reveal any clear patterns in topic or title of standards used. In addition, several items were used multiple times within the two-month period, and the overall number of uses was less than 10% of the total standards set available for view or download within the ASTM Digital Library.

Table 1. Consolidated subscribed standards use data by SDO, via Techstreet unless noted

SDO	2015	2016	2017	2018
IEEE (via IEEE Xplore)	88	67	143	34
ASTM (via ASTM Digital Library)	0	120	83	1268
ASTM	0	10	48	0
ACI	0	0	0	0
ISO	0	10	0	0
AWWA	0	0	0	2
ASHRAE	0	0	0	2
AASHTO	0	15	6	1
NFPA	0	0	0	1
DIN EN ISO	0	0	1	0
NEMA	0	0	3	0
BS EN	0	2	0	0
BS	0	2	0	0
ISO/TR	0	2	0	0

We also saw the use of the Techstreet aggregator product increase from 2015-2017, with a drop in 2018. A different set of standards and SDOs were used each year. ASTM and AASHTO were the SDOs with standards most frequently accessed via Techstreet, and led us to add the ASTM Digital Library subscription to our collection in 2016. Overlap in ASTM use after we subscribed to ASTM Digital Library is likely due to continued use of both building blocks and several already subscribed items in Techstreet, as well as a delay in our request to suppress ASTM items in the Techstreet search interface. It is possible that ILL staff also continued to purchase ASTM standards via Techstreet before training and their internal processes incorporated use of the ASTM Digital Library, but this would not account for the bulk of the ASTM uses in Techstreet in 2016 and 2017.

We obtained the ILL request data for 2012-2018 and searched each year for items containing the string *standard*. Those items were then evaluated to determine if they were the standard format type. Remaining items (not containing the word *standard*) were then filtered to exclude titles with the string *journal* or *proceedings*, and the resulting set were manually scanned for acronyms in all capital letters within fields with data entered by patrons. Entries with all capital letter acronyms were flagged and further assessed for the standard format type. All items determined to be standards were then reviewed to determine if the request was fulfilled by ILL staff by any means.

Our data show that the number of ILL requests for standards increased after we implemented outreach to patrons in late 2015 (Table 2), but the number remained less than 0.1% of total ILL requests per year. The rate of successful fulfillment of ILL standards requests also increased after training and outreach to ILL staff was implemented in 2015.

Table 2. *ILL fulfillment rate 2012-2018*

<u>Year requested</u>	<u>Total Requests</u>	<u>Total Standards</u>	<u>Total Fulfilled or Found</u>
2012	12,161	7	2
2013	10,892	7	2
2014	9,154	7	3
2015	10,015	5	1
2016	8,803	18	12
2017	9,700	19	15
2018	8,892	12	5

Discussion and Conclusion

By training ourselves and ILL staff, and adding the Techstreet aggregator to our workflow, we were able to achieve a higher fulfillment rate for ILL requests for standards documents. The use of an aggregator and encouraging on-demand requests also allowed us to better understand the demand for this format type and revealed the SDOs and sets that we might consider adding to the collection. For instance, we subscribed to the ASTM Digital Library in 2016 based upon the Techstreet use data for that SDO. The librarian-mediated on-demand requests also allowed for follow up inquiries with patrons regarding potential standards use in courses, and the number of likely patrons for research and other purposes.

However, the inefficiencies of the subject librarian-mediated workflows and the removal of the pre-paid building blocks for SDO sets in the aggregator product make it likely that we will direct more patron requests for single-seat use to the ILL system. It is unlikely that we would be able to change the signature authorities for updates to the Techstreet license to improve our time to fulfillment for those patron requests. We will explore suppressing the Techstreet direct request option for our patrons, or consider a standard reply that they should use the ILL request system if the item will not be used for a course. More frequent analysis of ILL requests and continued outreach to patrons about this format type and the potential utility of standards documents in the design process will allow subject librarians to identify standards that should be added to the

collection, either in the Techstreet aggregator system, or other multi-user licenses. We have also initiated annual evaluation of the subscribed items in our Techstreet license to remove those without long-term utility.

We plan to investigate local cataloging practices that might increase the discoverability of standards already in our collection, and to improve our standards web guide for use by more audiences. In particular, we will explore the potential to add catalog records for long-term multi-seat licensed standards within the Techstreet database. We will also consider SDO-direct subscriptions that are IP-authenticated rather than user account based access.

We also hope to improve the discoverability of standards made freely available online by SDOs, including the *de facto* standards highlighted by Phillips [5], which are not included in aggregator indexes such as Techstreet. We will continue direct outreach to engineering faculty and other instructors to encourage them to request course-related standards access via their subject librarian, and we will add more information about use of standards in courses to the standards web guide. These data also support refresher training and periodic outreach to ILL staff, as the number of standards requests are few compared to the overall ILL request load. It is true that this format type requires more effort to collect and maintain, and the cost is not insignificant. However, the value that standards documents provide to our patrons for their research, education, and other design projects demands an increased level of attention from their academic library.

Literature Cited

- [1] ASTM International, *Form and Style for ASTM*, ASTM International, West Conshohocken, PA, October 2018. Accessed on Mar. 13, 2020. [Online]. Available: https://www.astm.org/FormStyle_for_ASTM_STDS.html
- [2] ISO, *ISO - Benefits of standards*, ISO. Accessed: Mar. 13, 2020. [Online]. Available: <https://www.iso.org/benefits-of-standards.html>.
- [3] ABET, *Criteria for Accrediting Engineering Programs, 2020 – 2021 | ABET*, 2019. [Online]. Available: <https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2020-2021/>
- [4] J. Gelfand, I. Lawal, J. Powell, and A. Rauh. (2018). Collecting standards for scholarship, organization, industry, and innovation. Presented at *Charleston Conf.: Issues in Book and Serial Acquisition*. [Online]. Available: <https://surface.syr.edu/sul/185/>
- [5] M. Phillips, “Standards collections: Considerations for the future,” *Collect. Manag.*, vol. 44, no. 2–4, pp. 334–347, Jul. 2019, doi: 10.1080/01462679.2018.1562396.
- [6] E. M. Rowley and A. Ben Wagner, “Citing of industry standards in scholarly publications,” *Issues Sci. Technol. Librariansh.*, vol. 92, Aug. 2019, doi: 10.29173/istl27.
- [7] J. Z. Piety and A. McCormick, “The standards collection in the Science and Technology Department of the Cleveland Public Library,” *Sci. Technol. Libr.*, vol. 10, no. 3, pp. 37–

- 48, May 1990, doi: 10.1300/J122v10n03_03.
- [8] B. S. Mathews, "The role of industry standards: An overview of the top engineering schools' libraries," *Issues Sci. Technol. Librariansh.*, vol. 46, spring 2006, doi: 10.5062/F48C9T6D.
- [9] L. J. Pellack, "Industry standards in ARL libraries: Electronic and on-demand," *Collect. Build.*, vol. 24, no. 1, pp. 20–28, Mar. 2005, doi: 10.1108/01604950510576092
- [10] K. A. Kozak, "Standards, standards: Where might you be?" in 2014 ASEE North Midwest Section Conf., pp. 1–8, 2014, doi: 10.17077/aseenmw2014.1039
- [11] P. Melgoza, "A study of ILI Standards database cost savings at Texas A&M University," *ASEE Annu. Conf. Proc.*, pp. 9445–9451, 2002. Available: <https://peer.asee.org/10431>
- [12] J. Cusker, "Adding individual technical standards to a library collection: A case study and a proposed workflow," *Collect. Manag.*, vol. 45, no. 3, pp. 124-138, 2019, doi: 10.1080/01462679.2019.1650864
- [13] L. K. Dunn and S. Xie, "Standards collection development and management in an academic library: A case study at the university of Western Ontario libraries," *Issues Sci. Technol. Librariansh.*, vol. 2017, no. 87, Jun. 2017, doi: 10.5062/F4KK9928
- [14] M. Phillips and S. Huber, "Science and technology resources on the Internet: Standards resources for engineering and technology," *Issues Sci. Technol. Librariansh.*, vol. 2017, no. 87, Jun. 2017, doi: 10.5062/F4B27SJ7
- [15] C. Erdmann, "Standards for new educators: Guide to ABET outcomes and standards availability in libraries," in *ASEE Annu. Conf. Proc.*, pp. 15.1088.1 - 15.1088.24, 2010. Available: <https://peer.asee.org/16224>
- [16] G. D. Kuh, *High-Impact Educational Practices: What They Are, Who Has Access to Them, and Why They Matter*. Washington, DC: Washington, DC : Association of American Colleges and Universities, 2008.