Library Collection Development for Professional Programs: Trends and Best Practices

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Chapter 8
Information Sources and Collection Planning for Engineering

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ABSTRACT

This chapter will provide background for practicing librarians who have collection development responsibilities for engineering programs at academic institutions. Although it is intended as a resource for all engineering bibliographers, new librarians or those new to the technical fields may find it especially useful. Engineers (and engineering students) use information quite differently than other disciplines, and this can make collection development a daunting task. Furthermore, it is common for librarians with no background in engineering or technology to be assigned to manage the engineering collection. The information and tips contained in this chapter are meant to make this job easier.

INTRODUCTION

A few years ago at a conference session for engineering subject selectors, the members of the audience were asked how many of them had a background in engineering. Fewer than half raised their hands. Although far from a scholarly study, this illustrates a situation common in academic libraries. Many librarians are asked to manage collections in engineering and technology although they have no academic background in the subject.

Librarians in this situation face two major obstacles to success: learning how engineers use different types of information and becoming familiar with the language of engineering.

The purpose of this chapter is to help both new and seasoned engineering librarians improve their collection management skills; however, it will be of most use to those new engineering librarians who do not have a strong engineering background. Various formats of engineering resources will be discussed. Some formats such as monographs and

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journals are common to all disciplines, but the way engineers use each of these resources differs from other areas of research. Other resources like patents and grey literature may be less familiar. Both society and commercial publishers are major providers of engineering information, so each type of publisher will be discussed.

Next, the chapter covers how to determine information needs and the process of creating a collection development policy. No two engineering programs are the same, and as a result no two collections should be developed in the exact same way. Engineering has several sub-disciplines (e.g., civil, mechanical, electrical, chemical, and aeronautics), each of which may have its own focus. Just as professors split their efforts between teaching and research, the library’s collections must support student learning and the research efforts of students and faculty, and collection development policies should cover the needs of both aspects. The teaching component is driven by the courses and degrees offered, while the research component is driven by faculty research interests, in conjunction with the focus of any research centers that are part of the institution.

Even if a formal collection development policy exists, periodically reviewing the institution’s teaching and research efforts facilitates efficient collection management. This process usually gives the librarian more detailed information than is included in the written policy and encourages consistent updates to the policy. Libraries may have institution-wide policies, both formal and informal, which should be incorporated into the engineering collection development policy. (Is there a preference for electronic versions wherever possible? What are the budgets for books and serials?) Librarians should also keep in mind that engineering research is becoming increasingly interdisciplinary in nature. It is not uncommon for a research topic to be shared with another discipline in science or even a social science area.

Near the end of the chapter, the authors will discuss issues and challenges such as creating buy-in for open access initiatives and dealing with the inevitable journal cancellation projects resulting from ever-increasing subscription prices. Throughout the chapter, collection development tips gleaned from the literature or from the authors’ experience will be discussed. A special section of tips for new engineering librarians is also included.

BACKGROUND

In his monumental paper on the information-seeking habits of engineers, Thomas Pinelli pointed out that in order to meet library patrons’ needs, librarians must first “become familiar with the information-seeking habits and practices of the user” (Pinelli, 1991, p. 5). He goes on to explain that when engineers are using information they are really seeking answers. The end is what is important to them, not the journey. If they do not have ready access to the information they will first go to colleagues (Lord, 2000), and then move on to searching the literature when other avenues are exhausted. In 2006, Williams and Fletcher analyzed citations from engineering master’s theses. Their study showed that while journals are used most heavily, books, conference papers, government documents, and other resources are also widely cited across several engineering disciplines. Websites also received a significant number of citations. This again shows that engineers are more concerned with the answers than which source they use to find them. Kirkwood (2009) found remarkably similar results in her study of civil engineering theses and dissertations.

Engineers were early adopters of electronic libraries. Holland explains that “the corporate engineering library is no longer a physical location. Instead, it is a desktop information system or set of systems bundled together” (Holland, 1998, p. 40). A later study of engineering students and faculty shows that while the physical library is still valued in academia, electronic resources are becoming heavily consulted (Li & Baer, 2009). A
potential stimulus for this shift was borne out by a survey of engineering faculty at the College of New Jersey in which respondents indicated that “coverage and relevance were not as important as immediate accessibility” (Tucci, 2011, Results section, para. 6). Engineers want answers, and they want them now.

COMMON RESOURCE FORMATS

Engineers use many different types of information formats. Although journal articles are cited most often, conference articles, books, standards, government documents, and grey literature are also commonly used. Each of these formats fills a niche in the engineering information world and is therefore important to understand for those managing collections in this discipline.

Which of these formats is most important? To a student or faculty member it is probably the one that holds the information they need at the moment. That being said, at one time or another each format will be needed; and as a librarian managing a collection, though it is impossible to know all future needs, it is important to try to anticipate them. Understanding the role each format plays will help to keep collection development efforts in proper balance. The major formats of engineering information are listed below along with a brief discussion of why they are important to an academic engineering collection. An effort has been made to move from the more important formats to the less important ones, but that ranking is somewhat arbitrary. In each of engineering’s many sub-disciplines, the order may be slightly different.

Journals

Scholarly journals are the primary vehicle for disseminating research in the technical fields. It is a format that is familiar to all areas of study, wherein articles are carefully vetted through a peer-review process and then published in a timely manner. The very nature of the process in which incremental advances in scholarship can be presented relatively quickly is ideal for the Science, Technology, and Medical (STM) fields that are so time sensitive. In addition to scholarly journals, engineers use trade journals to keep abreast of general advances in their fields.

Journals present many challenges for collection development. The most obvious is simply selection. Which of the thousands of journals are most important for a particular collection? This question is not easily answered, but ultimately, the best combination of journals to support an engineering program depends upon the specific needs of that program. The “Collection Development Plans” section of this chapter will discuss methods to ascertain those needs. Journal Citation Reports (JCR) can be used to identify the significant journals in a particular sub-discipline, but keep in mind that many journals are not indexed by JCR and the rankings in JCR may be skewed downward in subjects where publishing in conference reports is considered an acceptable scholarly alternative to journals. Valuable tools to identify journals include publisher catalogs, faculty recommendations, and conducting reviews of the collection choices of peer institutions. Likewise, blogs, listservs, and wikis for engineering librarians can be useful sources of information. Notices from engineering publishers are helpful to keep abreast of new publications, which arise to fill gaps in publishing for emerging areas.

Scholarly journals tend to be expensive and can quickly eat up a collection development budget. To make matters worse, subscription prices tend to rise much faster than budgets. Since the mid-1990s most journals have offered electronic versions, which are usually preferred by students and faculty alike. Access to electronic articles has been made even easier by software that facilitates the linking of index and abstract records directly to the full-text of articles. The combination of tightening budgets and electronic access has
caused a number of publishers to bundle journals together in subscription packages. Libraries can save a great deal by using these packages compared to the cost of subscribing to each journal at normal rates. However, these bundles are costly when it comes to flexibility. Usually, librarians cannot negotiate which journals are included and which are not. It is a take it or leave it proposition. This can make it difficult to add a new journal. Typically, because the allocation of additional ongoing funding for new journal subscriptions is difficult to secure, one or more journals need to be identified for cancellation in order to pay for any new journal subscriptions. Yet, bundles cannot be broken by removing individual journals, thereby reducing the pool of journals eligible to cancel for the purpose of adding new ones. Some libraries (especially those with large STM collections) are attempting to address this issue by moving funds that had previously been allocated to the purchase of individual book titles into their budgets for journals and other subscription costs. This can be helpful in alleviating the immediate demand for adding new journals to the collection but it requires a careful balancing act so as not to overlook important new books (which can also be expensive). It is also only a temporary solution, as, unlike one-off book purchases, subscriptions require payment every year and (as mentioned previously) tend to increase rapidly. A more long-term solution may come out of the growing strength of the open access movement (discussed further in the Challenges section), but for the moment, this issue looms large.

Books

Engineers (and engineering students) tend to use books in three different ways: as reference tools, as mechanisms to foster learning, and as vehicles to disseminate research. Reference works are essential to engineers. By nature, an engineer’s work touches on many diverse disciplines of science and technology. Often, the engineer must consider including unfamiliar materials when designing a project. Trying to memorize all the data needed would be impossible let alone impractical. Handbooks and encyclopedias provide easy access to a variety of information, which gives the engineer more time to concentrate on understanding how things work.

Traditionally, print handbooks, encyclopedias, and directories would be purchased and kept in a reference collection that would not circulate because of heavy use. Over the past few years, most print reference collections have been all but replaced by electronic resources. Students and faculty members enjoy the usability and convenience of online products such as Referex, Knovel, and CRCnetbase that provide large selections of engineering reference materials. Unlike print collections, the books in these products are subscribed to, not bought. Thus, if the library cancels the subscription all access to titles within the collection is lost.

There are also three less obvious issues with “rented” reference collections. First, since the selections are bundled, librarians are more restricted in tailoring a collection to meet the institution’s particular needs. Librarians do have a choice in which package to buy, and some plans may be broken up into basic building blocks. For example, Knovel has twenty-six different sub-packages such as “Chemistry and Chemical Engineering,” “Earth Sciences,” and “Nanotechnology” that can be selected. However, if a library does not subscribe to the “Optics and Photonics” sub-package, it will not get access to Fiber Optic Measurement Techniques. Second, because the library does not own the individual titles it has no guarantee that any specific title will remain in the collection from year to year. Some titles disappear from packages either due to licensing issues with the individual publishers or because aggregators make active decisions to weed older editions as newer editions become available. Third, there is often a delay from the time a handbook appears in print and when it is available through an aggregator’s
collection. This delay is designed to entice libraries to continue purchasing items in print, which effectively means buying the same title twice. Indeed, there are some print resources that may still merit purchase; however, that decision should be up to the library and not the aggregator.

Engineers also use books for other purposes. Many books do not convey current research and are not reference sources; rather they give an overview of a topic. This role is especially vital in a university setting. These books allow a reader to explore new areas and teach themselves basic concepts at their own pace. They are often used to supplement classroom learning. Textbooks are a prime example of books that foster learning. Although some libraries have policies against purchasing textbooks so as not to compete with the bookstore, others make a point of placing popular texts on reserve. Engineering librarians may choose to select textbooks not offered by the bookstore, either in addition or as an alternative to those selected by the teaching faculty as course texts as students may often benefit from the fresh perspective an alternative textbook can provide. Even though scholarly journals and conference proceedings are the most common venues for disseminating research, some publishers like Springer and Elsevier publish books that fill this role. These books are usually collections of articles written specifically for that purpose. Many series such as Lecture Notes in Artificial Intelligence (Springer) actually consist largely of conference reports.

When considering monographic purchases for a library’s engineering collection, the topic of e-books will be central to the discussion. E-books are a relatively recent option in collection development arenas, slowly gaining momentum since the appearance of Net Library and Project Gutenberg in academic libraries around the late 1990s. While the concept of accessing book content from the comfort of one’s own computer was appealing, the early implementations were clunky, forcing users to download reader platforms and navigate less than intuitive interfaces. It is common for publishers to bundle e-books together for purchase or lease similar to journals with many of the same advantages and challenges inherent to that model. Although many users prefer an e-book to its print counterpart, an electronic version is not always available. E-books have come a long way since the early days and must be seriously considered as a significant part of engineering libraries.

It is difficult to predict what the future holds for e-books; however, it seems likely that e-books will replace their print counterparts as the standard in engineering. This has already happened for reference books where the usage of print collections has largely been replaced by searching collections like Knovel or Referex, and a large portion of other engineering books are being collected in electronic versions. An important factor in this movement is the way engineers use books, which is different than other disciplines. For the most part, engineers do not read books cover to cover. Instead, they tend use smaller sections, a chapter, or even a page at a time. E-book vendors like Ebrary allow readers to download small sections of their books in electronic formats, which can be loaded into personal readers, like Kindles or tablets. As long as e-book providers keep up with technology such that their products retain the convenience factor, their dominance in the engineering field should continue.

**Conference Reports**

Many professional organizations sponsor conferences where researchers in specific disciplines can gather to present their findings. This is by no means unique to engineering. What is different about an engineering conference is the academic rigor involved and subsequently the importance placed on conference articles. Most engineering conferences include a double blind, peer-reviewing process that is every bit as arduous as that associated with scholarly journals. It is the article itself that is reviewed, vetted, and accepted not merely an abstract of what will be presented.
The conference presentation will be based on the article, but it is the article that is most valuable.

Even though conference reports are extremely important to engineers, they can be quite difficult to collect. In order to understand the reasons for this, it is helpful to know a little bit about the structure of the conferences themselves. Most conferences are sponsored by professional societies. Professional societies are led by elected officials within the organization who often have little or no knowledge of the publishing industry. Likewise, conferences are organized by the engineers who participate in these societies. The intricacies of publishing a conference report are often not a major part of planning the conference.

Some of the larger professional societies like the Institute of Electrical and Electronics Engineers (IEEE) and the American Society of Mechanical Engineers (ASME) self-publish their own journals and conference reports. In fact, IEEE may be the largest publisher of engineering information. Academic libraries will usually identify the professional societies that are most important for the programs they serve and purchase all the conference reports published by them in a package deal. This prevents reports from individual conferences from slipping by unnoticed. For example, a library that supports a civil engineering program might want to collect everything from the American Society of Civil Engineers (ASCE). Even purchasing conference packages from societies may occasionally leave holes in a collection. For example, if a conference is co-sponsored by more than one society, it may not be included in one or the other of the societies’ bundles. Some of the additional challenges for collecting conference literature are:

- **Identifying which conferences to collect:** There are so many conferences out there, and some seem to fly under the radar. Many reports will not be advertised to libraries and it can be especially difficult to identify new conferences arising in support of new areas of research.

- **Delayed publications:** Conference reports are frequently published a couple of years after the actual event.

- **Unpublished reports:** Several conferences never have published reports.

- **Non-obvious places of publication:** Many conference reports will be published as special issues of a journal or as part of a book series. Likewise, some conference reports are given titles that seem to be ordinary books and major book vendors may not even identify them as conference reports.

**Government Documents**

Government documents can be of great use to engineers. Reports from government labs or government-sponsored research provide a wealth of scholarly information. Some areas of research are more likely to have government documents relevant to their field. If a government agency focuses on a specific area of science, there is a good chance that the reports it produces will be of interest to disciplines that share the same focus. For example, the Environmental Protection Agency produces many items of interest to environmental engineers. Federal depository libraries will usually have a librarian designated to manage the government documents collection. In these cases, engineering subject specialists may not need to be involved in the collection of government documents. Access to government documents has been transformed over the past several years, and many are now distributed freely on the Web. It is becoming more important to concentrate on collecting reference materials like directories and indexes for government information rather than the documents themselves since a Google search can often easily find the full-text.
Patents

Although patents could be grouped with government documents, they merit their own category. Engineers concentrate on transferring scientific knowledge into usable technology, including marketable products. Patents are of interest both as a medium to see the results of cutting edge research and as a protection for the engineers’ own inventions. United States patents can be freely searched and obtained from either the U.S. Patent and Trademark Office website (http://www.uspto.gov/) or Google Patents (http://www.google.com/patents). Other websites provide access to European patents (http://www.epo.org/searching.html) and Canadian patents (http://patents1.ic.gc.ca/). Asian patents can be found also (often through government sites in the country of issue); however, they tend to be more problematic to find in part because searching needs to be done in the native language. As far as collection development is concerned, it is most important to ensure that engineers have access to adequate resources on the process of obtaining patents as well as on locating existing patents.

Theses and Dissertations

Master’s theses and doctoral dissertations provide a wealth of scholarly information, which can be of interest to engineers. Most libraries collect the thesis and dissertations from their own institutions, but rarely add print copies of those originating from other schools. Many institutions subscribe to the Proquest Theses and Dissertations database, which indexes theses and dissertations from around the world. Some institutions purchase a full-text version of the database, whereas others subscribe to the version that provides only indexing with a limited full-text preview. These schools have traditionally relied on interlibrary loan to provide access. These documents are becoming easier to access as more and more schools are providing electronic access to their thesis and dissertations via institutional repositories.

Standards

The world of engineering revolves around standards. Webster’s Dictionary defines a standard as “something that is established by authority, custom, or general consent as a model or example to be followed” (Gove, 1993, p. 2223). Basically, standards are accepted ways of doing things that have been established by professional societies or other recognized organizations. Because standards are used, when a blender is plugged in, it works. Likewise, a file can be saved on a flash drive and opened on a different computer. All thanks to standards. When engineers design new products they must take into account the existing standards. Engineering research at academic institutions is often sponsored by grants from government agencies or industry. These grants frequently require the investigators to comply with certain standards. These standards may specify processes, which need to be followed, minimum or maximum physical properties of materials used, or standardized inputs and outputs required. Therefore, access to standards is critical for engineers.

For anyone not used to working with standards, their designations may seem strange. Although standards have descriptive names, standard granting agencies will also assign each standard a number, which is usually an alphanumeric code like ASTM C658-98. The first few letters indicate the agency that has approved the standard, in this case ASTM International (formerly the American Society for Testing and Materials). The next few characters represent the specific standard. In this case, C658 is the standard for “Chemical-Resistant Resin Grouts for Brick or Tile.” The last couple of digits represent the version of the standard or, more specifically, which year the standard was accepted or revised. Standards are updated from time to time so the date is important. Older versions of a standard should not be discarded because it may be necessary to determine which version of a standard was applicable when a product was designed or a building was built.
There are thousands of standards, and most libraries cannot afford to purchase all of them. Instead, it is common to determine which collections of standards best fit the needs of the institution and then to purchase (or subscribe to) everything in that collection. ASTM, IEEE, Society of Automotive Engineers (SAE), and the Uniform Building Code are commonly collected groups of standards.

**Grey Literature**

Grey literature has an important place in the collection development policy of the engineering librarian. Definitions for the types of collections which fall within the umbrella of grey literature differ from source to source. The Luxembourg Convention on Grey Literature, which was drafted at the third International Conference on Grey Literature, defines grey literature as “that which is produced on all levels of government, academics, business and industry in print and electronic formats, not controlled by commercial publishers” (Thompson, 2001, p. 58). In the current environment which encourages open access, and where information exchange proliferates through diverse social networking avenues such as blogs, discussion groups, twitter ponds and scholarly based technical portals, this definition of grey literature explodes into a dazzling array of resources.

Grey literature is, by its nature, difficult to locate. Much of it is not readily available and often subject to low print runs, which makes obtaining copies at a later date problematic. The previously discussed research resources of conference literature and government documents may fall into the grey literature category, as might technical reports, manufacturers’ catalogs and industry standards. International societies and research groups are an increasingly important source of relevant research, and manufacturing standards differ by country. The inherent difficulty of identifying and obtaining these types of international resources places them into the grey literature category as well. The collection development librarian must evaluate all these diverse materials and is often challenged by researchers and faculty to locate these esoteric items with only a partial or faulty citation to guide the search.

The advent of the Web has had the dual effect of both helping and hindering the discovery of grey literature. While the power of Web-crawling search engines, such as Google, has made electronic copies of grey literature more accessible, it has also encouraged the tendency to forget that some valuable grey literature also exists in a print-only form. These print resources can become even more difficult to locate in the electronic age where the collection development librarian may not bother to look beyond the results returned from online searching.

GreyNet, or the Grey Literature Network (www.greynet.org), is a nonprofit organization founded in 1992 which hosts conferences on the topic of grey literature and publishes *The Grey Journal, An International Journal on Grey Literature* (TGJ). Librarians interested in delving more deeply into all the issues and challenges surrounding grey literature can join the organization’s listserv and explore the growing database of grey literature conference proceedings from the past thirteen international conferences.

**Technical Reports**

While in many cases technical reports could be considered either grey literature or government documents, they are of such importance to the engineer that they deserve their own category. U.S. government-sponsored technical reports were originally produced almost exclusively by the Government Printing Office (GPO) and generally cataloged by their assigned Superintendent of Documents (SuDoc) numbers. During the last two decades of the twentieth century, the National Technical Information Service (NTIS) took over the distribution and indexing of the reports generated by several agencies. This move has resulted
in a complex environment where some technical reports are available only via the federal agency that produced them, others via NTIS, and still others, generated by individual state and local governments, may be very difficult to obtain. There is also a growing collection of non-government reports being produced internally by large corporations like IBM or Bell Labs, which may be proprietary and not available for collection at all even though they may show up tantalizingly in bibliographies. To add to the complexity, government agencies that publish technical reports have been known to change their method of distribution. The collection development librarian is challenged by the task of staying current in this continually shifting environment so as to assure that subsequent publications are not missed as the publishing source changes (Thompson, 2001).

Databases

Any discussion of engineering resources would be remiss without mentioning some of the key databases for engineering literature. The final decision for obtaining subscriptions to new databases is not usually a part of the engineering collection development librarian’s responsibilities. Nevertheless, the librarian will no doubt be consulted with regards to the relative importance of various database choices because a solid understanding of database’s features and its value to the engineering faculty and students will be critical. Launching a new database on a library website is a big decision that involves a long-term commitment. Once faculty and students become comfortable with a new database and begin to depend on the resources it offers, it is difficult to discontinue the subscription or change to other vendors without an unwelcome adjustment curve for users. Therefore, decisions regarding new databases are carefully considered and are usually deferred to a collection development team. Once the team identifies the database and vendor that they feel will provide the greatest return in benefits to their users, the final decision-making process often involves the approval of library administrators or consortia due to the high ongoing cost structure and the complexity of negotiating contracts with vendors.

The definitive engineering database is COMPENDEX, the electronic version of the original Engineering Index. This database indexes and abstracts over 5000 key journals and conference proceedings back to 1884, as well as a select group of technical reports and monographic chapters for all the major engineering branches. Because it has become the standard for engineering databases, it is now very difficult for engineering schools to achieve accreditation without library access to COMPENDEX. The premier vendor for COMPENDEX is the EI Engineering Village as both are owned by Elsevier. In addition to COMPENDEX, Web of Science (or its competitor, SCOPUS), INSPEC and SciFinder are key general scientific/technical databases that generate high usage statistics at most engineering schools. There are a number of other databases that are valuable to one or more engineering branches. For example, electrical engineering researchers will find IEEE Xplore to be essential, and Factiva’s business resources will be very important to industrial engineering researchers. Each engineer may have their own favorite database list based on the specific focus of their discipline. This can be challenging for the collection development librarian who is trying to determine the optimum mix of resources for the library collection.

COLLECTION DEVELOPMENT PLANS

Collection development plans are tools used by even the most seasoned librarians to keep track of what they need to collect and why. These plans (or policies) include information about each program being supported so as to better understand what information the program needs. Analysis of the program’s information needs can help answer
questions before the selection process begins. What topic areas need to be collected only on a general level? Which topic areas need to be exhaustively collected? Can certain aspects of a topic be excluded? Of course, factors besides the program itself are considered in the creation of a collection development plan. Library-wide decisions and funding help determine the level at which each subject is collected.

A librarian may create several collection development plans. Having a separate plan for each budget helps librarians ensure that each discipline is adequately supported. No collection development plan should be set in stone. Institutions change, programs change, circumstances change, and therefore, collection development plans should change. While most changes will be minor from year to year, over time, the collection and its associated policy should change to reflect the emerging needs of the institution. When taking over a new management assignment, studying the collection development plan, if one exists, is a great way to familiarize oneself with the program and the thought behind the collection. Even if a detailed plan exists, going through the process of updating and revising it can be advantageous, especially for those new to engineering disciplines.

The first step to creating a useful collection development plan is to gather information about the academic program and organize it. Only after understanding how the program uses literature can a librarian create an efficient plan to collect it. No two engineering programs are the same. Engineering is made up of several disciplines and sub-disciplines, which have overlapping yet specialized needs. If an engineering degree is offered at an institution, it usually focuses on one of the common engineering disciplines like civil, electrical, mechanical, or chemical, rather than being offered as a general engineering degree. The uniqueness of a program is often found in the sub-disciplines or areas of focus within the disciplines. For example, a mechanical engineering program may concentrate on developing alternative fuels or on tribology or any combination of dozens of areas. Each program will have some of the basics in common, but the unique areas will define it. Although every civil engineering program will need to teach courses in statics and dynamics, it may or may not offer classes in transportation, and, if it does, the focus may be different from that of other programs.

The librarian should start by gathering basic data about the program. What degrees are offered? At what levels? Are there any emphases offered? How many students are enrolled in each degree? How many degrees in each discipline have been bestowed in the past few years? How many teaching faculty are there? Are there any dedicated research faculty (faculty members that have no teaching responsibilities)? Are there special research laboratories on campus in which the program is involved? Academic departments should have all of this information readily available and are usually willing to share it with the library. When organizing information about the program, it is important to keep in mind both its classroom (learning) and laboratory (research) components. Library support for each of these areas differs.

Classroom support will be heavily concentrated on books, but may also include a healthy dose of trade journals and core scholarly journals. How can one determine which courses need library support? This is a very relevant question in engineering since most undergraduate courses will not encourage students to look beyond the textbook for information. Engineering librarians need to be proactive in determining which courses would most likely use library collections. For example, upper division and graduate courses are more likely to have a writing component. Likewise, design courses are likely to use resources like handbooks, and seminar courses may also need general works on the topics covered in the course. Professors teaching these courses may offer suggestions on what would be useful, but they will often only give general recommendations.
The need for research support is tied more closely to faculty research interests than course offerings. Most graduate students’ research is tied with the interests of faculty advisors, so concentrating on the needs of faculty is doubly important. Research interests for faculty can often be found on departmental websites, but keep in mind that these pages may be incomplete and out of date. Engineering departments may maintain more elaborate pages on areas of research focus within the department. However, the best way to determine faculty research interests will be through personal contact. A five minute visit to a professor during office hours can go a long way to developing a lasting collection development partnership.

It is important not to push too hard or to become discouraged. Many engineering faculty feel they do not have time to be involved with library collections, but may be willing to give a brief introduction of their research. Every now and then, an engineering professor will want to play a more active role in collection development decisions. These relationships should be cultivated because they can be helpful in every aspect of a librarian’s job, especially collection development. Research laboratories will also help set the research focus for departments associated with the lab. Information about the emphases of each lab is usually found either on the lab’s website or at the lab itself.

Once the information needs (both research and curricular) for the program have been identified, they should be organized and then analyzed. It may be helpful to refer to the Library of Congress classification outline (http://www.loc.gov/catdir/cpso/lcco/) when organizing the information needs by subject. Keyword searches in the online catalog can help determine call number ranges for subjects as well. It is essential to keep track of which areas are accentuated for research and which are covered by courses. The subject areas of little or no need are as important to identify as the areas of heavy need. Knowing what not to buy makes collection development decisions much easier.

Frequently, topics of interest to engineers will fall outside the engineering disciplines. Engineers have always drawn upon scientific knowledge and applied it to their projects, but research is becoming more and more cross disciplinary in nature. Engineers will share research interests with colleagues in the sciences, social sciences, and even the humanities, and there is a tremendous overlap between engineering disciplines. Communication between subject selectors is critical. It should be identified and agreed upon as to how collection responsibilities for shared areas will be divided. Which librarian will have primary responsibility for a given area? Will the responsibilities be divided by specific aspects of the topic? Often one librarian will be given the primary responsibility to collect materials for a subject even if it is used by faculty outside their discipline. Planning and communication among subject selectors can help to eliminate duplicated effort.

It is important to remember that collection development plans look beyond the specific subject area they address. Library-wide policies affect collection strategies. For example, is there a preferred e-book vendor? How much influence do individual subject librarians have in the purchase of journal packages? What budgeted funds are available for serials? For monographs? How does the library handle standing orders? Library-wide policies affect every aspect of collection development so they should be included in the planning process.

Collection development plans enable librarians to quickly review all the parameters affecting the selection of new library materials. Determining which materials to add to the collection is a balancing act. A balance should be reached between the information supporting curricular needs and that filling research needs. This does not mean the same amount of money should be spent on both areas. Rather, it means that neither area should be neglected. Likewise, a balance should be maintained among the many subject areas, making sure that all are adequately covered. Librarians should
keep in mind that publication patterns change from year to year. One year, an abundance of books on fiber-reinforced concrete may be published. The next year may find none on that topic, but several on non-destructive testing methods for concrete. Purchases should be adjusted year to year with availability kept in mind. Also, knowing the current collection is invaluable. If a gap in existing collections is identified, more funds than usual may be spent on that area for a couple of years so the weak area can be shored-up.

In another sense, collection development requires balancing between different formats. Serials budgets are commonly held separate from monograph budgets. The main reason for this is that the serial budget is already committed from one year to the next. Any new journals would need to be matched with a similar cut in other subscriptions. Because purchasing journals is a long-term commitment, journal selection should be a more involved process with heavy user input. Book purchases are much more fluid in nature. In either case a collection development plan aids the librarians in making wise choices.

TIPS FOR NEW ENGINEERING LIBRARIANS

Many new engineering librarians do not have a degree in an engineering field, and may or may not have prior experience performing collection development activities for other subject areas. Regardless, the discipline of engineering may initially seem both exciting and daunting to tackle. Following are some tips to help new engineering librarians get started with their responsibilities.

Start by learning from those who have gone before. Review any documentation left by previous librarians, and talk with colleagues to gain insights into any particular institutional practices. Review all written collection development policies and meet with the collection development coordinator to learn the procedures for budget allocations and how roles differ for the purchase of new journals and databases versus monographs. Who has final selection approval, and what standing orders are in place? Become familiar with all the standing orders related to engineering. Standing orders ensure that every monograph in a book series is ordered by a library. If a librarian places a separate order for a book that is already included in a standing order it may result in unwanted duplication.

Sometimes the best way to become familiar with a new area is to start at the most basic level. A new engineering librarian wanting to learn about the discipline, both generally and locally at his or her institution, may want to:

- Consult the Occupational Outlook Handbook (http://www.bls.gov/oco/) for an introduction to different engineering fields.
- Review the Library of Congress detailed classification scheme for the engineering disciplines supported by the institution. Browse those sections of the library to get a better feel for the current collection and review recent introductory texts to get a broad overview of subject areas. Look up definitions for terms or concepts that are unfamiliar.
- Explore relevant departmental websites. Many departments have listings of key research areas for the faculty and often identify associated research centers in the university.
- Examine the vitae of faculty to gain insight into which journals are being chosen for faculty publications and what conferences the faculty members regularly attend. This can help identify journals and conference proceedings to purchase for the collection.
- Read the university course catalog as it will provide a wealth of information about the type and breadth of courses being offered by the engineering department. Notice the distribution of topics between undergradu-
ate and graduate level. Most book vendors will identify the content level of books in some way to distinguish general audience/popular, undergraduate, graduate, research and/or professional level coverage.

- Watch for any multidisciplinary or joint degrees that are gaining popularity. Identifying these degrees can point the engineering collection development librarian to other subject specialists with whom they should collaborate when selecting titles for those degree areas.
- Identify the major associations related to the different engineering branches. Study their websites for news on current research topics. These organizations will also often be a key source for monograph, conference proceedings, and journal purchases.
- Browse through several general texts on information sources for engineering to get another view on the breadth of a particular branch of engineering. Some are listed in the references and additional reading sections at the end of the chapter.

**CHALLENGES AND ISSUES**

In addition to the unique collection development aspects of the engineering discipline, there are also several universal challenges being experienced by librarians today. The collection development landscape is being altered by the constant pinch of budget restraints (aggravated by the journal crisis), and the expansion of the open access movement. The very foundation of engineering disciplines is also morphing and blending to create new specialties and interdependences among programs.

The tenure and promotion process in higher education has added to the budget crises facing many libraries. Over time, achieving tenure has become tied to a faculty member’s success in publishing in peer-reviewed journals. This has led to a proliferation of journal publications with new journals emerging every year. Professors rely on journals not only to obtain others’ findings, but also as a vehicle to publish their own work. Historically, journal prices have risen much faster than library budgets. This is especially true with prestigious journals, which publishers know that libraries cannot cancel without widespread faculty outcry. The bundling of journal purchases has added to the pinch libraries feel as these bundles often include expensive multi-year deals, which cannot be broken without stiff penalties.

Enter the downturn of the American economy with state revenues shrinking and massive budget slashes occurring across the board. Even private institutions, not tied to state revenues, have experienced lower returns from endowments due to market volatility. As a result, many libraries continue to struggle today with decreased collections budgets that do not even cover the cost of their existing journal subscriptions. Hard, unpopular decisions will continue to be made with regards to journal cancellations. Some journal vendors are recognizing these difficulties and are beginning to become more willing to negotiate lower increases and offer creative options in order to allow libraries to maintain their collections, but the serious nature of the problem will continue to dominate the attention of collection development librarians for the foreseeable future.

Something that may help to ease the impact of the journal crisis is the increase of open access journals. Open access journals are committed to a policy under which they do “not charge subscription or access fees” for their articles (Budapest Open Access Initiative, 2002, para. 7). Instead, they use alternative funding models. The open access movement continues to gain considerable popularity as time goes on.

So far, there are relatively few open access journals in engineering, but the number is growing. One factor that may inhibit the growth of open access journals in the field is the large number of existing journals published by professional societies. Traditionally, society publishers have
been seen as a low cost alternative to commercial publishers. Society publishers also have a proven track record of providing quality publications and have an established system for vetting articles. On the other hand, if more government agencies require federally funded research to be published in open access journals, the number of new open access journals in engineering will quickly increase. Some commercial publishers are also investigating open access models by passing on all publication costs to authors. New and experienced engineering librarians will want to keep abreast of open access publication trends.

Some related efforts such as the Scholarly Publishing and Academic Resources Coalition (SPARC) have championed scholarly journals that are more cost effective than traditional journals. Even though these independent journals are not open access, they do provide a relatively low cost alternative to expensive established journals. It will take extra effort to protect these independent journals during broad-scale journal cancellation projects. With the larger part of many library’s journal subscription budgets tied up with big deals, these independent journals may be one of the only places to cut journal costs. Cutting independent journals would have the undesirable result of strengthening the big deal vendors’ hold over the journal publication market as the smaller alternative titles fold due to lost subscription revenue.

Another byproduct of rising journal prices is the shrinking of funds budgeted for monographs and other one-time purchases. In order to minimize the number of journal titles cancelled, many libraries have needed to allocate a larger portion of the budget to serials. It is simply a case of Peter robbing Paul. Thus, ensuring adequate collections of non-serial materials becomes more challenging. Usually, the allocation of funds between serials and monographs is decided by library administrators rather than individual librarian responsible for selecting materials for purchase. However, in the engineering fields journals are generally more important to research than monographs, so the shrinking monographic budget is seen as the lesser of two evils, but there is a point beyond which this is no longer a viable alternative. At some point additional funding must be identified to avoid deteriorating collection quality. Although there are no definitive answers to this problem, there are two methods that some libraries have found effective in obtaining additional funding for collections. The first is to educate faculty to the reasons behind the library’s budgetary problems, and the impact that has on maintaining adequate collections to support their needs. Requests for additional library funding that originate from the faculty have a powerful effect on the university administration’s budgetary decisions. The second method is for the library to actively seek endowments to support collections. This method requires a major investment of staff time (many library deans spend a significant portion of their time on fundraising) but can provide returns that are well worth the effort.

The management of engineering collections faces an additional challenge in that the nature of both engineering and scientific research is becoming increasingly cross-disciplinary. Subjects that traditionally fell into one discipline now are studied by many disciplines, often in entirely different ways. Finding ways to efficiently select the best materials without duplicating effort will take innovative and collaborative approaches to collection development.

Finally, the electronic access to information, while a great boon, also creates many challenges to the creation and access of collections. As users become more dependent upon one-stop searches, the less mainstream portions of the collections may remain undiscovered by those who most need the answers these sources contain.

CONCLUSION

The engineering collection development librarian has a dynamic role in university libraries.
Collection development decisions are based on a complex evaluation of teaching versus research needs, open access versus big deal alternatives, and budgetary limitations. Continual learning in a changing landscape assures success for the collection development librarian who can remain flexible and innovative in their efforts to serve the needs of the institution’s engineering populations.

REFERENCES


ADDITIONAL READING


Information Sources and Collection Planning for Engineering


**KEY TERMS AND DEFINITIONS**

**Collection Development Plan:** (also called Collection Development policy) A document which defines priorities for collection decisions based on both the current and long-term goals and purpose of the organization it serves.

**Conference Proceedings:** Conferences allow researchers the opportunity to present original research findings and to discuss common challenges in their field. Conference Proceedings are a collective publication of conference papers presented during the conference.

**Engineering:** A practical field, which utilizes science and mathematics to design and construct concrete things. Engineering is split into specialized disciplines. For example, civil engineering encompasses the design and construction of roads and other physical structures. Mechanical engineering, on the other hand, focuses on the design and construction of vehicles, engines and machines of all types.

**Grey Literature:** Scholarly writings of both print and electronic formats which are not disseminated via traditional publishers and thus often more difficult to locate. Grey literature can include technical reports, government documents, blogs, scholarly discussion groups and portals.

**Handbook:** A reference book compiled of brief facts and specifications for a given subject.

**Peer Reviewed:** A process in academic publishing whereby qualified individuals in a given field evaluate a submitted written document to determine whether it meets the academic standards deemed suitable for publication in that field.

**Standards:** Widely accepted procedures or specifications defined by professional organizations or the government to maintain consistency or assure safety.

**Standing Order:** An automatic ordering process for monographic serials that assures titles in the series are not missed in the collection development process.

**SuDoc Classification System:** An acronym for the Superintendent of Documents classification system which was developed in the library of the Government Printing Office. Organizes government documents by issuing agency.

**Technical Reports:** Often funded by private corporations or government entities, technical reports are strictly structured documents, which report the findings and conclusions of scientific and technical research and often include design details and supporting data.