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Science and Technology Libraries Partnering with Knovel

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Abstract

The engineering library plays a critical role in initiating and maintaining the conduit between vendors of engineering information and the users of that information—faculty, students, and researchers. Likewise, vendors play a key role in supporting library and faculty efforts to promote science and engineering information resources, beyond just supplying content and interface. Science and engineering libraries and vendors can effectively work together to get the most from electronic resources for both large and small institutions. The case studies here show how Knovel Corporation, a sci-tech e-book vendor, has worked with librarians at large and small institutions and with faculty members to promote awareness and usage of Knovel's interactive library of electronic books for science and engineering education.

Librarians and Knovel partner at a large institution like Drexel University to give on-site workshops for faculty and students. At these workshops important features of Knovel's content and software are discussed and demonstrated in a live format. Questions are encouraged to ensure participants understand the technology, and short assignments reinforce learning. Knovel works with librarians to promote these sessions and continues the dialogue with attendees

afterward. On-site demonstrations are one of the most effective ways to educate users about new technologies and new content. Librarians at smaller institutions often do not have the time and resources to devote to a full-scale on-site workshop. They need an "out-of-the-box" solution that is quick to deploy with an interface that is self-evident to users. Complete integration of e-book titles into the institution's information toolbox is the key here. Knovel provides resources to promote ready access to meet the needs of smaller institutions, including MARC records for the library's catalog. Finally, librarians and Knovel work directly with faculty to integrate Knovel's content into their courses. An example is Purdue University's "treasure hunt" assignment given in the Mechanical Engineering Technology program which includes questions which leverage Knovel titles to answer.

By supporting outreach and access strategies appropriate for institution size and need, librarians and Knovel illustrate how to create an effective partnership with engineering libraries to increase awareness, usage and, ultimately, cost-effectiveness of electronic resources.

Introduction

A university's science and engineering libraries play a vital role in the intellectual and academic life of students, researchers, and/or faculty members. As a conduit of technical information, the library is unsurpassed in its ability to connect people to vital references and data. With the onset of online science and technology reference sources, the library's traditional role as the physical storage house for reference materials has changed and expanded, allowing users to access data on their computer desktop without actually opening a book or searching a card or online catalog index. More materials are becoming available online and electronic resources have decided

advantages (Webster 2003). Users in turn have changed their information-seeking behaviors to take advantage of this electronic environment, and user preferences are often for electronic information when Available (Lehto, et al 1995; Marcum 2003; Gray and Langley 2002; Komerath and Smith 2002; Kantor, et al. 2000).

As the library's level of service has expanded to off-site and 24 hours a day, 7 days a week service via the new online model, librarians must look at changes in outreach strategies (Lonsdale and Armstrong 2001). Vendors that supply these online products and services must change their working relationship with librarians to meet the individual needs each institution -- large or small -- requires. Now it is not enough for vendors to simply provide content and the means to use it. The science and engineering libraries and vendors can seek a partnership to support the needs of the library's user community in order to provide the level of value necessary to make such a venture more successful (Trolley and Sheppard 2002). Unused information or untouched subscriber services are unacceptable to any university as budgets are scrutinized and technology allows budget-makers to track usage and clearly see what returns are being made on any resource investment. Thus, vendors must be visible to their customers, offering training to subscribers, and ultimately becoming part of the reference and research "culture" that exists at a college Vendors must show their value by seamlessly becoming part of the search and retrieval fabric of the user community.

The focus of this paper is a case study model that shows how a sci-tech e-book vendor, Knovel Corporation, has partnered with science and engineering libraries at several different academic institutions to meet each university's needs. The paper shows how combining outreach and

access support with relevant content, interactive software tools, and an effective product format can meet the specific needs of each learning institution and enhance the resources of both the library and the online provider.

Library/Vendor Partnerships and a New Reference Book Paradigm

Achieving a productive and valuable partnership requires input and responses from the parties involved. Typically, in the management of an online information product those parties consist of the library and the online vendor. In some cases, the scope of the relationship is much larger than just an interface between librarian and vendor; the relationship includes many liaison roles, such as communicating with faculty, graduate students and undergraduates (Glynn and Wu 2003). In 2002 a survey was conducted by the Working Group on Liaison Relationships, a task force that focused on finding answers about what services were most valuable at the Rutgers University Library. The study revealed the community's preferred methods of communication, priorities for library liaisons, and the importance of these services to students. Academic departments and faculty preferred face-to-face meetings to discuss new services and tools available at the library; the faculty ranked as highest the liaison services that informed them about new library services and new online or print materials available at the library. Similarly, when students were questioned about liaison services, they overwhelmingly responded the same (Glynn and Wu 2003).

This survey reinforced the fact that a successful partnership requires knowing how the audience wishes to be contacted, and then providing the services they need in an effective way. While a vendor's online collection of electronic reference books may, on the surface, appear to be simply

a keystroke away and the vendor's only requirement is to ensure the product is available and up-to-date, the Rutgers University survey showed this is not all that users' desire. Libraries must enhance access to online services in ways that are comfortable to their user community and to fully meet their needs. Vendors should provide support for outreach, enhanced access, thoughtful insight into the collection's content, and intuitive organization of these resources for ease-of-use. This way, all parties—library, vendor, faculty, researchers and students—benefit from a truly useful reference source.

Outreach and improved access are particularly important when e-products lead users away from traditional print usage and formats and push the comfort zones of the user community by their unfamiliarity. Knovel Corporation's e-book reference product is built on the premise that faster, more flexible means of accessing reference materials is the way of the future, but that the model of the standard printed reference book remains viable. Knovel created a Web portal from which scientific and technological information from reference books could be accessed in an interactive electronic format. The company's editorial advisory board is composed of members with diverse backgrounds, including the academic, industrial, corporate and publishing fields. This core advisory group is responsible for reviewing and recommending published print titles for inclusion in Knovel's e-book collection.

Knovel offers its e-book reference collection in a format very similar to that of a traditional bound paper reference book. Electronic "pages" open and read just as they would in a print book, so users can intuitively navigate the site. Although the screen may have a traditional look, the company has coupled the standard page layout with a unique combination of software tools

to search and manipulate data. Librarians and their users can work within the traditional book format, but they are encouraged by the electronic environment and search tools to expand the way they use the materials and explore new means of access and data manipulation—to change the way they think about reference books.

This new treatment of reference books is being explored at universities in Knovel's customer base across the United States and abroad. Reference librarians now have more options in how they provide information to their users, making it increasingly important to communicate these options to their user community. Librarians, no strangers to electronic resources at this point, are still faced with common issues when managing innovative e-reference tools. These issues include promotion of the product, user training, providing staff and technical support resources for access to the product, and providing evidence that these products are an efficient and effective use of library/institutional resources. Vendors can play an important role in support of these activities.

The Drexel University Experience

Drexel University's Hagerty Library is tasked with providing reference materials and services to an 11,000-strong audience of users encompassing faculty, professors, researchers and students on both the undergraduate and graduate levels. The librarian's area of specialty is engineering information services, providing consulting services to patrons with a wide spectrum of information needs including substantive information in scientific disciplines. The challenge faced here with sourcing any new reference material is providing the level of specific information required by mechanical engineering, biomedical engineering, electrical engineering

and chemical engineering students, researchers and faculty. The need for this breadth and depth of content at Drexel University means the first hurdle a reference vendor must clear is providing a deep array of technical data across a wide spectrum of academic fields. Second, it is an advantage for a vendor to provide content that appeals to a "Google culture" that is, materials that can be searched using a simple interface for quick access to data. (Bell 2004; Kenny 2004; Wong and Kim 2004). Knovel provides a simple user interface with deep searchable capabilities that "mine" the entire contents of the reference books for relevant data. Knovel's subject "bundles" of reference titles provide the content to enhance retrieval of useful information in technical subject areas, which include:

Adhesives, Coatings, Sealings and Inks

Aerospace and Radar Technology

Biochemistry, Biology and Biotechnology

Ceramics and Ceramic Engineering

Chemistry and Chemical Engineering

Construction Materials and Engineering

Electrical and Power Engineering

Environment and Environmental Engineering

Food Science

General Engineering References

Mechanics and Mechanical Engineering

Metals and Metallurgy

Pharmaceuticals, Cosmetics and Toiletries

Plastics and Rubbers

Safety, Health and Hygiene

Semiconductors and Electronics

Textiles

The interactive capabilities of the "knovelized" content bring tables, charts and technical information into a more functional environment. Users can plug data into text formulas, etc. and instantly obtain answers from within the reference page where the chart is contained. This feature no printed textbook can provide, along with the diverse array of content and the Knovel product's easy-to-use interface, have made it a popular search choice for users in the engineering and science disciplines at Drexel University. The chemistry and chemical engineering content bundle gets the most use per month here, with construction materials and engineering coming in second and plastics and rubbers taking third. Over 35,000 pages of Knovel content had been viewed from August to December 2004. The ability to measure the metrics of the library's reference investment with usage statistics is a relatively new tool for librarians, but increasingly important as library budgets come under close scrutiny.

Figure 1. Example of a Knovel interactive table from a search for information on carbon tetrachloride. Users can manipulate data, export it, change the table configuration, view linked notes, etc.

Chemical Compounds (Organic); C-Table - Microsoft Internet Explorer

International Critical Tables of Numerical Data, Physics, Chemistry and Technology (1st Electronic Edition) Display: Data Found | All Data

Table: Chemical Compounds (Organic); C-Table
Table Type: Interactive Table
Search Query: (methane) AND (temperature)
Data Found (Search): 63 rows retrieved out of 6256 rows
Number of Hidden Columns: 3

First Page | Previous Page | 1 of 2 | Jump To Page | Next Page | Last Page

Select Rows | Find Data in Table | Filter Data in Table | A-Z Sort Z-A Table | Show / Hide Columns | Change Column Order | Print Table | Export Table | View Associated Text | Back to Search Results | Unit Conver

	no.	index no.	material or substance name	synonyms	mol. formula	CAS Registry No.	mol. weight	melting point (°C)	boiling point (°C)	sp. gravity
	3	2	bromotrichloromethane	view synonyms	$CBrCl_3$	75-62-7	198.29	-21	172	1.959 [14.5/4°C]
	6	5	bromopicrin	view synonyms	CBr_3NO_2	464-10-8	297.76	10.3	127 [118 mmHg]	2.799
	7	6	carbon tetrabromide	view synonyms	CBr_4	558-13-4	331.66	α 48.4; β 90.1	189.5	3.42
	9	8	dichlorodinitromethane	view synonyms	$CCl_2N_2O_4$	1587-41-3	174.93	122.5		
	12	11	chloropicrin	view synonyms	CCl_3NO_2	76-06-2	164.38	-64	112.4	1.692
	13	12	carbon tetrachloride	view synonyms	CCl_4	56-23-5	153.83	-23.0	76.8	1.595
	14	13	carbon tetrafluoride	view synonyms	CF_4	75-73-0	88.00	-80	-15	
	17	16	carbon tetraiodide	view synonyms	CI_4	507-25-5	519.73	d.		4.32
	18	17	tetranitromethane	view synonyms	CN_4O_8	509-14-8	196.03	13	125.7	1.650 [13/4°C]
	22	17.4	bromodichloromethane	view synonyms	$CHBrCl_2$	75-27-4	163.84		92	1.925 [15°C]
	23	18	bromoform	view synonyms	$CHBr_3$	75-25-2	252.76	7.7	150.4	2.890
	24	19	chloroform	view synonyms	$CHCl_3$	67-66-3	119.38	-63.5	61.2	1.489
	25	20	fluoroform	view synonyms	CHF_3	75-46-7	70.008		20 [40 atm.]	2.53
	26	21	iodoform	view synonyms	CHI_3	75-47-8	393.80	119		4.1

Accessibility to the e-books is another requirement. All Knovel e-books are cataloged in the library's online catalog since Knovel provides MARC records. A batch of new MARC records for each new title is normally sent every month to the library's Technical Services Department so new items are quickly represented in the catalog. A student's ability to search the online catalog is crucial for providing easy access to Knovel content. Perceived ease-of-use and availability, a significant part of the usability equation, combines with the online format of the e-reference books to strongly encourage use (Webster 2003; Marcum 2003; Gray and Langley 2002; Subramanian 1998; Landoni, Wilson and Gibb 2000).

Yet offering an easy-to-use accessible site with good content is not enough for Knovel to maintain the solid partnership with Drexel University. A primary component of the partnership is outreach—supporting on- and off-site workshops to faculty and students to facilitate the best use of the electronic product, distributing user guides, and demonstrating the built-in software tools in a live format to convince users of the product's worth. Library liaisons coordinate and

implement the more sophisticated techniques geared toward finding information in the science and engineering specialties at this university. Effective bibliographic instruction is not only a critical component of liaisonship for librarians, but it also generates goodwill that further enhances liaison relationships with user communities (Glynn and Wu 2003).

Knovel works with the librarian to send e-mail blasts to users and have signs placed at community gathering points to effectively market the courses given on campus. Follow-up dialogue, plus ongoing e-mail communications with users at Drexel are also important elements of this strategy. For example, a few times the librarian and Knovel have paired up to offer a talk for faculty and students at the library's seminar room, and Knovel "sweetened the pot" by offering free pizza and drinks to attendees. For winter 2005, a required seminar is planned by the chemistry and chemical engineering department entitled 'Chemical Information Retrieval Class,' that has required homework for attendees to complete; these courses actively reinforce the use of online products. In the future, the partners envision a session where questions are solicited from the audience and that ends with a homework assignment. Users would be awarded prizes for accurately answering three questions within a designated time period; the questions could not be answered unless Knovel is accessed for solutions.

The proof in the vendor/university relationship's success is how users access Knovel to answer questions and solve problems in their everyday coursework and research. Drexel University's freshman design project that 800+ burgeoning engineers must complete in their first year is an example of this. The project pushes students to combine theory, statistics, and materials in one cohesive package. Many times, students have no idea where to begin, and Knovel offers them a

"launching pad" to outline ideas and narrow them down as the project develops. For example, in 2003 a student chose wood as a material and needed to know about the moisture properties in wood and how this impacts wood construction. Knovel provided the tools for him to quickly find answers that otherwise might have required a time-consuming and possibly fruitless search through stacks of print reference materials. Other students have queried the Knovel web site about the mechanical properties of gears, how safety pins break, or the properties of steel in steel construction. The e-books provided data on the crystalline structures of metals and the actual grain orientation of different materials for students to successfully complete projects.

In a chemical engineering course, 'Process Material Balances,' the students are asked to solve problems using Knovel. For example, one problem requests, "Find the vapor pressure of phenol using Knovel." One of the results of the search "phenol" and "vapor pressure" is an interactive table from *Perry's Chemical Engineers Handbook*. Students can manipulate data in the table and click on an "equation plotter" link to plot the equation with the proper software.

 Another benefit is the ability to directly link Knovel books through course management software such as WebCT™. One such application can be found in the 'Thermodynamic Analysis I' course. *The Mechanical Engineering Handbook*—an e-reference book available from Knovel— is linked so students can access it directly through WebCT. Linking e-books from Knovel or similar materials from other vendors by using course management software helps students complete their work more efficiently. The Knovel electronic tip sheets and tutorial sessions can also be linked through WebCT, which empowers students to use them for more efficient

searching. Faculty can identify appropriate e-books for their courses and add links when developing content for their courses in WebCT.

Drexel University librarians and Knovel note the successful partnership is due, in large part, to availability of instruction to all levels of users. The distribution of tools, either done electronically or via handouts and coordination with staff at the science and engineering libraries effectively promote Knovel's resources to the user community as relevant and important. Using non-traditional means to alert users, like faculty coffee meetings or flyers at the reference desk, reinforces awareness of the product. With ongoing efforts, as new personnel and students arrive each year, the librarian and Knovel have integrated this collection of e-books into the academic culture at Drexel.

The Colorado School of Mines Experience

The Arthur Lakes Library at the Colorado School of Mines provides reference and instruction services to approximately 4,000 students, faculty and researchers. The Colorado School of Mines (CSM), a small PhD-granting state university in Golden, Colorado, offers degrees in engineering and the physical sciences with a focus on earth resource engineering. This user community needs a specialized collection of engineering and science reference materials congruent with the university's academic and research programs and, based on user and librarian feedback, prefers on-demand assistance in using these materials. The university's user community is comfortable with the Google model, and a successful vendor must take this preference into account to gain widespread appeal.

Library instruction at CSM has developed into a flexible program with a course-based focus as most effective for this environment. Reference and instruction activities depend on ready access to both print and electronic resources, and the library's information literacy program emphasizes developing skills in moving effectively between the two formats. Integration of both print and electronic titles into the library's web-based information "toolbox" of databases and finding aids is a priority. The library subscribes to a number of electronic reference books through various vendors/publishers; these e-book titles must be integrated into the library's toolbox and evaluated for efficiency and effectiveness. Vendors who can provide assistance with integrating their resources into the library's existing body of electronic tools (web catalog, etc.) are valued.

Knovel meets these demands by providing resources that can "just appear" when users search the library's web site for CSM's familiar suite of information tools. The preferences of the university's user community and the library's small staff make full scale on-site workshops impractical on a widespread basis; instead the librarians rely on Knovel's integration into the library's information toolbox as the primary method of outreach and the vendor's supporting resources to educate users through Knovel WebEx™ demonstrations and self guided tutorials. The contents of the library's toolbox are promoted in instruction sessions and news releases on the library's web site, and by distributing tailored bookmarks and other promotional materials to users.

The library's online catalog is a major element of this toolbox, and Knovel meets the need for complete integration of e-resources into the catalog (similar to the Drexel University model) by providing MARC records ready to load into the system. This is critical at CSM, as the library's

small staff cannot readily undertake the labor-intensive process of cataloging a changeable online package of hundreds of reference titles. Records for titles are loaded with minimal local manipulation and are immediately available in the catalog with a web link that leads directly to the e-book. Also, the records are displayed in the regional union catalog "Prospector," of which CSM is a member. Full information on Knovel titles in these catalogs is an effective and easy outreach method, and it emphasizes library catalogs as important sources of technical information for users. This seemingly covert kind of product marketing is successful for this university.

For example, students enrolled in the team-based freshman engineering design course all participate in an integrated library instruction session, which amounts to about 16 sections and 400 students each semester. Because of the structure of the design course the librarians cannot anticipate what type of information each student will seek, so all students are encouraged to use the library catalog and other basic sci/tech information tools. A student searching the library catalog for information on batteries for the team's 2005 project—designing a robot sampling arm—finds a link to Knovel's *Handbook of Batteries* and browses its chapters. While the student is in the Knovel user interface he takes the opportunity to search under "robot arm" as well and retrieves useful illustrations on robot arm configurations. In another example, a graduate student attends a library session on thesis research and, following the librarian's advice, checks a library web guide on environmental engineering resources. A link on the website takes her to Knovel where she finds data from several titles on the cost of remediation methods for her research. In addition to these examples, the reference librarians regularly use Knovel in on-the-

fly teaching opportunities during reference queries for students and faculty, particularly for queries on chemical and physical properties of materials.

Usage statistics are commonly employed by librarians to help evaluate the effectiveness of e-products on several different levels (Peters 2002). Although Knovel does not provide detailed statistics that allow for in-depth analysis of use on a title-by-title basis, for example as recommended by the COUNTER initiative , usage statistics by subject bundle from Knovel are still an important tool in assessing the product and in modifying instruction strategies (COUNTER 2005, Shepherd 2003). Use patterns for Knovel at the university are strong, with the bundled content use strongest in the areas of chemistry, ceramics, construction materials, mechanical engineering and electronics. The total usage of Knovel titles increased 50% after the first year, a pattern comparable to that of other electronic subscriptions introduced at CSM and elsewhere and predictable given the nature of the university's user population and the types of outreach employed (Townley and Murray 1999).

The economics of using Knovel have been favorable as well—cost is still a top concern when considering an e-book purchase (Albanese 2004). Assuming a conservative estimate of the number of Knovel titles actually used from the total subscription, the library's cost runs about $300 per title. Usage statistics coupled with cost data offer the library an opportunity to compare different vendors' products in both print and electronic formats. Although not every part of the Knovel package is heavily used, the metrics of the product as a collection of subject bundles remain within the CSM librarians' comfort zone. The librarians evaluate packages of titles carefully when considering subscriptions because of the overall cost of package deals and the

potential for inclusion of peripheral (less desirable) content (Kantor, Summerfield and Mandel 2000). In this situation, the ability to access the "just in case" (more peripheral) titles included in the subscription package "just in time" via the user's desktop is an added bonus and increases the product's overall usefulness. Another obvious advantage of a package of e-books is the unified multi-function interface—Knovel is accompanied by more value-added features in its entirety than if similar content was purchased as separate reference books. In addition, the librarians forward suggestions on new titles they would like to see included to Knovel to continue to enhance the fit of this reference collection's content to the university's information needs.

Even though the library does not have a formal instruction program centered on Knovel, the e-book service is an integrated part of library instruction at CSM. Informal feedback from users and librarians and Knovel's usage statistics provide information about the degree to which Knovel titles are integrated into the user community's information research behaviors. Librarians can track statistics for unanticipated levels of high or low usage and use this data as feedback to modify instruction strategies, target specific audiences, edit in-house web guides, or make cautious inferences about user behaviors (Peters 2002). Knovel has proven to be a good fit for this smaller institution at several levels, and particularly in the level of vendor support for improved access to the user community and the provision of evaluation data.

The Big Ten Conference Institution Experience
The Engineering Library at Purdue University's Libraries in West Lafayette, Indiana provides accurate and timely reference resources to a population of over 38,800 students with specializations in aeronautics and astronautics, agricultural and biological, biomedical, chemical,

civil, construction and management, electrical and computer, industrial, interdisciplinary, materials, mechanical and nuclear engineering disciplines. The challenge at Purdue, as at Drexel University and the Colorado School of Mines, is finding an online vendor whose product content covers these subjects and the deep searchable tools that provide reference data that is attractive to the user—breadth, depth and searchability. Again, Knovel's e-book collection and user interface are a good fit. A researcher's time is valuable and cross-title searchability and other tools maximize user efficiency and allow users to "prune" the data to meet their needs (Van Epps *in* press).

In Purdue's case, the vendor supports outreach by working with the librarian to focus on the faculty as a means of reaching the science and engineering students. The connections made between Knovel and faculty members were key in generating the support necessary to receive special funding for the product. Knovel provides the university with a full information package for students and faculty each year. The librarian and Knovel partner with faculty to integrate Knovel resources into the coursework at strategic places to show its effectiveness in helping to find data for students' needs. Much of the demonstration with students happens in a one-on-one situation when students are looking for specific information. One example of generating use is an assignment for freshman students which take the form of a "treasure hunt." The purpose of the treasure hunt is to teach students how to find a wide variety of information that will be important in their professional careers. The assignment has been used for years and many answers are contained within materials that are a part of Knovel. With Knovel available to the students, they can see the depth of the content and efficiency of retrieval available from

electronic reference books. Each student needs to answer 10 questions, many of which leverage the search capabilities of Knovel to answer.

The librarian has been working with Knovel to offer an on-campus session or two, similar to those offered at Drexel. It is believed there could be much more use by faculty and students alike once they are more aware of the product and its capabilities. Purdue is also pursuing the inclusion of records for the e-books in the library catalog as a method for raising awareness with the user community. As indicated by several authors, students prefer online access to materials whenever available, so the libraries need to be sure the users are aware of the electronic availability for these titles (Lehto, et al 1995; Marcum 2003; Gray and Langley 2002; Komerath and Smith 2002; Kantor, et al. 2000). The result of this style of low-key marketing has already been indicated by its successful implementation in other libraries for universities of all sizes.

Piggybacking on the regular Knovel e-mail announcements to librarians highlighting one of the company's e-books, the librarian uses the information to produce a "did you know" blurb on the engineering library homepage as part of the library news section. This blurb points out the availability of the e-book and provides a link to the specific title.

Knovel is a well used product at the university and regular statistics show that the most heavily used subject area is chemistry and chemical engineering, followed by mechanics and mechanical engineering and the materials and metallurgy bundles. The librarian and Knovel are able to coordinate their resources and enhance both the student learning experience and successful use

of Knovel e-books. For Purdue, engaging in direct involvement with the faculty is an effective way to provide outreach to the user community.

Conclusion

The present information environment is characterized by the availability of more data, more electronic products, and ever faster and more interactive means of utilizing information. University science and engineering libraries are continuously challenged to address the technologically-impacted issues surrounding outreach, access and needs of the user community in addition to the familiar issues of content, quality and economy (Glynn and Wu 2003; Moyo 2004; Rader 2000). Vendors can share the same concerns from their perspective, making a common ground with librarians. It is to the benefit of all parties (libraries, vendors, faculty and students) for libraries and vendors to provide ready access to and promote effective use of a product (Trolley and Sheppard 2002). By supporting outreach strategies appropriate for an institution's size and needs, maintaining active lines of communication and feedback between library and vendor, and working out customized solutions to meet user and library needs, engineering librarians and vendors like Knovel illustrate how to foster strong relationships to serve in a variety of educational environments. Shared goals between libraries and vendors (even with different motivations) can make a successful partnership in information outreach to engineering students and faculty. Ultimately, each member of the partnership benefits by increased awareness of the online resource and the use of the information it contains.

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