The interdisciplinary use of physics journals

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Online searching as a collection management tool.

Online search systems have traditionally been used to provide patrons with journal citations on a specific topic. Such systems can, however, be used for other purposes within the library. Evaluating the importance and potential demand for journals before moving them to a branch library or canceling subscriptions can be a difficult, labor intensive process. Often such evaluations must be produced in a short period of time. Online searching is one fast and efficient way to gather the information needed to make such an evaluation. Journals that are heavily indexed in several major databases for example, may not be good candidates for moving to a branch library or canceling subscriptions. When such a situation arose at Texas A&M University, two approaches were used to determine where the journal titles were indexed and what percentage of the articles in those journals were actually covered in each database. One approach was to search for specific articles; the other was to search for journal titles. The information gathered was provided in report form to the library administration, the university administration, and the Library Council, which is composed of representatives from each college.

The Situation

At present the library system on the main campus of Texas A&M University has a single central library and no branch libraries. Recently the Evans Library was requested by a group on campus to relocate 36 physics journals to start a separate branch library. This group argued that the journals were used only by physicists and not by other departments. The reference staff was asked by the library administration to provide information about the interdisciplinary nature of these journals. Unfortunately there was less than a week to complete the task. Obviously it was necessary to find the fastest way to compile this information while at the same time covering all the regular duties of the Reference Division. Online searching was the only method which would be fast enough and require only a few staff members.

Methodology

The first step was to compile a list of potential databases. Two staff members, using *Ulrich's International Periodicals Directory* and OCLC, produced a list of the indexes in which the 36 periodicals in question were covered. The initial compilation turned up a list of 36 different indexes. From these 36, eight which had online counterparts were selected for the online searching project. These eight were: *Chemical Abstracts*, *Computer & Control Abstracts*, *Electrical & Electronics Abstracts*, *Engineering Index*, *International Aerospace Abstracts*, *Mathematical Reviews*, *Metals Abstracts*, and *Science Citation Index*. These particular databases represent a wide variety of disci-

TABLE 1
Coverage of Physics Journals by Chemical Abstracts

Journals	Articles Indexed 1983–1985	Articles Published 1983–1985	Percentage[1]
Annals of Physics	245	334	73%
Applied Physics Letters	2,534	2,686	94%
Contemporary Physics	44	60	73%
Fortschritte der Physik	31	58	54%
Journal of Applied Physics	3,944	4,511	87%
Journal of Low Temperature Physics	340	402	85%
Journal of Physics A: Mathematical & General	380	1,034	37%
Journal of Physics B: Molecular Physics	1,169	1,169	100%
Journal of Physics C: Solid State Physics	1,731	1,731	100%
Journal of Physics F: Metal Physics	701	701	100%
Journal of the Optical Society of America B	331	346	96%
Nuclear Physics A	1,825	1,839	99%
Nuclear Physics B	1,324	1,646	80%
Optics Letters	431	626	69%
Physica (A, B, C, D)	1,796	2,464	73%
Physical Review A: General Physics	1,825	2,979	61%
Physical Review B: Condensed Matter	5,532	6,481	85%
Physical Review C: Nuclear Physics	1,920	1,920	100%
Physical Review D: Particles and Fields	1,925	2,480	78%
Physical Review Letters	3,486	3,895	90%
Physics Letters A	1,307	2,636	50%
Physics Letters B	4,013	4,543	88%
Physics Reports	153	207	74%
Progress of Theoretical Physics	535	777	69%
Review of Scientific Instr.	819	1,269	65%
Reviews of Modern Physics	43	61	70%
Zeitschrift für Physik A	824	824	100%
Zeitschrift für Physik C	763	802	95%
Total	39,971	48,481	82%

[1] Articles indexed (1983–1985) divided by articles published (1983–1985)

plines, are heavily used and are of major importance. *Physics Abstracts* was specifically excluded because the basic premise was that these journals were used by nonphysicists as well as physicists; their appearance in *Physics Abstracts* would only demonstrate the obvious fact that physicists use these journals.

Because of the shortage of time, two online searchers were assigned to work on the project full-time. The first approach used was article specific; one issue from each journal was selected and the entire contents of the title page were searched in each database. This was done by searching for the author's name and limiting the search by year. The

TABLE 2
Summary of Coverage by Eight Major Indexing and Abstracting Services

Index	Articles Indexed 1983–1985	Articles Published 1983–1985	Percentage[1]	No. of journals Indexed by Service[2]
Chemical Abstracts	39,971	48,481	83%	28
Computer & Control Abstracts	178	4,693	4%	4
Electrical & Electronics Abstracts	5,987	30,981	19%	15
Engineering Index	6,450	11,678	55%	6
International Aerospace Abstracts	7,607	36,366	21%	19
Mathematical Reviews	5,329	39,658	13%	25
Metals Abstracts	3,064	19,348	16%	12
Science Citation Index	49,266	52,241	94%	32
Total	117,852	243,446	48%	

[1] "Articles Indexed 1983–1985" represents the total number of articles, from the 36 physics journals, cited in each indexing and abstracting service. "Articles Published 1983–1985" represents the total number of articles published in journals that were cited in each indexing and abstracting service (see the last column for number of journals indexed by service). "Percentage" represents "Articles Indexed 1983–1985" divided by "Articles Published 1983–1985."

[2] Total journals studied = 36.

objective of this approach was to determine how a typical issue of the journal might be represented in indexes from other disciplines.

After a day of almost constant searching, it became apparent that searching for specific articles was not practical and another method would have to be used. There were several reasons for this decision. First of all, one issue could have as many as 60 article titles to look up; this took far too long. Secondly, it was difficult to retrieve one specific article when an author published extensively during the year, thereby adding significantly to the time spent online. Finally, many of the databases required different forms of author searching which made it more difficult for the searchers. The tremendous amount of time spent online caused a two-fold problem: time and money. The cost was getting out of hand and with only a week to complete the project, time was running short. Also, one issue of a journal is not necessarily a good measure of the coverage of the journal itself in various indexes.

The next approach was to search by journal title. Each of the 36 journal titles was searched in each of the 8 databases for the years 1983–1985 to determine the number of times the journal was indexed. This demonstrated how the journal as a whole, rather than just a single issue, was covered in various disciplines. In addition, it indicated that the indexes used by other disciplines also cover physics journals. Therefore it was a better indication that these 36 journals were used by non-physicists. The journal title approach also solved the problems encountered earlier with time and cost because it was faster and simpler for the searchers.

Results

A table was created for each of the eight online databases giving a detailed analysis of each journal and its coverage in that database (see Table 1). The first column lists the number of articles indexed in the database from 1983–1985 for each of the journals being studied. These figures were obtained from the online searches. The second column lists the total number of articles published in each journal for the same time period. These figures were taken from the "Journal Citation Reports" in *Science Citation Index*. In the third column, "articles indexed" is divided by "articles published" to give a percentage. Table 1 is just one example of such detailed analyses. As shown in this table, 28 of the physics titles examined had at least 37% of their articles cited in *Chemical Abstracts*. In fact, 57% of the titles indexed had more than 75% coverage. Similar tables were compiled for each of the other seven databases.

Table 2 summarizes coverage by the eight indexing and abstracting services. *Chemical Abstracts*, for example, cited 83% of the articles published in 28 of the journals. *Science Citation Index*, which is used by all science and engineering disciplines, cited 49,266 articles of the 52,241 (94%) articles published in 32 journals. Forty-eight percent of the articles published in the 36 physics journals exam-

TABLE 3
Coverage of 36 Physics Journals by 8 Major Indexes

Titles	CA	CCA	EEA	EI
Annals of Physics	73%*	1%	—	—
Applied Physics Letters	94%	—	73%	38%
Classical and Quantum Gravity	—	—	—	—
Contemporary Physics	73%	—	12%	—
Europhysics Letters	—	—	—	—
Fortschritte der Physik	53%	—	—	—
JETP Letters	—	—	5%	—
Journal of Applied Physics	87%	—	44%	58%
Journal of Low Temperature Physics	85%	—	6%	98%
Journal of Physics A: Mathematical and General	37%	—	—	—
Journal of Physics B: Atomic, Molecular & Optical	100%	—	—	—
Journal of Physics C: Solid State Physics	100%	—	5%	—
Journal of Physics F: Metal Physics	100%	—	—	—
Journal of the Optical Society of America B	96%	—	31%	44%
Nuclear Physics A	99%	—	—	—
Nuclear Physics B	80%	—	—	—
Nuovo Cimento	—	—	7%	—
Optics Letters	69%	2%	64%	—
Physica (A,B,C,D)	73%	1%	11%	62%
Physical Review A: General Physics	61%	—	4%	—
Physical Review B: Condensed Matter	85%	—	3%	—
Physical Review C: Nuclear Physics	100%	—	—	—
Physical Review D: Particles and Fields	78%	—	—	—
Physical Review Letters	90%	—	3%	—
Physics Letters A	50%	—	—	—
Physics Letters B	88%	—	—	—
Physics Reports	74%	—	—	—
Progress of Theoretical Physics	69%	—	—	—
Review of Scientific Instruments	65%	11%	42%	55%
Reviews of Modern Physics	70%	—	—	—
Soviet Journal of Nuclear Physics	—	—	—	—
Soviet Journal of Particles and Nuclei	—	—	—	—
Soviet Physics: JETP	—	—	3%	—
Zeitschrift für Physik A	100%	—	—	—
Zeitschrift für Physik B	—	—	—	—
Zeitschrift für Physik C	95%	—	—	—

CA = *Chemical Abstracts*
CCA= *Computer and Control Abstracts*
EEA= *Electrical and Electronics Abstracts*
EI = *Engineering Index*

*percentage (articles indexed 1983–1985/articles published 1983–1985)

ined are cited in at least one of the eight major indexes.

Conclusion

The physics journals examined in this project are major components in the field of physics literature and are obviously important to physicists. However, a large percentage of the articles published in these journals are also critically important to researchers in other disciplines. Engineers, chemists, computer scientists, mathematicians, and scientists from virtually every other field find relevant articles in these key physics journals. To illustrate this point, Table 3 shows how these 36 physics titles are heavily cited in eight major indexes that emphasize disciplines other than physics. For example, 94% of the articles in *Applied Physics Letters* are indexed in *Chemical Abstracts*, and 73% are cited by *Electrical and Electronics Abstracts*. Seventy-three percent of the articles in *Physica A,B,C,D* are included in *International Aerospace Abstracts* and 62% are in *Engineering Index*.

TABLE 3 (cont'd)
Coverage of 36 Physics Journals by 8 Major Indexes

Titles	IAA	MR	MA	SCI
Annals of Physics	—	65%	—	99%
Applied Physics Letters	42% *	—	—	100%
Classical and Quantum Gravity	60%	100%	—	100%
Contemporary Physics	15%	—	10%	100%
Europhysics Letters	—	—	—	—
Fortschritte der Physik	—	50%	—	95%
JETP Letters	20%	—	7%	91%
Journal of Applied Physics	24%	—	19%	100%
Journal of Low Temperature Physics	—	—	28%	100%
Journal of Physics A: Mathematical and General	6%	100%	—	100%
Journal of Physics B: Atomic, Molecular & Optical	21%	2%	—	100%
Journal of Physics C: Solid State Physics	—	—	22%	100%
Journal of Physics F: Metal Physics	—	—	98%	100%
Journal of the Optical Society of America B	35%	6%	—	—
Nuclear Physics A	—	1%	—	82%
Nuclear Physics B	—	27%	—	100%
Nuovo Cimento	31%	11%	2%	100%
Optics Letters	45%	—	—	100%
Physica (A,B,C,D)	73%	10%	—	100%
Physical Beview A: General Physics	19%	8%	—	100%
Physical Beview B: Condensed Matter	.4%	1%	—	63%
Physical Beview C: Nuclear Physics	—	.6%	—	100%
Physical Beview D: Particles and Fields	.2%	26%	—	100%
Physical Beview Letters	20%	9%	11%	100%
Physics Letters A	21%	25%	8%	99%
Physics Letters B	—	12%	—	100%
Physics Beports	—	25%	—	94%
Progress of Theoretical Physics	—	37%	—	100%
Beview of Scientific Instruments	17%	—	4%	98%
Reviews of Modern Physics	3%	16%	—	100%
Soviet Journal of Nuclear Physics	—	5%	—	95%
Soviet Journal of Particles and Nuclei	—	16%	—	—
Soviet Physics: JETP	—	3%	12%	—
Zeitschrift für Physik A	—	.1%	—	100%
Zeitschrift für Physik B	—	.7%	14%	98%
Zeitschrift für Physik C	—	8%	—	100%

IAA = *International Aerospace Abstracts*
MR = *Mathematical Reviews*
MA = *Metals Abstracts*
SCI = *Science Citation Index*

*percentage (articles indexed 1983-1985/articles published 1983-1985)

been given to starting duplicate subscriptions because the journals were obviously needed by other researchers. However, there appeared to be no ready source of library or university funding for the duplicate subscriptions.

Online searching used in a non-traditional manner provided a fast and efficient solution under tight time constraints. Information gathered from the searches done on this project would have been impossible to obtain by hand in time to meet the deadline. This same approach could also serve well in similar situations that demand that journal collections be evaluated. One question must first be answered: is the evaluation important enough to offset the cost in time and money of doing the online searches? If the answer is yes, online searching will generate meaningful results quickly. ■■

Scientific literature: Producers and consumers

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Is there a crisis in science publishing?

There is much smoke these days about a crisis in academic and scientific publishing. From some quarters, especially from librarians, but occasionally from scientists and publishers, the word is there is too much literature that is too expensive and too little used. From other quarters, including many publishers and scientists, comes word that all is fine. Is there need for a brigade to put out the fire generating all this smoke, or is it just a smokescreen? Let's listen to what librarians, publishers and scientists are saying and then formulate some questions.

Many prominent librarians say we are experiencing a crisis caused by, among other things, a half-dozen profiteering publishers who are gouging a captive academic library market.

The publishers say that price increases have occurred for good reasons. Higher subscription rates are due to the devaluation of the dollar, or because a title has grown in size providing more words and information for more dollars, or because of inflating production costs. High subscription rates also subsidize new titles that are losing money. Publishers say that new and expanded titles are needed because scientists want to be published and if publisher X doesn't accept the manuscript, publisher Y will. Very occasionally publishers say they need to increase subscription rates to make more money! (Commercial publishers return a profit to stockholders, non-commercial publishers provide services to association members.)

The library profession has responded to this perceived crisis in a number of ways. ARL prepared a statement which summarizes the library profession's concerns and proposes some long term solutions. Institutions have strengthened resource shar-