Analysis of E-book Use: The Case of ebrary

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Abstract

The interest in the use of electronic media in scholarly communication is growing. Nowadays, libraries reserve much larger budgets for electronic information sources as users tend to get access to the full-texts of journal articles and books online. The effective management of library collections is only possible through studies identifying user needs as well as studies of usage analysis showing how much of what is being used in these collections. Although e-books are a significant part of library collections, studies on e-book use are scarce. In this paper, we have analyzed about half a million use data of ebrary e-book database by the users of Hacettepe University Libraries within a four-year period (2006-2009). We obtained COUNTER-compliant use data identifying, among other things, book title, publisher, and publication year for each transaction to analyze the use. We identified the most frequently used e-book titles by Hacettepe University ebrary users in each Library of Congress (LC) subject class. E-books on Medicine (R) were used most often, followed by books on Education (L) and Language and literature (P). A small number of e-books in each subject class satisfied half the demand, while an overwhelming majority of e-book titles were never used. Findings of this study can be used to develop an e-book collection management policy and understand its implications for consortial licensing of e-book packages.

Keywords: e-book use; collection management; collection development; ebrary; Hacettepe University Libraries

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1.   Introduction

Libraries continue to develop their own collection management policies that suit their users' information needs.   Limited library budgets put the consortium-type collaboration efforts on the agenda.   Therefore, libraries must not only understand the needs of their potential users but also be aware of the needs of the users of other consortium members. Developing effective collection management policies and executing them in a consortial environment requires careful work as well as polished negotiation skills.

Databases provide instant access to information. Full-text databases are more intensely used than bibliographic ones as they provide direct access to the sources. Full-text electronic books (e-books) are now available via several database vendors or aggregators, and they are becoming an important part of library collections. The increase in the variety of e-book packages forces libraries to be selective as their diminishing budgets are not enough to cope with the growth of databases. Libraries have to investigate the trends and choices of their users to be able to build an effective policy for collection development and management. Therefore, it is important to address the following questions: Who are the actual users of these databases?   Do tendencies on using e-books differ across the subjects? Are current e-books requested more often by the users?

This paper addresses some of these questions by analyzing the usage of e-book titles in the ebrary database by the users of Hacettepe University Libraries. It identifies the most frequently used e-book titles and tries to shed some light on the non-use of titles in some subjects. Findings can be used to improve the micro-management of e-books collections and understand its implications on a wider scale for library consortia.

2.   Literature Review

Generally, an "e-book" is defined as a digital version of a traditional print book designed to be read on a personal computer or an e-book reader [1]. Related studies explain some advantages of e-books such as adjustable font size and font face, easy access to the content, multimedia display capabilities, no cost for paper, ink, binding, wrapping, postage, or transport, no physical space requirements, on-demand availability, and searchability within a book [2, 3, 4]. Typically, e-books are cheaper than hard copy versions.

Despite the many advantages of e-books, some studies showed that their usage can be very low [5, 6, 7, 8]. Most users are unaware of the existence of e-books in library collections. Although they are willing to discover and use e-books more effectively, user unfriendly interfaces or usability problems tend to hinder their further use. Some studies comparing usage statistics of e-books to that of their print counterparts concluded that e-books are used more often [9] while others did just the opposite [10]. Usage patterns should be taken into consideration in interpreting these somewhat conflicting findings.

E-book use is hard to measure when compared to printed ones. For instance, the use of printed books can be measured by the number of loans or in-library use whereas e-book use can only be measured by access statistics. Access to e-books, on the other hand, can be defined in different ways such as print, view or download. Access statistics provided by e-book vendors differ in this respect. Hence, a standard presentation of parameters is not available for e-books. It can be difficult to compare e-book usage across different packages since there is almost no consistency in usage statistics between vendors [11]. Therefore, most of the e-book usage studies in the literature focused on e-books provided by the same vendor rather than making comparisons across different vendors [12]. COUNTER (Counting Online Usage of Networked Electronic Information Resources) is an international initiative to set practical world-wide standards for the recording and reporting of vendor-generated usage statistics in a consistent and compatible way [13, 14].

Libraries benefit from usage statistics of e-books in collection development despite the lack of standardized reports. Statistics of e-book use show the demand for e-books as well as give some important clues about the most popular subject categories for e-books. For instance, according to the usage statistics of the netLibrary, e-books on computer science and engineering (39%), business, economics, and management (17%), arts and humanities (14%), and natural sciences and mathematics (13%) were the most demanded ones [11]. Safley [11] emphasized in the same study that the use of ebrary has increased 190%. In a different study almost 19% of the library's e-book titles had been accessed at least once [12]. The results of the Springer's e-book use study showed that chapters from e-books on chemistry and materials science were downloaded most often [15]. The study also pointed out that the growth of sales of Springer's printed books is commensurate with the increase in Springer's e-book usage, and that the use of Springer's e-books has increased 60% in Turkey between 2007 and 2008. The study concludes that the e-book use was on the rise and printed books were not being

"cannibalized" by e-books. E-books were even driving print book sales especially in the countries which have a large e-book penetration [15].

There are many surveys on who use e-books, how and why they use them. For instance, more than 60% of netLibrary users in a university library said they preferred print books over electronic ones [16]. They generally read a chapter or a few pages instead of reading the whole e-book. In a different study, special libraries were the largest users of e-books (15% to 60%) compared to academic (5%) and public (2%) libraries [17]. Users of special libraries appreciated the remote use and they preferred the convenience of e-books. Academic librarians thought that e-book usage was better for browsing and reference work [17]. Studies also show that users are unaware of the existence of e-books. More than 70% of students of an academic library were familiar with the term "e-book", yet almost 60% of them did not use e-books and did not know that e-books were available in their university library [18]. (See also [19].)

3. Method

This study analyzes nearly half a million e-book "sections" (a section is defined as a chapter or an entry [20]) requested from ebrary, an e-book database, by the users of Hacettepe University Libraries within a four-year period (2006-2009). Hacettepe University has currently some 28,000 students and 3,500 academic staff and Hacettepe University Libraries offer a rich collection of both printed and electronic sources of information to its users including more than 70 databases [21, 22]. The University added ebrary database to its collection in 2006 as a member of the Consortium of Anatolian University Libraries (ANKOS). ebrary has been Hacettepe's most frequently used and the largest e-book database containing more than 45,000 e-book titles in several disciplines. We obtained COUNTER-compliant use statistics of Hacettepe University Libraries from ebrary. We then looked into the usage of e-books classified under different Library of Congress (LC) Classification System subjects. The term "usage" in this study is defined as the number of times each e-book is requested from the ebrary e-book database.

This paper addresses the following research questions:

- Which e-books are requested most frequently from the ebrary collection?
- What are the subjects of the most frequently requested e-books?
- Does the usage of e-books differ across the subjects?

- Does the usage of e-books change by year?

Finding answers to these research questions would empower Hacettepe University Libraries to better manage its precious resources, negotiate better deals with e-book database vendors and aggregators, and align its collection management policy with that of the Consortium.

4. Findings and Discussion

The total number of books in ebrary database is 45,147. Users of Hacettepe University Libraries requested a total of 499,841 sections from 12,826 different books in ebrary collection between the years 2006 and 2009, indicating that just over a quarter (28%) of the overall ebrary collection was used. Figure 1 provides the number of unique book titles requested from ebrary collection between 2006 and 2009 (4,213, 4,548, 4,343, 5,072, respectively), which at any given year constitutes only a fraction (about 10%) of the total number of books available in the ebrary collection (45,147). Although the number of requested books has increased in 2009, the number of sections requested by the users of Hacettepe University has been decreasing in the last three years.
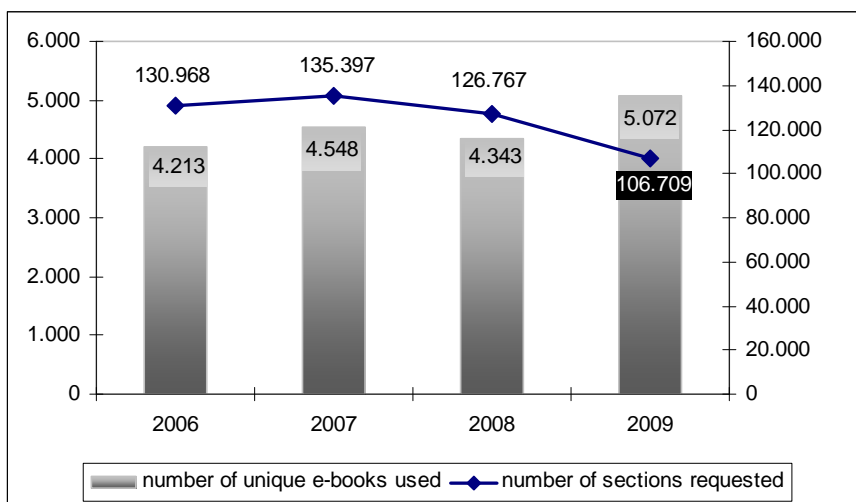

Figure 1. Number of unique e-books used and sections requested therefrom (2006-2009)

The distribution of 43,422 e-books and sections requested therefrom under LC Classes is given in Table 1 (no LC subject classification information was

available for 1,725 titles). The number of e-books under each LC class ranges between 40 (A: General works) and 10,021 (H: Social sciences), median being 1,142. Books classified under Social Sciences constitute 23% of all books in the ebrary e-book database, followed by Language and literature (P) (12%) and Science (Q) (11%) (column 3 of Table 1). Books classified under General works, Naval science (V), Library science (Z), on the other hand, make up less than 1% of the overall ebrary collection.

Of 43,422 of e-book titles available in the ebrary database, 12,826 (or 29.5%) were used at least once. The number and percentage of e-book titles used under each LC subject classification (excluding 1,484 titles with no LC Class numbers) is given in columns 4 and 5 of Table 1. On the average, 74% of 43,422 e-book titles were not used at all. The proportion of use of e-books under each LC subject varied, although none was over 40%. For instance, only 39.8% of e-book titles on Medicine (R) were ever consulted, followed by e-books on Education (L), General works and Library science (*circa* 35% each). About 90% of e-book titles on American history, Military science (U) and Naval science were not used at all. The use of e-books seems to be closely related with the disciplines studied at Hacettepe University, which has one of the top medical schools in the country along with a Faculty of Education, but has no military/naval school or a department on American history (F).

The total number of sections requested from 12,826 e-books was 499,841. The distribution of 429,049 sections under each LC subject (as frequencies and percentages) is given in columns 6 and 7 of Table 1 (no LC subject classification information was available for 70,792 sections). The number of sections requested from e-books under each LC subject ranges between 90 (Naval science) and 78,157 (Medicine), median being 3,841. More than 51% of all sections requested came from e-books on Medicine (18.2%), Social sciences (16.8%) and Language (16.5%). E-books under 11 LC subjects satisfied less than 5% of all requests. Sections from e-books on Medicine, Education, Language and literature and Science have been requested more heavily. For instance, the number of e-books available on Medicine and Philosophy, psychology, religion (B) are almost the same (each constitutes 8.4% of all e-books). Yet, more than twice as many sections were requested from books on Medicine (18% of all section requests) compared to that of Philosophy, psychology, religion. The number of sections requested from all but four subjects (Medicine, Education, Language and literature and Science) was not commensurate with the number of e-books available under those LC subject classes.

Table 1. Number of books and sections requested from ebrary database (under Library of Congress subject classes)

LC Class	# of books (a)	*% of total books (43,422) (b)	# of requested books (c)	**% of books requested (c / a)	# of sections requested (d)	***% of all sections requested (d / 429,049)	d / c
General works (A)	40	0.1	14	35.0	269	0.1	19.2
Philosophy, psycho., religion (B)	3,667	8.4	866	23.6	36,051	8.4	41.6
Auxiliary sciences of history (C)	161	0.4	53	32.9	998	0.2	18.8
History (D)	2,319	5.3	507	21.9	17,297	4.0	34.1
American history (E)	1,101	2.5	123	11.2	3,288	0.8	26.7
American history (F)	614	1.4	52	8.5	684	0.2	13.2
Geography, anthro., recreation (G)	1,142	2.6	324	28.4	11,296	2.6	34.9
Social sciences (H)	10,021	23.1	2,271	22.7	72,162	16.8	31.8
Political science (J)	1,639	3.8	379	23.1	10,844	2.5	28.6
Law (K)	1,195	2.8	151	12.6	2,161	0.5	14.3
Education (L)	1,727	4.0	612	35.4	24,383	5.7	39.8
Music (M)	659	1.5	147	22.3	3,581	0.8	24.4
Fine arts (N)	405	0.9	105	25.9	3,159	0.7	30.1
Language and literature (P)	5,393	12.4	1,819	33.7	70,615	16.5	38.8
Science (Q)	4,962	11.4	1,472	29.7	59,032	13.8	40.1
Medicine (R)	3,675	8.5	1,461	39.8	78,157	18.2	53.5
Agriculture (S)	557	1.3	110	19.7	3,841	0.9	34.9
Technology (T)	3,391	7.8	744	21.9	28,752	6.7	38.6
Military science (U)	467	1.1	49	10.5	985	0.2	20.1
Naval science (V)	71	0.2	8	11.3	90	0.0	11.3
Library science (Z)	216	0.5	75	34.7	1,404	0.3	18.7
Total/Average	43,422	100.0	11,342	26.1	429,049	****99.9	37.8

*Ratio of the # of books in LC classes to the *total # of books* **Ratio of the # of requested books to the *total # of books* under corresponding LC Class
***Ratio of the # of requested sections under corresponding LC class to the total # of requested sections ****Percentages may not equal 100% due to rounding

The last column of Table 1 provides the average number of sections requested from books under each LC subject. Medicine came first with an average of 54 sections per e-book used, followed by Philosophy, psychology, religion (42 sections), Language and literature, and Education (40 sections each). Users studying Medicine seem to attach greater importance to electronic information sources [23]. Monographs in electronic form appear to be in high demand in Language and literature as well as in Education [24]. E-books used in Naval science, American history and Law (K) were consulted much less often (average of 11, 13 and 14 sections per book, respectively). E-books under these LC classes can be considered as prime candidates to be excluded from the collection.

Figure 2 shows the cumulative percentage of 12,826 e-books in the ebrary database satisfying Hacettepe users' demand. About 10% of books satisfied 63% of the total requests and 20% did 78% of all requests, conforming to Trueswell's well-known 80/20 rule [25]. When the entire collection of ebrary database with 45,147 books is taken into account, the concentration of requests on a relatively few e-books is even more remarkable: 10% of books satisfied 90% of the total demand.
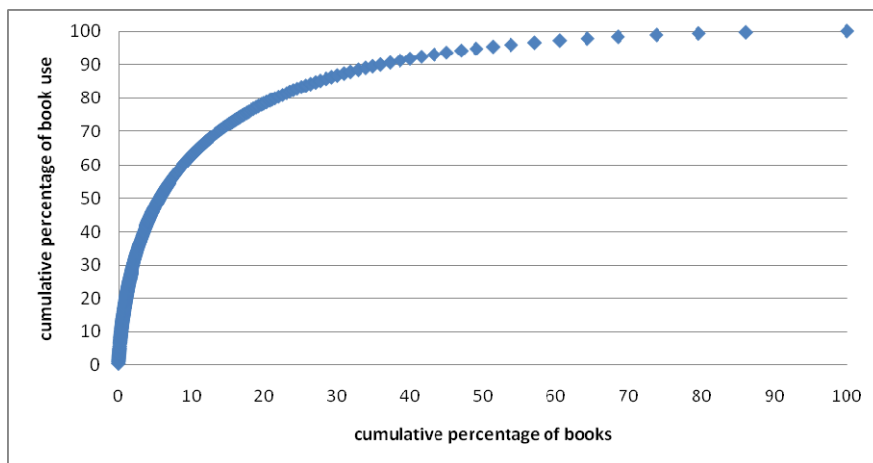

Figure 2. Usage of e-books in ebrary database

We obtained similar results for e-books used under each LC subject. A small number of books in each LC subject class consistently satisfied one third or half of all requests (Table 2). For instance, in Social sciences, a subject with the highest number of books (10,021), 60 books satisfied 33% of all requests while 142 books did 50%. Similarly, 7 books each in General works and American history, 8 books each in Auxiliary sciences of history (C), American

history (E) and Fine arts (N), 6 books in Agriculture (S), 2 books in Military science, and 5 books in Naval science satisfied half the demand. In general, a few books satisfied the overwhelming majority of demand while the great majority of books were not used at all. It should be kept in mind that the proportion of books satisfying 33%, 50%, 67% and 100% of the demand in each LC subject would be much lower if we used the total number of books available under each LC subject instead of total number of books used (as we did in Table 2). For instance, 5% of out of all e-books *used* to satisfy 40% of the total demand in Language and literature subject class constitute only 1% of all e-books *available* under that class.

Table 2. Number of books satisfying demand

LC Class	33%	50%	67%	100%	# of books
A	5	7	10	14	40
B	20	44	95	866	3,667
C	5	8	12	53	161
D	16	36	68	507	2,319
E	3	8	17	123	1101
F	4	7	12	52	614
G	9	19	37	324	1,142
H	60	142	287	2,271	10,021
J	10	22	47	379	1,639
K	8	16	30	151	1,195
L	21	49	97	612	1,727
M	48	76	102	147	659
N	3	8	20	105	405
P	30	84	197	1,819	5,393
Q	34	81	182	1,472	4,962
R	48	105	197	1,461	3,675
S	3	6	11	110	557
T	17	38	81	744	3,391
U	2	2	5	49	467
V	3	5	6	8	71
Z	5	12	20	75	216

No discernable pattern of yearly variations was detected in the use of e-books under different LC subject classes, although this may change in the long run. Subjects of e-books requested in different years were similar.

We also tested if the distribution of books to requests under each LC subject fits the Price Law, which states that the square root of all books would

satisfy half the demand [26]. Books classified under General works and Library science were in accordance with the Price Law to some extent. The rest did not fit the Price Law. For LC subject classes of Social sciences, Education, Music (M), Language and literature, Science and Medicine, the number of books that satisfied 50% of all requests in respective fields were higher than that predicted by Price Law whereas the number of books satisfying half the demand for subject classes of Philosophy, psychology, religion, Auxiliary sciences of history, History (D), American history (E & F), Geography, anthropology, recreation (G), Political science (J), Law, Fine arts, Agriculture, Technology (T), Military science, and Naval science were lower than that predicted by Price Law. It could be that relatively small number of requests for e-books under most LC subject classes was not enough to test the validity of a power law such as Price Law.

Table 3. The most frequently used 20 ebrary books

Book	LC	N
International Encyclopedia of Ergonomics and Human Factors*	T	2,194
5 Steps to a 5 on the Advanced Placement Examinations: Calculus	Q	2,147
Beginner's Guide to Structural Equation Modeling*	Q	1,436
Beginning Programming	Q	1,411
Character Strengths and Virtues: A Handbook and Classification	B	1,372
Routledge Critical Dictionary of Semiotics and Linguistics	P	1,346
Psychology of Humor: A Reference Guide & Annotated Bibliography	P	1,308
On That Point! An Introduction to Parliamentary Debate	P	1,246
Harrison's Manual of Medicine (16th Edition)	R	1,224
Jacques Derrida and the Humanities: A Critical Reader	B	1,202
Speaking, Listening and Understanding: Debate for Non-Native English Speakers	P	1,186
Talking Gender and Sexuality	P	1,170
Routledge Reader in Politics and Performance	J	1,169
Speech Acts in Literature	P	1,164
Provocations to Reading: J. Hillis Miller and the Democracy to Come	P	1,150
Argument and Audience	P	1,106
Advanced Mathematical Thinking	Q	1,094
Theoretical Aspects of Heterogeneous Catalysis	Q	1,080
Discourse	P	1,067
SPSS for Intermediate Statistics: Use and Interpretation*	H	1,032
Total		26,104

Note: Titles with asterisks (*) did not have LC subject classes assigned to them. They were classified by the authors.

The most frequently requested 20 e-book titles satisfied 5% of the total requests (Table 3). Almost half (9) of 20 book titles came from Language and literature, 5 from Science, 2 from Philosophy, psychology, religion, and 1 each from Political science, Medicine, Technology, and Social sciences.

5.   Conclusion

ebrary has been the most heavily used e-book database at Hacettepe University Libraries since 2006. Although the number of subscribed books in ebrary database was increasing since then, the number of sections requested has been decreasing in recent years.

The use of e-books under different LC subject classes differs tremendously. There was almost 20-fold difference between the average number of total requests in Medicine and that in American history. Books classified under Naval science, Law and Military science were used very infrequently. Relatively lower rates of use of e-books in these subjects are probably due to the fact that Hacettepe has no military and naval schools and the Faculty of Law has recently been founded. Hence, a few Hacettepe researchers appear to study in these fields. Hacettepe University Libraries have to promote e-books more intensely to increase their use.

The use of e-books exhibits a Bradfordian distribution in that relatively few titles satisfied the majority of the requests, perfectly in line with the findings of similar studies. The fact that the majority of e-book titles in some subject areas were not used at all suggests that libraries should review their collection management policies. It could be that a potential user base for e-books in certain subjects may be lacking. Or, the existence of licensed e-book packages such as ebrary may need further promotion within the campus to increase the awareness. In any case, the unit cost of using a title from a licensed e-book database could be quite expensive if such e-book packages are not carefully selected according to collection development policies and user needs of respective libraries. The lack of consortial collection development and management policies complicates the issue of cost further.

The following recommendations can be offered:

- The usage levels of e-book databases licensed by universities through consortia have to be measured.
- Findings of in-depth usage analysis studies should be taken into account when negotiating deals with e-book suppliers for license agreements or renewals thereof.

- In addition to usage statistics, feedback should be gathered from users through questionnaires and interviews to find out why they use or do not use e-books.
- The percentage of non-used e-book titles should be figured into the license renewal terms to get discounts or additional titles.

Findings of this study can be used by libraries to improve their e-book collection management policies. Further studies on cost-benefit analysis of e-book use, comparison of e-book use in different libraries and its impact on library consortia are needed.

Acknowledgements

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