

Factors Affecting the Use of Print and Electronic Books: A Use Study and Discussion

Amy Fry

This article outlines a study assessing and comparing the rate of use of nonreference print and electronic book collections acquired during the same time period at one academic library. Rate of use was examined for both collections by discipline and method of acquisition. The author found that 74 percent of print titles acquired in 2008–2009 had been used within their first six years in the collection, and that 27 percent of print books acquired between 2008 and 2014 had been used between July 2013 and November 2014. By contrast, only 12 percent of the e-books acquired between 2008 and 2014 were used during the same 17-month period. The author examines how different print and electronic collection development models might affect monograph use in academic libraries within the context of previously published research.

Introduction

This article outlines a study assessing and comparing the rate of use of nonreference print and electronic book collections by discipline and method of acquisition acquired during the same time period at one academic library. The author uses this data to explore, within the context of previously published research, how different collection development methods (firm-order and approval plans for print books and demand-driven acquisition of e-books) impact monograph use in academic libraries, whether print books have lost their value for library users, and how libraries can assess if and/or when e-books are used more than print. This study is unique in attempting to compare use of all of a library's nonreference print and electronic monographs acquired during the same time period and also in its discussion of the rate of use of e-books from multiple studies. Thus, the article offers new perspectives on the transition of academic library collections from print to electronic format.

Literature Review

Use of print collections in academic libraries has been a rich area of research in library science for decades. Usage studies span collections from small special libraries to large research libraries and consortia. Though each study is different, most measure what

Amy Fry is Electronic Resources Coordinator in Jerome Library at Bowling Green State University; afry@bgsu.edu. ©2018 Amy Fry, Attribution-NonCommercial (<http://creativecommons.org/licenses/by-nc/4.0/>) CC BY-NC.

percentage of a part of the library’s collection (usually defined either by publication date or acquisition date) received use (measured either by circulations only or circulations combined with in-house use counts) during a given time period.

The frequently cited Pittsburgh study examined collection use at the University of Pittsburgh between 1969 and 1975.¹ It revealed that only 60 percent of books purchased there in 1969 had circulated at least once in their first seven years in the collection. This figure is frequently cited as the benchmark for use that most academic libraries’ print collections experience, though an exploration of the published literature shows that, in fact, rate of collection use as demonstrated in published studies varies widely (as great as 91 percent and as low as 34 percent).

TABLE 1
Published Print Use Studies, 1942-2012²

Institution	% Use	Time Owned	Study Date
a. Louisiana State University	45%	1 year	1992
b. Muhlenberg College	45%	1 year	1942
c. Western Michigan	54%	1.3 years	1995
d. Pennsylvania State University	69%	1–3 years	2007
e. University of Illinois at Urbana–Champaign	60%	1–3 years	2007
f. Kent State	62%	1–3.5 years	2012
g. CARLI Libraries (Illinois Academic Libraries)	66%	1–5 years	2008
h. University of Illinois at Chicago Health Sciences Library	58%	2 months–2 years	1989
i. University of Illinois at Chicago Health Sciences Library	81%	3 years	1995
j. University of Denver	58%	4 years	2009
k. University of New Mexico Health Sciences Center Library	91%	4 years	1993
l. Asbury Theological Seminary Libraries	34%	4–9 years	2012
m. Lingnan University, Hong Kong	67%	6 years	2010
n. Cornell University	45%	0–20 years	2010

Moreover, variations in the literature on print use make it very difficult to generalize the conclusions of any one study to all libraries. This is not only because collection use is influenced by a variety of factors that will differ from library to library, but also because the studies themselves are all a little different. Some include in-house use; others do not. Some only include approval books; others do not. The amount of time the books have been available in the collection also varies from study to study.

There are no follow-up studies to show how many of the unused books in one study ultimately do get used. It’s impossible to extrapolate from the data that exist to come up with a “typical” value for the use of print collections.

Rate of use has also been employed to assess publisher and aggregator e-book collections. Like print use studies, these studies show rates of use that vary widely.

In 2001, Langston found that 94 percent of 1,522 e-books available to all 23 California State University libraries received at least one use between May and December 2001.³ Bucknell looked at the number of Springer e-books used at the University of Liverpool in 2009 and found that 48 percent of 2005–2008 imprints and 40 percent of 2009 imprints were used at least once that year.⁴ At Seton Hall, Rose-Wiles found that 55 percent of

214 individually purchased e-brary e-books added between 2009 and 2011 were used in 2011, but only 7.2 percent of “a large business collection” of e-books was used in 2009, the first year it was available.⁵

Knowlton looked at the percent of titles used in a collection of e-books and compared it to the percent of titles used in a collection of print books to determine the percent expected use (PEU) of e-books in different subject areas at the University of Memphis.⁶ His methodology closely mirrored the methodology employed in the current study, with a few differences. Knowlton compared the rate of use of a group of e-books to the rate of use of a group of print books during an identical time period (academic year 2013–2014), but he chose groups of titles based on publication date rather than acquisition date (resulting in groups more equivalent in size than in the current study), and limited his examination of e-books to one aggregator collection: those available via e-books on EBSCOhost. Knowlton found that 16.1 percent of the print books received use during the time period studied while only 10.4 percent of the electronic titles received any use.

The majority of quantitative use studies of e-books have looked at the use of e-books acquired via DDA (demand-driven acquisition). In this method of acquisition, records for e-books are loaded into the library’s catalog, and patron use determines which titles are purchased. Though the authors of these studies usually focus on metrics such as cost and which subjects and publishers receive the highest number of purchases, they also typically include statistics for how many titles were made available to users and how many received use or received enough use to be purchased during the time covered in the study. As the published data reveals, the percentage of e-book titles used or purchased in these programs has ranged from about 4 to 14 percent, despite the fact that the DDA records in these studies were profiled before loading to be relevant, recent, and academic in nature.

TABLE 2
DDA Studies, 2010–2014⁷

Institution	Number of Records Available	Time Period Titles Available	% Use	Scope of Records
a. University of Illinois at Urbana-Champaign	6,000	4 months (April–July 2010)	11%	Not owned, under \$200, in English, academic, recently published, some subjects excluded
b. University of Illinois at Urbana-Champaign	8,792	6 months (November 2012–April 2013)	4%	Six humanities disciplines, academic, recently published, no literature/serials/reference, focus on university presses
c. University College Dublin	19,337	6 months (May–October 2013)	5.8% (purchased)	Detailed subject profiles, recently published
d. Colorado State University	7,942	8 months (May–December 2010)	11.9%	Select providers, recently published, English, under \$300, certain subjects excluded

Institution	Number of Records Available	Time Period Titles Available	% Use	Scope of Records
e. University of Iowa	12,947	11 months (September 2009–July 2010)	6.6% (purchased)	Recently published, under \$250, not currently available electronically, excluding popular titles and K's, following print approval profile but with fewer exclusions
f. Kent State University	22,018	1 year (January–December 2012)	8.2%	Recently published, following subjects from print approval profile
g. University of Arkansas	19,194	14 months (June 2012–September 2013)	6%	Academic, no textbooks, under \$250, mirroring approval plan
h. Hong Kong University of Science and Technology	22,117	1 year 9 months (October 2012–June 2014)	13.9%	Under \$250, recently published, following subject and nonsubject parameters of slip profile
i. University of Arizona	594,000	2.5 years (July 2011–December 2013)	10% (purchased)	Recently published, academic, no textbooks, popular fiction or manuals

When compared to the results of print use studies, it is evident that existing quantitative studies of e-book use from DDA plans demonstrate a much lower rate of use (as measured by quantity of titles available receiving any use) than existing quantitative studies of print books. One reason for the low rate of overall use in DDA studies may be because the titles studied were only available for a short time before their percent use was recorded, often less than one year, while the titles in print studies were usually available for much longer. However, it is important to note that DDA programs appear to result in the use of a narrower range of available titles than those in more traditionally acquired print collections.

A number of studies have attempted to compare e-book and print book use, usually (though not always) by comparing vendor-supplied use counts of e-books (in the form of accesses or downloads) to circulations of those same titles held in print. This is problematic, because one e-book “access” will involve a user doing one of many actions, such as looking at the table of contents, downloading a chapter, doing a search, or reading any number of pages. One circulation of a print book can represent hundreds of such actions—or none. Though both statistics are valuable information for assessment, these measurements are simply not comparable.

Some researchers have used these kinds of data to claim that e-books are used more than print, but looking at percent titles used shows that this is only sometimes the case.⁸ Littman and Connaway compared the use of 7,880 titles at Duke University and found that 40 percent of the books were used electronically between February 2001 and August

2002, while 35.5 percent were used in print.⁹ In Christian and Aucoin's study of the use of 2,852 books at Louisiana State University in 2002, not only did more of the print books receive use (29.27% vs. 19.6% of the electronic books), their total circulations were higher than the total number of e-book accesses.¹⁰ Kimball, Ives, and Jackson showed that, of 4,288 science and technology titles available at Texas A&M, 14 percent and 13 percent of e-books and print books, respectively, received use between June 2006 and July 2007.¹¹ Downey et al. compared the circulation of 20,030 print books at Kent State University to the use of 22,018 e-books made available via DDA records: 62.5 percent of the print books circulated at least once in calendar year 2012, while only 8.2 percent of the e-books received at least one use that year. (An important factor in the difference between these two figures is the fact that the print books had been in the collection for between 1 and 2.5 years, while the e-books had only been available for between six months and one year.)¹² In contrast to the aforementioned studies, Goodwin compared the use of 275 titles at Coastal Carolina University between April 2011 and October 2013 and found that 75.6 percent of the titles were used electronically, while only 29.1 percent were used in print.¹³

Methodology

Two methods were used at Bowling Green State University (BGSU) to assess the use of recently acquired nonreference print books. The first involved evaluating what percent of titles acquired between July 2008 and June 2014 had received at least one circulation or recorded in-house use since their acquisition. The second involved determining what percent of the same group of titles had received at least one use (specifically a circulation) between July 2013 and November 2014. This was the period represented by the "last year/year-to-date" fields for circulation counts in BGSU's integrated library system (Innovative's Sierra) at the time the data were collected. In-house use from July 2013 to November 2014 could not be calculated, because there is no mechanism for recording in-house use by date in Sierra.

In November 2014, the author used the "create lists" function in Sierra to export lists of all items acquired during each of the six fiscal years 2008–2009 through 2013–2014 and shelved, as of November 2014, in the main circulating collection. Titles with multiple item records attached to the bibliographic records were removed to simplify the analysis process (these titles equaled 1%–3% of the titles in each list). Next, titles with purchase fund codes that indicated they were not firm order or approval purchases were also removed.

The titles in the study were divided into six disciplines and 42 subjects based on call number ranges (see table 3). The call numbers were normalized using Conley and Nolan's formula for Excel.¹⁴

Percent use was calculated for the titles purchased in each year from 2008–2009 through 2012–2013 by determining how many titles purchased in each year had at least one recorded circulation or in-house use in Sierra from the date of order through November 2014.

The library's nonreference e-books were similarly assessed. While it would have been ideal to determine the number of zero-use titles in all of BGSU's e-book packages acquired between 2008 and 2014, the data to do this was simply not available. Therefore, the author examined what percent of nonreference e-books acquired between 2008 and 2014 received at least one use (as defined by a download) between July 2013 and November 2014. This is the same time period represented in the "last year/year-to-date" circulation count for the lists of print books included in the study. Five e-book packages containing 73,148 titles were examined; these fit the criteria of being: a) mainly nonreference monographs; b) acquired since 2008; c) books for which title-level usage

TABLE 3
Discipline, Subject, and Library of Congress Classification Breakdown Used

Discipline	Subjects	LC Classes
Business	Business	HE, HF, HG, HJ
Education	Education	L
General	General	A
Humanities	Architecture, film, fine arts, languages & linguistics, languages & literatures (Asian), languages & literatures (Romance), literature (English & American), literature (general), literature (Germanic), music, philosophy, photography, religion	NA; PN1994–PN1999; N, NB–NX; P–PH, PM; PJ, PK, PL; PQ; PR, PS, PZ; PN; PT; M; B, BC, BD, BH, BJ; TR; BL, BM–BX
Sciences	Agriculture, biological sciences & general science, chemistry, computer science, environmental sciences & ecology, geography, geology, mathematics, medicine, military & naval science, physics & astronomy, recreation & leisure, technology	S; Q, QH–QR; QD; QA76–QA90; GE, GF; G–GC; QE; QA (except QA76–QA90); R; U–V; QB, QC; GV; T–TP, TS–TX
Social Sciences	Anthropology, criminology, economics, history (general), history of the Americas, history (Africa & Oceania), history (Asia), history (Europe), law, library science, political science, psychology, sociology and social sciences	GN, GR, GT; HV; HB, HC, HD; C; E, F; DT, DU; DS; D (except for DS, DT, DU); K; Z; HX, J; BF; H, HA, HM–HT

TABLE 4
E-book Collections Included in Study

Publisher	Acquired	Package Type	Titles Available	Titles Used Jul13–Nov14	% Use Jul13–Nov14
Cambridge	2013–14	Consortially purchased DDA	158	50	32%
Ebrary	2006–2014	Locally subscribed aggregator package with several hundred consortially purchased DDA titles	25,648	2,517	10%
Oxford	2008–2014	Consortially purchased publisher package	10,501	880	8%
Springer*	2008–2014	Consortially purchased publisher package	34,450	4,854	14%
Wiley	2012–2014	Consortially purchased publisher package	2,391	422	18%
Total			73,148	8,723	12%

*Springer books were acquired by OhioLINK beginning in 2005; 2005–2007 and 2015 imprints were excluded from the study.

data were available (see table 4). The only package that fit these criteria but could not be included was Safari, an e-book package of technical books, because title lists and adequate usage reports were unavailable.

The number and subject distribution of titles owned was determined by downloading title lists from the publishers’ websites and using either the call number or subject area assigned to each title on that list. The lists were downloaded between November 2014 and June 2015. To determine the number and subject distribution of titles used, the author downloaded COUNTER BR2 usage reports for July 2013–November 2014 from the publishers’ websites and downloaded call numbers for each book from GOBI (EBSCO’s—formerly YBP’s—book acquisition software) by matching on ISBN. (COUNTER BR2 reports list each title that has gotten a full-text download and how many downloads were made from that title in a given time period.) Most, but not all, titles could be matched to a call number. E-books were broken out into the same subject and discipline groups as the print titles. For two packages, Oxford and Springer, usage reports were also downloaded from the OhioLINK Electronic Book Center (a separate platform that provides access to many of the books purchased by OhioLINK), combined with those publishers’ BR2 reports, and deduplicated to get an accurate picture of all titles used in those packages.

Looking at the number of titles used in each format allowed for a comparison of the level of use of print to electronic nonreference monographs that bypassed the shortcomings of comparing the number of accesses or downloads of e-books to the number of circulations of print to assess which group of titles received more use.

Findings

Print Book Use

The oldest group of print books included in the study (those that were purchased in 2008–2009 and therefore had been part of the collection for six years) had a use rate of 74 percent by 2014, where 74 percent of the titles had at least one circulation or in-house use since their date of purchase—much greater than the 60 percent overall use rate often cited. This use rate also compares favorably to those in other published use studies.

Year Purchased	Titles Purchased	Titles With 0 Use	% Use
2008–2009	8,477	2,230	74%
2009–2010	7,145	2,301	68%
2010–2011	7,671	2,596	66%
2011–2012	7,185	2,771	61%
2012–2013	6,097	3,106	49%

Print Use by Length of Time in Collection

Table 6 shows how use for monographs purchased from 2008–2009 through 2012–2013 at BGSU grew the longer each group of titles remained in the collection. Even though it is impossible to know when each of BGSU’s titles circulated for the first time, we do know both how many titles in each group have ever circulated as well as how many circulated in the “last year/year-to-date” period (July 2013 through November 2014), and these numbers show how use of each group grew the longer the books were owned. The data suggests that, at BGSU, a collection’s use will continue to grow throughout the first six years its titles are available, though the rate of growth will be greatest in the first three years.

The authors of the Pittsburgh study concluded that if a book hadn’t been used in its first two years in the collection it was unlikely to be used at all, but studies other than this one suggest that the period of growth lasts longer than that.¹⁵ Cornell found

TABLE 6
Growth in Use of Bowling Green State University Print Monographs by Time Owned

Year Purchased	Titles Purchased	Number Circulated LY/YTD (Jul 2013–Nov 2014)	% Circulated LY/YTD	Years in Collection	Number Circulated before 2013	% Circulated before 2013	Years in Collection	Total # Circulated	Total % Circulated as of Nov. 2014
2013–14	2,767	848	31%	1	0	0%	0 years	848	31%
2012–13	6,097	1,956	32%	2	805	13%	year 1	2,761	45%
2011–12	7,185	2,132	30%	3	1,988	28%	year 1–2	4,120	57%
2010–11	7,671	2,085	27%	4	2,662	35%	year 1–3	4,747	62%
2009–10	7,145	1,605	22%	5	2,930	41%	year 1–4	4,535	63%
2008–09	8,477	1,719	20%	6	4,146	49%	year 1–5	5,865	69%

the “interval of active discovery” to be 12 years, not two.¹⁶ At Lingnan University it was seven years.¹⁷ De Jager did not specify when use at the University of Cape Town plateaued but did say that more than three years of ownership was necessary for a group of books to reach maximum use.¹⁸ Burrell also addressed this topic: in attempting to develop a mathematical model to predict how much of a collection will account for 80 percent of circulations, he showed that time influences circulation and concluded that, “When we observe a fixed collection over an increasing length of time we find that gradually more and more of the items are circulated for the first time so that gradually the size of the circulating collection increases.”¹⁹ Though, like de Jager, he did not provide a time period to plateau, his model was derived by looking at the use of four collections over a four-year window; percent use in all grew during that period.

Print Use by Subject and Discipline

Overall use for each subject and discipline was determined by looking at use of all years’ purchases in the aggregate. As shown in tables 7 and 8, the discipline with the

TABLE 7
Print Use by Discipline, All Years

Discipline	Total Purchases	Titles With 0 Use	% Use
Education	3,288	995	70%
Business	1,432	455	68%
Humanities	11,022	3,862	65%
Sciences	7,226	2,705	63%
Social Sciences	13,582	4,982	63%
General	25	5	80%
Total	36,575	13,004	64%

Discipline	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013
Business	74%	72%	73%	54%	46%
Education	77%	69%	71%	71%	57%
Humanities	74%	69%	67%	64%	50%
General	83%	83%	100%	67%	100%
Sciences	72%	66%	65%	58%	48%
Social Sciences	74%	67%	64%	59%	47%

highest percent use overall was education, but use in all disciplines across all years was very strong.

When use by subject was examined in the aggregate, eleven subject areas showed that 70 percent or more of purchases made from 2008–2009 to 2012–2013 had been used at least once (though some of these had relatively few purchases), while only four subjects had a use rate of less than 50 percent (see tables 9a and 9b).

Other studies have concluded that areas of collection strength tend to circulate at higher rates than areas that are less carefully built or have fewer titles.²⁰ However, the subjects with the highest rate of use at Bowling Green State University were not necessarily those that saw the highest rate of purchasing, though two were: education and sociology and social sciences ranked one and three respectively in number of purchases made. It is unclear exactly what other factors spurred the high rate of use of BGSU’s most popular subjects.

The lowest-used subjects were mostly in the sciences and non-English languages. This is consistent with existing studies. In the United States, circulation at academic libraries of non-English language books and “ethnocentric” subject areas, such as physics and mathematics, tends to be lower because the audience for these books is smaller than for English-language books and interdisciplinary subjects.²¹ A total of 61

Highest-Use Subjects (All Subjects with a Rate of Use of 70% or Greater)			
Subject	Titles Purchased	Titles With 0 Use	% Use
Library Science	138	23	83%
General Works	25	5	80%
Photography	268	55	79%
Recreation & Leisure	815	188	77%
Languages & Literatures, Asian	60	15	75%
Medicine	1,193	312	74%
Languages & Linguistics	897	249	72%
Film	1,232	361	71%
Sociology and Social Sciences	2,514	747	70%
Psychology	703	209	70%
Education	3,288	995	70%

Lowest-Use Subjects (All Subjects with a Rate of Use Below 60%)			
Subject	Titles Purchased	Titles With 0 Use	% Use
Literature, Germanic	184	105	43%
Geology	99	55	44%
Languages & Literatures, Romance	527	272	48%
Physics & Astronomy	471	240	49%
History	93	43	54%
Political Science	2,658	1,226	54%
Mathematics	1,067	467	56%
Literature, English & American	2,110	899	57%
Biological Sciences & General Science	1,335	568	57%
Law	460	191	58%
Technology	999	414	59%
Chemistry	110	45	59%

percent of Cornell's English-language books published between 1990 and 2010 had circulated by 2010, while the highest percent-use of a language other than English was 34 percent.²² In the OhioLINK consortium, Spanish-language books circulated half as much as English in 2007, and all other languages were used even less.²³ Kent et al also noted the comparatively low circulation of non-English language books.²⁴

Print Use by Order Method

Firm order books were, overall, used slightly more than approval books, but the difference between the two methods of acquisition was not great.

By Year					
Order Method	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013
% use firm order	75%	71%	69%	62%	51%
% use approval	73%	67%	65%	61%	49%
By Discipline					
Discipline			% Use Firm	% Use Approval	
Business			66%	69%	
Education			75%	68%	
General (only 25 titles)			67%	84%	
Humanities			68%	64%	
Sciences			63%	62%	
Social Sciences			67%	62%	

This supports Tyler’s findings at the University of Nebraska: approval books did not circulate as well as librarian selections there.²⁵ However, Kingsley drew the opposite conclusion: of about 1,000 books cataloged at Western Michigan in September 1995, 50 percent of approval books had circulated within 5 months, while only 29 percent of books acquired by other means had circulated in the same period.²⁶ Whether or not books acquired via an approval plan reach the same level of use as librarian purchases depends in part on how individual libraries structure both methods of acquisition; however, the author was surprised at the low variance between these methods at Bowling Green State University over this time period.

E-book Use

Though Bowling Green State University offers five undergraduate and 18 graduate degrees that are fully online, as well as additional blended degree programs and numerous online courses, e-book use at Bowling Green State University lags behind print book use. Even though the library acquired more than twice as many e-books as print books between 2008 and 2014, more print titles circulated between July 2013 and November 2014 than e-book titles were used during that time. In addition, a higher percentage of titles were used in print than were used electronically. While 27 percent of the print books acquired between 2008 and 2014 circulated at least once between July 2013 and November 2014, only 12 percent of e-book titles had at least one use (see table 11). In addition, use of recently purchased monographs in every discipline was lower for e-books than for print—in some disciplines much lower.

TABLE 11
Percent Use of Ebooks and Print Books Between
July 2013 and November 2014

Discipline	E-books			Print Books		
	Acquired 2008–2014	Used Jul13–Nov14	% Use	Acquired 2008–2014	Circulated Jul13–Nov14	% Use
Business	8,021	760	9%	1,499	331	22%
Education	4,970	884	18%	3,502	1,124	32%
General	53	10	19%	28	22	79%
Humanities	6,330	1,541	24%	11,915	3,202	27%
Sciences	33,100	3,409	10%	7,858	2,040	26%
Social Sciences	20,439	1,866	9%	14,540	3,756	26%
Unmatched	235	253				
Total	73,148	8,723	12%	39,342	10,475	27%

Collection Patterns and Use

Collection patterns at Bowling Green State University for e-books and print books were very different between 2008 and 2014. Of the print books purchased between 2008 and 2014, 70 percent were in the social sciences and humanities. Fully 7 out of 10 (70%) of the purchases that were used in that same period were also in the social sciences and humanities, as were 70 percent of the titles that circulated between July 2013 and November 2014.

Discipline	Titles Purchased 2008–2014, by Discipline	% of Titles Purchased in Each Discipline	Titles Circ'd by Discipline	% Circ'd 2008–2014 of All Titles Purchased	# Titles Circ'd Jul13–Nov14	% of All Circ'd
Business	1,499	4%	1,002	4%	364	3%
Education	3,502	9%	2,377	10%	814	8%
Humanities	11,915	30%	7,481	31%	3,522	34%
Sciences	7,651	20%	4,728	19%	1,978	19%
Social Sciences	14,540	37%	8,916	36%	3,757	36%
Total*	39,107				10,435	

By contrast, only 37 percent of e-books collected during the same period were in the social sciences and humanities. Again, usage rates by discipline for e-books aligned with collection rates (see table 13).

BGSU's data suggest that monograph use patterns follow collection patterns for both print books and e-books, and data from other e-book studies confirm this.

In two short pilots carried out at the California State University System in 2011 and 2012, Shepherd and Langston found the number of books purchased in each subject to be largely proportional to the number of records available in that subject.²⁷

McLure and Hoseth's data also show that use generally followed availability in Colorado State University's DDA program in 2010, though it did not correlate as closely as it did at BGSU (see table 14).²⁸

Levine-Clark looked at use of all 642,885 e-brary titles available worldwide in 2014 and shared the percentages of titles available and used in each of three disciplines that year. Again, the numbers are proportional (see table 15).²⁹

Does this mean that, if libraries collected more e-books in the humanities and social sciences, e-book use patterns would not lean as heavily toward STEM disciplines and would instead mirror the use patterns of print books? The author believes yes—but at a cost: libraries could also see lower overall monograph use than we do with print

	Titles Purchased 2008–2014, by Discipline	% of Titles Purchased in Each Discipline	# Titles Used Jul13–Nov14	% of All Used
Business	8,121	11%	760	9%
Education	4,970	7%	884	10%
General	53	0%	10	0%
Humanities	6,330	9%	867	10%
Sciences	33,100	45%	4,083	47%
Social Sciences	20,439	28%	1,866	21%
Unmatched	235		253	
Total	73,248		8,723	

	Titles Available	% of Titles in Discipline As % of All Available (7,942)	# Titles Used	% of Titles Used in Discipline As % of All Used (923)
Business	1,432	18%	132	14%
Education	505	6%	56	6%
Humanities	1,129	14%	84	9%
Sciences	2,758	35%	446	48%
Social Sciences	2,110	27%	204	22%
Uncategorized	8	0%	1	0%
Total	7,942		923	

collections. Knowlton examined access and use of print and e-books to calculate user preference for e-books by subject. He concluded that, at his institution, “preference does seem to have more influence than availability in dictating format choice,” meaning that simple availability of books in electronic format is not the only, or most important, factor driving use.²⁹ Even when use patterns follow collection patterns, format preference may still play a significant role. And, while users are increasingly willing to use e-books, surveys indicate they still, overall, prefer print: the author examined ten user surveys published between 2011 and 2016, and all showed that the largest number of respondents indicated a preference for print.³⁰

BGSU’S recently acquired print books might have been more in demand than our e-books not only because of format preference and discipline distribution, but also because the print titles were more relevant to our users’ needs. For example, many of the e-books available to Bowling Green State University users are in medicine and engineering, but Bowling Green State University does not have medical or engineering degree programs.

Acquiring e-books locally, especially via DDA, could definitely boost the relevance of BGSU’S e-book collections. However, despite the fact that BGSU’s e-books were consortial purchases of publisher packages, their overall rate of use during the year studied is comparable to what many libraries have experienced with DDA plans (see table 2). In fact, only two usage studies involving e-book collections of any kind larger than 2,000 titles have shown use of a significant portion of the titles. Dewland and See were enthusiastic about the University of Arizona’s “significant decrease in the acquisitions budget” after implementing a DDA program, but they ignored the fact

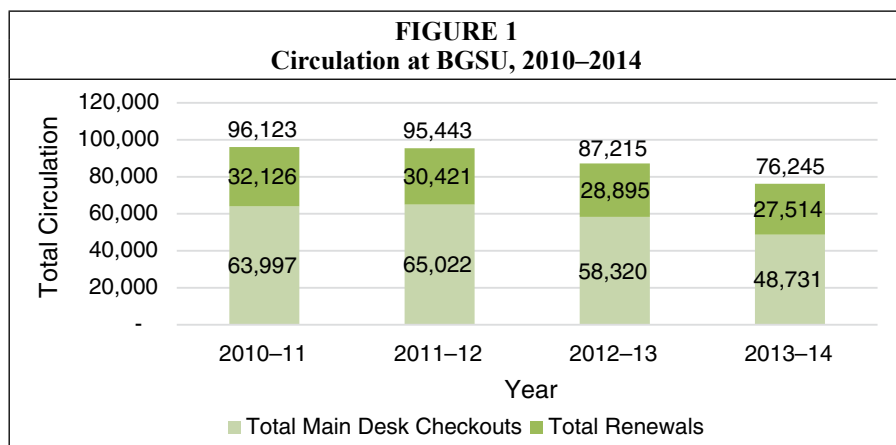
Discipline	Ebrary Available in 2014 (642,885 Titles)	Ebrary Used (Just over 53% of Available)
Humanities	28.9%	32%
Sciences	30.2%	29%
Social Sciences (including Business and Education)	28.6%	34%

that this was largely because their users were choosing to use very few e-books at all: even few enough to force a purchase of one via DDA.³²

It remains to be seen if the use rate of e-book collections will ever approach the use rate of print collections, and the data available make this far from certain. As Knowlton wrote, “if librarians blithely steer patrons toward e-books even in those fields where patrons have demonstrated a collective preference for print books, they may be unwittingly deterring use by making a majority of new titles available only in formats their patrons are disinclined to read.”³³ The lower overall rate of use of e-books in most studies seems to bolster this conclusion.

Falling Circulation: Are Print Books Less Valued?

At Bowling Green State University (as at many universities), overall circulation is declining (see figure 1).



Does this mean print books are less valuable to our users and the library should acquire fewer of them? The strong rate of use of new purchases suggests there are other reasons for this. One might be BGSU’S falling rate of print book acquisition: Bowden found that collection size contributed significantly to collection use.³⁴ Lower enrollment could be another: at the University of Nevada Las Vegas between 2002 and 2007, collection use patterns followed enrollment patterns.³⁵ Also, Bowling Green State University had nearly 200 fewer full-time faculty members in 2013–2014 than it did in 2008–2009, and both Cornell and Virginia Tech found that faculty were responsible for the circulation of more books than undergraduates, despite the difference in the size of these user populations.³⁶

The implementation of a discovery layer (Summon) in summer 2011 has probably also played a role in BGSU’S falling circulation. Before the 2011–2012 academic year, the default search box on the library’s home page searched the catalog, and thus users were directed primarily to books for the majority of their information needs. Beginning in 2011–2012, the default search box changed to search Summon, and users now find full-text articles alongside books and can choose which will better fill their need.

Conclusions and Suggestions for Further Research

Academic librarians have embraced e-books and DDA purchasing models with great enthusiasm while being critical of the number of unused books collected through traditional print collection development models.³⁷ At BGSU, data show that recently

purchased print books are enjoying a high level of use, comparing favorably both to the levels of use presented in other published print use studies and the level of use commonly cited for academic library collections, despite the fact that overall print circulation is falling. BGSU's data also show that e-books purchased at the same time had a lower rate of use in one recent year than these print purchases.

Despite the fact that the e-books available to Bowling Green State University users were mainly consortial purchases of front-list publisher packages, their rate of use was comparable to the overall rate of use of e-books made available via DDA plans at a number of other libraries in the past several years. Though most DDA studies have celebrated the success of their programs, the data from this and other use studies of e-books suggest that migrating monograph collections from print to online could have a detrimental impact on the overall use of monographs in an academic library collection.

Published studies of DDA use indicate that libraries can expect a very small percent of available records to receive any use when they are first added to the collection. Because it can take print books up to 12 years to see their first circulation, the period of discovery for e-books may be similar. However, because users still largely prefer print books, the unavailability of desired books in print format could also affect the overall rate of use of any e-book collection. Assessing the period to maximum use for groups of e-books by acquisition model (publisher package, aggregator package, and DDA) and assessing which acquisition models result in the highest rates of use for available titles and how these ultimately compare to different models of print acquisition are potential areas for further research for libraries. A complicating factor in discovering this information will be the difficulty in knowing exactly which e-books are made available when in different models.

As the balance of print and electronic monographs in academic library collections continues to evolve, libraries should pay attention to the availability of desirable titles in e-book format while acknowledging user preferences to reach their long-term collection goals, including goals for monograph use.

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