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E-Preferred Approval Books at the University of Manitoba: A Comparison of Print and Ebook Usage

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See table of contents

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Article abstract

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Methods – Usage data was compiled for books received on approval in 2012/2013 to December 31, 2014. Counter reports were used to determine use and non-use of ebooks, while vendor reports from EBL and ebrary were used for the cost per use analysis. Print usage information was drawn from SIRSI and then ALMA when UML switched systems at the beginning of 2014.

Results – Ebooks received more use than p-books overall, but when examined by subject discipline, significant differences could not be found for the "STM" and "Other" categories. With ebooks, university press books tended to be used more than those from other publishers, but the same result was not found for print books. Ebrary ebooks tended to be used more often than EBL, EBSCO, and Wiley ebooks, and single-licence books tended to be somewhat more used than multi-user ones. Cost-per-use data was much lower for print books, though the comparison did not look at staffing costs for each medium.

Conclusions – This study finds that of approval books matching the same profile, ebooks are used more, but print books receive more substantial use. Both formats are needed in a library's collection. Future comparisons of cost per use should take into account hidden labour costs associated with each medium. Usage studies provide evidence for librarians refining approval plan profiles and for budget managers considering changes to monographic acquisition methods and allocations.

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Research Article

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Abstract

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collection. Future comparisons of cost per use should take into account hidden labour costs associated with each medium. Usage studies provide evidence for librarians refining approval plan profiles and for budget managers considering changes to monographic acquisition methods and allocations.

Introduction

Libraries are changing the way they acquire monographs. Demand-driven and publisher front-list acquisition options are competing with traditional methods of firm ordering and approval plan delivery.[1] Approval plans are intended to save staff time and can operate despite staff absences or changes. But libraries are looking more critically at approval plans since purchasing a publisher's front list or using demand-driven acquisition can also save staff time.

This study looks at the performance of the YBP e-preferred approval plan at the University of Manitoba Libraries (UML). UML is an ARL and CARL member with an enrollment of approximately 30,000 and faculties of Agricultural & Food Sciences, Architecture, Arts, Engineering, Health Sciences, Law, Management, Music, and Sciences. It is the major research library for the province.

UML is facing budget challenges similar to those at other ARL libraries where monograph budget funds have decreased on average 4% over the last three years reported. UML's monograph budget has decreased 8.5%.[2] During the same period the financial commitment to demand-driven ebook acquisitions has remained steady and UML has purchased the Springer ebook collection and subscribed to other ebook collections (e.g. EBSCO, Knovel). Budget challenges were thus a strong motive to review the performance of UML's approval plan.

Literature Review

This study is quantitative; therefore, qualitative studies of ebook versus print use, although of interest and value, were not included in the review.

Ebook v Print Comparisons

Most quantitative studies of ebook and print monograph usage have examined the same titles in both formats. In addition, most of the early studies (e.g., Littman & Connaway, 2004) looked at Netlibrary titles as a basis of comparison with print. After 16 months of use the Littman & Connaway study at Duke University found 40% of the ebook versions had been used and 36% of the print (p. 259).

Kimball, Ives, and Jackson, in their study (2009), identified 4,288 Netlibrary books in the sciences that were also available in print. Although the ebooks were used more times per book, 24% of the ebooks were accessed while 23% of the print versions circulated (p. 23-24).

More recently Levine-Clark & Brown (2013) compared the use of Duke University Press titles online and in print published between 2009 and 2012. A greater number of print titles had been acquired before the ebook version, but there were 1,150 titles held in both formats. Of those titles, 54% of the print circulated and 39% of the ebooks had been used, leading the authors to conclude that when both formats were available, users preferred the print (slide 25). Goodwin (2014) looked at the 2011 collection from Duke University Press, 285 ebooks and 275 print (10 matching print titles had not been received by the study start). Usage was counted to October 2013 (two years, five months) and resulted in 73% of the ebooks being used and only 29% of the print, although only 12% of the ebooks received "substantive use."

A Kent State study (Downey et al., 2014) did not compare the same titles in print and ebook. Rather it looked at the performance of 20,000 of the most recently acquired print books (up to January 2012) added between July 2009 and January 1, 2012 in relation to 20,018 discovery records which were loaded in their catalogue for a patron-driven acquisition (PDA) project that ran January to December 2012 using ebrary ebooks. By the end of 2012, 8% of the books in the PDA discovery pool had been used (p. 148) with only 2% triggering a purchase (p. 154), but a relatively high number (62.5 %) (p. 149) of the purchased print books had circulated.

Ebook Usage

Levine-Clark (2014), working with major ebook vendors EBL and ebrary, examined data for about 625,000 ebooks across roughly 800 academic libraries. This study could not be used to predict rates of use in a single library, since the titles had a massive pool of potential readers. It found that usage of Social Science ebooks was higher than that for Humanities and Science, Technology & Medicine (STM) titles in terms of percentage of titles used and average amount of use (slides 31-36). Patrons spent more time in Humanities ebooks per online session than for ebooks in the other disciplines. STM ebooks involved more downloading. EBL and Ebrary titles were examined separately. In general Humanities ebooks were used more than STM titles on ebrary, and STM titles were used more than Humanities ones on EBL (slides 31-32).

Comparisons of Ebook Types of Acquisition

Many authors have published reports on patron-driven or demand-driven acquisition (PDA, DDA) programs at academic libraries. However, because PDAs/DDAs count usage of never purchased titles as well, they are not relevant to the present study of titles acquired by approval in print and electronic format.

Carrico et al. (2015, pp. 106-107) compared the usage of ebooks acquired in large publisher packages with those that were firm-ordered by librarians. In terms of the packages, 50% were used compared to 52% of the firm-ordered titles. This figure was somewhat skewed by the use of the medical titles in which 63% of the package titles and 84% of the firm-ordered titles were used. For the Humanities/Social Sciences, package titles and firm orders were used 47% and 45% respectively. For Science & Technology package titles and firm orders were used 49% and 57% respectively.

Print Usage and Substantive Use of Ebooks

A number of studies have shown that the percentage of print collections that circulate is low. Rose-Wiles (2013) examined the circulation for 2005 to 2009 of the entire collection of 443,577 print books at Seton Hall University and found 21.5% had circulated (p. 137). However, only 17.7% had been published in the 2000s. She examined the subset of science books published since 2000 and found 34.5% circulated 2005 to 2009 (p. 141). A Cornell University study (2010, p. 2) looked at the circulation of its collection published between 1990 and 2010 (1.6 million titles) and found that 45% had circulated.

A 2009 study (Alan et al.) looked at the usage of print titles acquired through approval plans, examining books received at University of Illinois at Urbana-Champaign (UIUC) and Pennsylvania State University (Penn State) July 2004 to June 2005 where usage was gathered from July 2004 to March 2007. It found that 69% of Penn State's and 60% of UIUC's approval books had circulated at least once (p. 70). It was suggested that the higher percentage of use at Penn State was based on the larger user population, 98,000 versus 45,000 at UIUC. No breakdown of use/non-use was provided by subject.

Most studies and guidelines (NISO, 2014, p.34) have exercised caution in drawing conclusions about the higher number of uses/transactions/sessions of ebooks in comparison with print usage. Many libraries do

not capture in-house use of their print collections, and some ebook accesses may be equivalent to the act of taking a book off the shelf, glancing through it, and then replacing it.

Some authors have looked at measures of substantive ebook use as a means of comparison with print circulation. Rose-Wiles used viewing of 10+ pages in an ebook as equivalent to a print check-out (p. 146). Goodwin used viewing 11+ pages as a measure of substantive use (p. 103). Ahmad & Brogan (2012, p. 198) in their case study of EBL ebooks usage, set the standard of more than 9 minutes spent in a book as an indication of reading, since the EBL platform uses that time to differentiate reading from browsing. In their study 29.12% of transactions were spent in reading under this definition and 70.88% in browsing.

None of the studies mentioned downloading as an equivalent to print check-outs. However, download could provide a more equivalent measure of comparison to the print check-out. Some effort is required to download the book. Though shorter than most print loan periods, a patron can use the ebook offline for one to three days. With both ebook downloads and print check-outs, there is no way of knowing how much a book is used while 'out' or in 'offline' mode.

Aims

This study assumes that a comparison of print book (p-book) and ebook usage is possible, especially when substantive use of ebooks is compared with print checkouts.

Given that the YBP approval plan will deliver a greater proportion of ebooks over time, this analysis attempts to answer these questions:

- Are approval ebooks being used at an equal or higher rate than print approval books?
- Is the usage or non-usage of approval ebooks and print books affected by their broad subject discipline? Is the usage/non-usage the same or different for the two media?
- Are university press books used more than non-university press books, and is usage the same for print and ebook?
- Did the vendor or type of license affect the usage of ebooks?
- What is the cost-per-use of an approval ebook and the cost-per checkout for a print approval book?

Method

Most comparisons of the performance of p-books and ebooks have been done comparing the same titles in both formats. Unless an analysis looks at the same titles purchased at the same time in the two formats, it is challenging to compare performance over a similar time period. Differing time periods for access may have affected the results of earlier studies (Levine-Clark & Brown, 2013, slide 3; Downey et al., 2014, p.145).

Although the titles are different in the UML comparison of approval books, approval books, no matter what format, are purchased over the same time period, match the same subject profile, and come from a similar set of publishers with similar publication dates. There is a wide variety of ebook platforms on the market, but the UML ebooks come on four platforms prescribed by the approval profiles: EBL, ebrary, EBSCO, and Wiley.

In 2012/2013, all subject profiles within the YBP approval plan were converted to e-preferred with the exception of pharmacy. The e-preferred mode meant that if an ebook were published within eight weeks of the print version, an ebook would be received by UML. In 2012/13, 35% of the approval receipts were ebooks. Usage of the approval books received in 2012/13 was counted to December 31, 2014, so both p- and ebooks were available for use between 20 and 32 months.

Table 1
Overall Comparisons of Print- and Ebook Usage

	No. of titles	**No. used**	**% used**
Print Books	5,237	2,003	38%
Ebooks	1,855	872	**47%**
P-Value two-sided	*proportion of usage different between p- & ebooks*		*0.0011*
P-Value one-sided	*proportion of usage greater for ebooks*		*0.00056*
***Note:* P = < 0.05**			

Source of data

Lists of ebooks and p-books received on approval were generated from SIRSI's Director's Station. Some call number and publisher data was retrieved from YBP's GOBI database.

While the Counter Book Report 2 was only available from ebrary, only the Counter Book Report 1 was produced for EBSCO, Wiley, and EBL ebooks. The Counter Book Report 2 records the number of uses of a section or sections of a book by month and title, whereas the Counter Book Report 1 counts only the uses of a title by month, without considering the use of chapters within it. The Counter 2 Book Report will therefore yield higher uses per title since it counts every section or chapter of a single title as a separate use, whether they were viewed in separate sessions or not. Because of this discrepancy, this study does not attempt to measure rates of use based on Counter reports, only use and non-use. More detailed information about use was obtained from vendor reports for EBL and ebrary ebooks for cost per use analysis; EBSCO and Wiley did not provide detailed information for their ebooks so were not included. Cost per use was calculated per book and then averaged, rather than the collection cost being divided by overall use as in other studies (Bucknell, 2010, p. 133; Bucknell, 2012, p. 53).

For p-books, circulation data was derived from SIRSI to the end of 2013, and then when UML changed systems, from ALMA for 2014. UML does not have consistent data on in-house use of its print collections. Therefore usage of print books was based simply on number of check-outs.

2012/2013 approval results

In this fiscal year UML received 5,237 p-books and 1,855 ebooks on approval. Of those, 38% of the p-books (2,003) circulated and 47% of the ebooks (872) were used. A Pearson's chi-square test for comparing two proportions showed that there was sufficient statistical evidence to conclude the usage of print and ebooks was different and that ebook use was greater than print.

A further analysis was done by broad subject discipline based on the following LC call number ranges, using the same subject breakdown as Levine-Clark (2014, slide 30).

- Arts & Humanities: B-BD, BH-BX, C-F, M-P
- Social Sciences: BF, H-L, U-V
- Science, Technology & Medicine (STM): Q-T

Use of ebooks by broad discipline

This analysis indicates that usage of ebooks in the broad disciplines is remarkably similar.

Use of p-books by broad discipline

UML received many more "Arts & Humanities" print books through the approval plan, but their usage was lower, compared to the size of the

Table 2
Ebook Usage by Broad Subject Discipline

	No. ebooks	No. used	% used	Proportion of total ebooks	Proportion of total uses
Arts & Humanities	635	300	47%	34.2%	34.4%
Social Sciences	669	306	46%	36%	35%
Science, Technology & Medicine (STM)	494	236	48%	26.6%	27.2%
Other	57	30	53%	3.1%	3.4%
Total	1,855	872	47%		

Table 3
Print Book Usage by Broad Subject Discipline

	No. p-books	No. used	% used	Proportion of total p-books	Proportion of total uses
Arts & Humanities	2,263	807	36%	43%	40%
Social Sciences	1,740	657	38%	33%	33%
Science, Technology & Medicine (STM)	1,063	469	44%	21%	24%
Other	171	70	41%	3%	3%
Total	5,237	2003	38%		

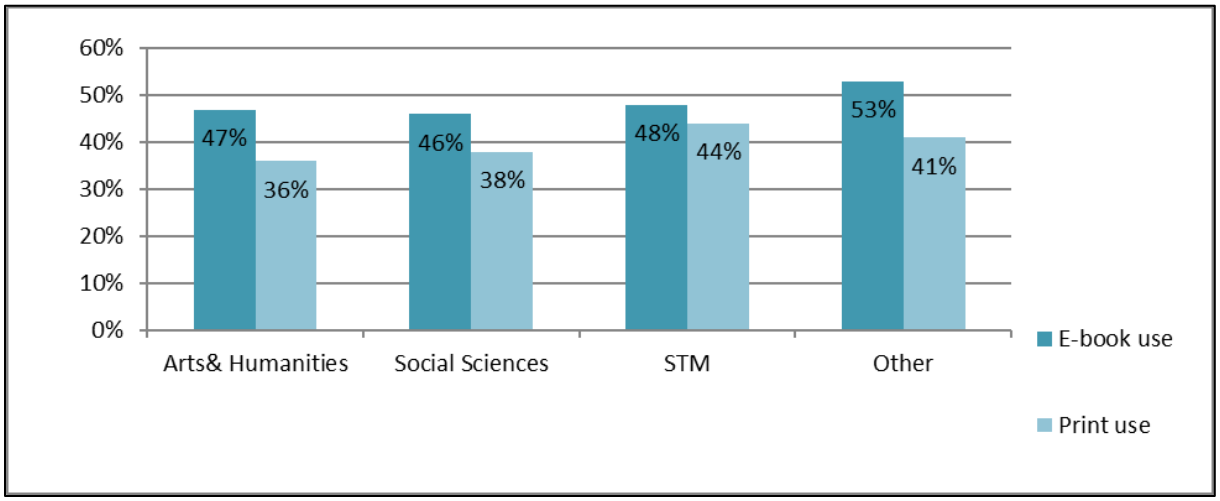

Figure 1
Comparison of print and ebook usage by broad subject.

Table 4
P- and Ebook Usage Comparison Chi-square Test

Subject	Proportion of Usage Ebook	Proportion of Usage P-book	P-Value two-sided	P-Value one-sided	Decision
Arts & Humanities	0.472	0.357	<0.0001	<0.0001	Significant difference
Social Sciences	0.457	0.379	0.0004	0.0002	Significant difference
STM	0.478	0.439	0.1474	0.07372	Insufficient stat. evidence
Other	0.526	0.41	0.1262	0.06309	Insufficient stat. evidence
***Note:* P = < 0.05**					

collection, while use of "STM" print books appeared to be higher relative to the size of its collection.

The results of the chi-square tests (Table 4 below) provided sufficient statistical evidence to find that usage of print and ebooks was different and higher for ebooks in the "Arts & Humanities" and "Social Sciences" categories. However, there was not statistical evidence to claim the same for the "STM" and "Other" categories.

Ebooks use by type of publisher

For ebooks, usage of books published by university presses was higher, especially considering use relative to the collection size.

P-books use by type of publisher

In comparison with ebooks, usage of print books from university presses did not appear different from that of print books from trade or other publishers. Proportionally UML received more university press books (47%) as ebooks while university press books accounted for only 39% of the print titles received.

Ebooks use by vendor platform

The analysis by vendor platform suggested that ebrary was the preferred platform.

Table 5
Ebook Usage by Type of Publisher

	No. of ebooks	No. used	% used	Proportion of total ebooks	Proportion of total uses
University presses	878	449	51%	47%	51%
Other publishers	977	423	43%	53%	49%
Total	1,855	872	47%		
P-Value two-sided			*0.0007*	*Proportion used is different between university presses & other publishers*	
P-Value one-sided			*0.0004*	*Proportion used is greater for university presses than other publishers*	
***Note:* P = < 0.05**					

Table 6
Print Book Usage by Type of Publisher

	No. of p-books	**No. used**	**% used**	**Proportion of total p-books**	**Proportion of total uses**
University presses	2,055	788	38%	39%	39%
Other publishers	3,182	1,215	38%	61%	61%
Total	5,237	2,003	38%		
P-Value two-sided			*0.4205*	*Proportion used is not significantly different between publisher type*	
P-Value one-sided			*0.2103*	*Proportion used is not significantly greater*	
***Note:* P = < 0.05**					

Table 7
Ebook Usage by Vendor Platform

	No. of ebooks	**No. used**	**% used**	**Proportion of total ebooks**	**Proportion of total uses**
EBL	867	371	43%	47%	43%
ebrary	820	434	53%	44%	50%
EBSCO	77	28	36%	4%	3%
Wiley	91	39	43%	5%	4%
Total	1,855	872	47%		
P-Value two-sided			*<0.0001*	*Proportion of usage differs significantly among vendors*	
***Note:* P = < 0.05**					

Table 8
Ebook Usage by Type of License

	No. of ebooks	***No. used***	***% used***	***Proportion of total ebooks***	***Proportion of total uses***
Single user (ebrary)	***483***	***250***	***52%***	***26%***	***29%***
1 user (EBSCO)	***77***	***28***	***36%***	***5%***	***4%***
Non-linear lending (EBL)	***863***	***368***	***43%***	***46%***	***52%***
Multi-user (EBL)	***4***	***3***	***75%***	***.02%***	***.03%***
Multi-user (Wiley)	***91***	***39***	***43%***	***5%***	***4%***
Multi-user (ebrary)	***337***	***184***	***55%***	***18%***	***21%***
Total	***1,855***	***872***	***47%***		
P-Value two-sided			***<0.0001***	***Proportion of usage differs significantly among the different vendor licenses***	
Note: P = < 0.05					

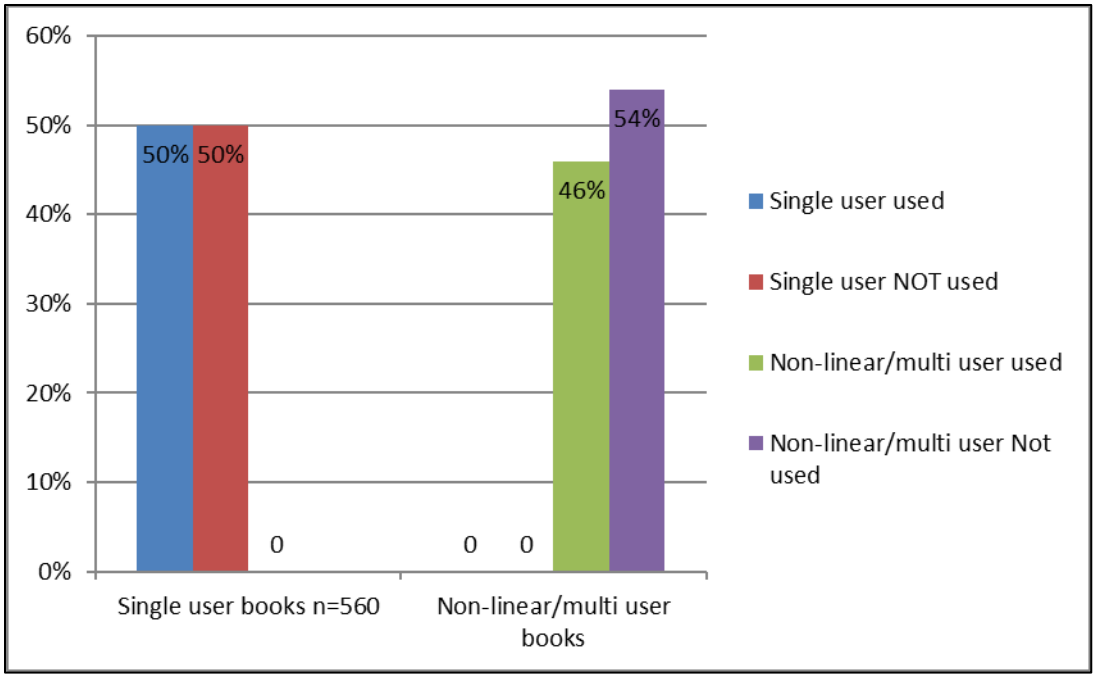

Figure 2
Comparison of usage of single user and multi-user licences.

Ebooks use by license

Ebrary ebooks seemed to receive higher usage independent of license type.

When results were separated into single-user and multi-user licenses, single-user licensed books were used somewhat more.

Substantive use of EBL and ebrary ebooks

Both EBL and ebrary provided detailed reports on usage, allowing a better comparison between p-books and ebooks. The two providers accounted for 91% of the ebooks received on approval in 2012/2013. Wiley and EBSCO ebooks were excluded from cost and cost-per-use calculations. For the purpose of this study, substantive use was determined to have occurred either when a title had been downloaded at least once, or when 11+ pages had been viewed or read. The level of substantive use of ebooks (32%) is lower than the overall mean usage (38%) of approval print books based on check-outs.

Mean costs for EBL and ebrary ebooks

The overall cost of the EBL collections is slightly higher than that of ebrary's because it has about 40% more "STM" books, which tend to be more expensive. In addition, pricing of an EBL non-linear lending ebook tends to be higher than a single-user title from ebrary.

A further analysis was done by broad discipline on the two platforms. The results showed that in general the EBL books were more expensive than ebrary's in all disciplines except "Social Sciences".

Table 9
Substantive Use of EBL and Ebrary Ebooks

	No. ebooks	No. used	No. of sessions/ transactions	Mean session per book	Mode session per book	No. of ebooks down-loaded	No. of ebooks with substantive use	% ebooks with substantive use
EBL	868	371	1,519	4	2	149	309	35.6%
ebrary	819	434	1,610	3.7	2	81	238	29%
Total	1,687	805					547	32%

Table 10
Mean cost of EBL and Ebrary Ebooks

	No. of ebooks	Cost of all ebooks	Mean cost of all ebooks	No. of ebooks used	Cost of ebooks used	Mean cost of ebooks used
EBL	868	$87,737*	$101	371	$36,826	$99
ebrary	819	$70,556	$86	434	$36,063	$83
Total	**1,687**	**$158,293**	**$94**	**805**	**$72,889**	**$91**
**** all costs given are in Canadian dollars***						

Table 11A
EBL Ebooks Mean Cost by Discipline

	No. of ebooks	Cost of all e-books	Mean cost of all ebooks	No. of ebooks used	Cost of ebooks used	Mean cost of ebooks used
Arts & Humanities	284	$25,168	$88	116	$10,792	$93
Social Sciences	313	$24,801	$79	123	$9,726	$79
STM	245	$31,800	$130	119	$14,863	$125
Other	26	$3,043	$117	13	$1,446	$111
Total	**868**	**$84,812**	**$98**	**371**	**$36,827**	**$99**

Table 11B
Ebrary Ebooks Mean Cost by Discipline

	No. of ebooks	Cost of all ebooks	Mean cost of all ebooks	No. of ebooks used	Cost of ebooks used	Mean cost of ebooks used
Arts & Humanities	322	$24,426	$76	173	$12,944	$75
Social Sciences	322	$27,574	$86	174	$15,062	$87
STM	148	$17,059	$115	70	$7,133	$102
Other	27	$2,310	$86	17	$1499	$88
Total	**819**	**$71,369**	**$87**	**434**	**$36,638**	**$84**

Mean Print Book Costs

The mean purchase price of all EBL and ebrary ebooks ($94) is much higher than the mean cost of all print books ($55).

A further breakdown of this information was done by broad discipline.

Cost per Use Comparison

Cost per use for EBL ebooks, ebrary ebooks, and print books ($57, $51, and $34) was about 40% less than the mean purchase cost per book ($101, $86, and $56 respectively).

The cost-per-use data has a non-normal or right-skewed distribution for p- and ebooks and for all disciplines. Therefore, the nonparametric Kruskal-Wallis test was used to determine where cost-per-use differs among the three groups: p-books, EBL ebooks, and ebrary ebooks.

As an alternative strategy, the square-root transformation was applied to the cost-per-use figures in all groups in order to reduce the right-skewedness in the data. A t-test (to compare two groups at a time) and the ANOVA (to compare all three groups) were conducted on the transformed data and the results were compared with those from the Kruskal-Wallis test. The reported conclusion is based on the Kruskal-Wallis test.

EBL and ebrary ebooks are not significantly different in terms of their cost-per-use. The mean cost per use is definitely lower for print books with the exception of books in the "Other" discipline, where the small sample size fails to lead to a conclusion.

Table 12
Mean Cost of Print Books

No. of p-books	Cost of all p-books	Mean cost all	No. of p-books used	Cost of p-books used	Mean cost p-books used
5,237	**$289,672**	**$55**	**2,003**	**$112,318**	**$56**

Table 13
Mean Cost of Print Books by Discipline

	No. of p-books	Cost. of all p-books	Mean cost all p-books	No. of p-books used	Cost of p-books used	Mean cost (p-books used)
Arts & Humanities	2,263	$109,462	$48	807	$39,735	$49
Social Sciences	1,740	$90,654	$52	657	$33,383	$51
STM	1,063	$79,681	$75	469	$34,774	$74
Other	171	$9,875	$58	70	$4,426	$63
Total	**5,237**	**$289,672**	**$55**	**2003**	**$112,318**	**$56**

Table 14
Ebrary, EBL, and Print Comparison – Cost Per Use/Checkout

	Arts & Humanities	Social Sciences	STM	Other	All
EBL no. used	116	123	119	13	371
cost	$10,792	$9,726	$14,863	$1,446	$36,827
uses	396	522	521	82	1,521
CPU	$57	$45	$72	$38	$57
Ebrary no. used	173	174	70	17	434
cost	$12,944	$15,062	$7,133	$1,499	$36,638
uses	676	641	230	63	1,610
CPU	$47	$50	$64	$39	$51
Print no. used	807	657	469	70	2,003
cost	$39,735	$33,383	$34,774	$4,426	$112,318
uses	1,857	1,725	1,374	173	5,129
CPU	$32	$31	$42	$38	$34

Discussion

In terms of the comparison of print and ebook usage, although the overall results favoured ebooks, in the "STM" and "Other" categories the results were inconclusive. The sample size was too small for the Other category, and usage of STM books in the two formats was not significantly different. The Sciences and Technology libraries at UML have always had a comparatively small print book budget, and their smaller collections may account for greater print usage than in other categories.

Usage of print approval books was low, but a number of libraries have indicated equally low results (e.g., Rose-Wiles, Cornell University). These libraries studied a larger number of books over a longer time period, but nonetheless their findings point to a similar trend. A number of factors may be affecting print use: changes in teaching requiring fewer research papers, the availability of information sources outside of libraries, changing reading habits, an increased ability of students to buy books, and student reluctance to use the physical library.

As others have pointed out, it is difficult to compare p- and ebook usage, especially if the print usage does not include in-house use. Although the comparison of substantive use of ebooks to check-outs of print books is an attempt to mitigate the lack of in-house information, 'substantive use' is not an objective measure. The results do, however, seem to agree with the often cited belief that print and ebooks are used for different purposes; ebooks for quick searches and reading shorter texts, and print books for more extensive reading.

In addition, the cost per use data for both formats in the study does not consider the labour cost of the processing and maintenance of print books versus those for ebooks. During the time studied, UML paid $14.87 per p-book for outsourced cataloguing and processing and nothing for ebook catalogue records. Full consideration of any such 'hidden' costs is beyond the scope of this study, but nonetheless deserves further inquiry.

The ebook results by broad subject are similar to those for package titles in the "Humanities/Social Sciences" (47%) and "Science/Technology" (49%) areas in the Carrico study (2015, p. 106). Carrico found much higher use of medical books; however, the only categories of medicine covered by the UML's

Table 15
P-Value: EBL, Ebrary, and Print Comparison – Cost Per Use/Checkout

Discipline	Comparison	Average difference	t-test	ANOVA	Kruskal-Wallis	Conclusion
Arts & Humanities	EBL to ebrary	9.30	0.163		0.322	Not sig. different
	EBL to print	23.27	< 0.0001		< 0.0001	Significantly different
	ebrary to print	14.97	< 0.0001		< 0.0001	Significantly different
	EBL-ebrary-print			< 0.0001	< 0.0001	Significantly different
Social Sciences	EBL to ebrary	-4.28	0.170		0.068	Not sig. different
	EBL to print	14.76	< 0.0001		0.024	Significantly different
	ebrary to print	19.04	< 0.0001		< 0.0001	Significantly different
	EBL-ebrary-print			< 0.0001	< 0.0001	Significantly different
STM	EBL to ebrary	7.55	0.326		0.281	Not sig. different
	EBL to print	29.92	< 0.0001		< 0.0001	Significantly different
	ebrary to print	22.37	< 0.0001		0.005	Significantly different
	EBL-ebrary-print			< 0.0001	< 0.0001	Significantly different
Other	EBL to ebrary	-0.89	0.811		0.802	Not sig. different
	EBL to print	0.35	0.822		1.00	Not sig. different
	ebrary to print	1.24	0.899		0.931	Not sig. different
	EBL-ebrary-print			0.965	0.931	Not sig. different
Overall	EBL to ebrary	6.46	0.201		0.474	Not sig. different
	EBL to print	22.93	< 0.0001		< 0.0001	Significantly different
	ebrary to print	16.47	< 0.0001		< 0.0001	Significantly different
	EBL-ebrary-print			< 0.0001	< 0.0001	Significantly different
***Note:* P = <0.05**						

approval plan were nursing and public health. Levine-Clark's (2014, slides 31-36) meta-analysis of EBL and ebrary ebooks found that social sciences titles were used more than "STM" ones, but in the UML study of approval ebooks, the usage was quite similar for the three main categories.

The higher usage of university press ebooks at UML is in agreement with Levine-Clark's (2014, slides 23-27) study. However, type of publisher did not seem to affect print book usage at UML, perhaps reflecting the higher number of print approval books coming from important, non-university press publishers (e.g., Wiley, Routledge, Palgrave Macmillan).

The greater usage for ebrary ebooks was somewhat surprising given that EBL is the preferred format for many users and librarians at UML (Warren, 2015, p. 15). However, during the study UML's proxy server was dropping users of EBL ebooks. These access problems have since been remedied but could have skewed these 'historical' results. In addition, this result may reflect a different database structure and method of counting use.

Conclusions

Of approval books that matched the same subject profile, this study finds that ebooks are used more, but print books receive more substantial use. When the data is broken down by broad discipline, the greater usage for ebooks is significant for the "Arts & Humanities" and "Social Sciences" category. However, results for the "STM" and "Other" categories were inconclusive. Clearly both formats of books are needed in a library's collection.

In terms of type of publisher, university press ebooks were more highly used than ebooks from other publishers, while for print books there appeared to be little difference in usage of the two publisher types. This difference may have occurred because a greater number of important non-university press books arrived in print.

Cost per use for print books ($34) was lower than for EBL and ebrary ebooks[3] ($53), in part because ebooks are generally more expensive; the mean purchase cost of ebrary and EBL titles was $91, but $55 for print books. These differences may not tell the full story since print usage did not include in-house browsing or reading. On the other hand, turnstile counts at UML, as at other academic libraries, have decreased over the last decade suggesting that in-house use may not be as significant as it once was. Finally, cost per use in this study did not reflect the cost of processing and maintenance of the different media, but the cost is likely higher for print.

It is recommended that future usage studies work with a larger sample of ebooks relative to print and take into account the hidden costs of access and maintenance of the two formats in order to produce more compelling results. Many books are published in the arts & humanities and social sciences. For a library with limited resources and similar low use of print in these areas, it may be more cost-effective to acquire monographs in these disciplines, through publisher front-lists or PDAs/DDAs than through an approval plan.

Usage patterns take time to unfold, and libraries like the UML often have to make abrupt changes to monographic acquisition methods and allocations for budgetary reasons. Thus UML altered and reduced its YBP approval plan before the results of this study were determined. Nonetheless usage studies can provide evidence for librarians refining approval plan profiles and for budget managers considering changes to monographic acquisition methods and allocations.

Endnotes

[1] For a discussion of demand-driven acquisition options, see NISO's "Demand Driven Acquisition: A Recommended Practice" (9-13) and for a discussion of ebook acquisition

methods see Kumbhar (pp. 786-787, 2012) and Bucknell (2012).

[2] ARL Statistics 2011/2012 to 2013/2014 provide statistics on amounts spent on one-time purchases, of which monographs would be a large portion.

[3]Although EBSCO (77) and Wiley (91) ebooks came on approval, neither vendor supplied detailed usage reports that could be used for cost-per-use comparisons.

References

Ahmad, P., & Brogan, M. (2012). Scholarly use of e-books in a virtual academic environment: a case study. *Australian Academic & Research Libraries*, *43*(3), 189-213. http://dx.doi.org/10.1080/00048623.2012.10722277

Alan, R., Chrzastowski, T. E., German, L., & Wiley, L. (2010). Approval plan profile assessment in two large ARL libraries, University of Illinois at Urbana-Champaign and Pennsylvania State University. *Library Resources & Technical Services*, *54*(2), 64-76.

Association of Research Libraries. (2013). ARL statistics 2011-2012. Retrieved from: http://publications.arl.org/arl_statistics

Association of Research Libraries. (2014). ARL Statistics 2012-2013. Retrieved from: http://publications.arl.org/arl_statistics

Association of Research Libraries. (2015). ARL Statistics 2013-2014. Retrieved from: http://publications.arl.org/arl_statistics

Bucknell, T. (2012). Buying by the bucketful: a comparative study of e-book acquisition strategies. *Insights*, *25*(1), 51-60. http://dx.doi.org/10.1629/2048-7754.25.1.51

Bucknell, T. (2010). The 'big deal' approach to acquiring e-books: a usage-based study. *Serials*, *23*(2), 126-134. http://dx.doi.org/10.1629/23126

Carrico, S. B., Cataldo, T. T., Botero, C., & Shelton, T. (2015). What cost and usage data reveals about e-book acquisitions: ramifications for collection development. *Library Resources & Technical Services*, *59*(3), 102-111. http://dx.doi.org/10.5860/lrts.59n3.102

Cornell University Library. (2010). *Report of the Collection Development Executive Committee Task Force on Print Collection Usage*. Retrieved from http://staffweb.library.cornell.edu/system/files/CollectionsUsageTF_ReportFinal11-22-10.pdf and http://staffweb.library.cornell.edu/node/1781

Downey, K., Zhang, Y., Urbano, C., & Klinger, T. (2014). A comparative study of print book and DDA ebook acquisition and use. *Technical Services Quarterly*, *31*(2), 139-160. http://dx.doi.org/10.1080/07317131.2014.875379

Goodwin, C. (2014). The e-Duke Scholarly Collection: e-book v. print use. *Collection Building*, *33*(4), 101-105. http://dx.doi.org/10.1108/CB-05-2014-0024

Kimball, R., Ives, G., and Jackson, K. (2009). Comparative usage of science e-book and print collections at Texas A&M University Libraries. *Collection Management*, *35*(1), 15-28. http://dx.doi.org/10.1080/01462670903386182

Kumbhar, R. (2012). E-books: Review of research and writing during 2010. *The Electronic Library, 30*(1), 777-795. http://dx.doi.org/10.1108/02640471211282109

Levine-Clark, M. (2014, June 27). Diving into ebook usage: An ALA update. American Library Association Annual Meeting, Las Vegas, NV, USA. Retrieved from: http://www.slideshare.net/MichaelLevineClark

Levine-Clark, M., & Brown, C. (2013, March 19). E or p? A comparative analysis of electronic and print book usage. Electronic Resources & Libraries Conference, Austin, TX, USA. Retrieved from: http://www.slideshare.net/MichaelLevineClark/erl-e-books-2013

Littman, J., & Connaway, L. S. (2004). A circulation analysis of print books and e-books in an academic research library. *Library Resources & Technical Services, 48*(4), 256-262. Retrieved from: http://www.oclc.org/content/dam/research/publications/library/2004/littman-connaway-duke.pdf

National Information Standards Organization. (2014). Demand-driven acquisition of monographs: A recommended practice (NISO RP-20-2014). Retrieved from: http://www.niso.org/apps/group_public/download.php/13373/rp-20-2014_DDA.pdf

Rose-Wiles, L. M. (2013). Are print books dead? An investigation of book circulation at a mid-sized academic library. *Technical Services Quarterly, 30*(2), 29-152.

Warren, R. (2015). E-book assessment report [for usability]. University of Manitoba Libraries.