Transaction Analysis of Academic E-book Usage: The Case of Ebrary

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Abstract

Purpose: This paper explored the patterns (way and extent) of e-book use in an Australian case study academic and research library.
Design/methodology/approach: Two years' system-generated datasets (log files) of e-book usage on Ebrary platform were analyzed statistically.
Key finding(s): Only a small fraction of e-books was used in two reporting years at the case study academic and research library. Whereas, a major proportion of e-books was never even accessed.
Research limitation(s): This study is limited to one case study institution and one e-book platform.
Practical implication(s): In a subscription model of e-book acquisition libraries pay the subscription price for the whole database regardless of the usage or non-usage. Hence, renewal of subscription decision or selection of appropriate acquisition model should be based on the extent of usage particularly when funding is scarce.
Contribution to knowledge: The findings of the study may be useful for those libraries that have not yet acquired e-books but are planning to do so.

Paper type: Research.
Keywords: E-books; E-book usage; Academic libraries; Ebrary; Edith Cowan University (ECU); Australia.

Introduction and Literature Review

The shift from print to digital format is rapid across the globe. Asunka (2013) asserts that higher education institutions worldwide are transitioning to e-books generally and e-textbooks particularly. Polanka (2011) views electronic books (e-books) in the academic mainstream. According to Reitz (2017), electronic books in libraries took decades to evolve staring from digitization of catalogues, progressed to periodical

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indexes and abstracts, then to serials and large reference works, and finally to books. The main drivers of e-book adoption in academic libraries are distance students, anywhere and anytime access, need for multiple copies and simultaneous users, lack of physical space, lack of staff and time-bound procedures of circulation and shelving, eco-friendliness, as such no physical processing and wear and tear, and ease in acquisition. E-books are available through publishers, vendors, and aggregators against different acquisition models, e.g. subscription, purchase, and short term loan. Acquisition of e-books via aggregator platforms (e.g. Ebook Library, Ebrary, MyiLibrary, Safari, and NetLibrary) is becoming popular day by day. Aggregators provide a variety of e-books on multiple disciplines by different publishers on a single platform.

D'Ambra and Wilson (2012) citing Cox claim that the sale of e-books in Australia has increased by more than 100% between 2008 and 2009 (p. 49). Schmidt (2013) citing Hales asserts that academic libraries' purchase of e-books is increasing at an astonishing rate (p. 1). For example, at the Queensland University of Technology Library, e-book acquisitions accounted for 20% of the monograph budget in 2008 (Stokker & Hallam, 2009) and about 50% in 2010 (Huthwaite, McClintock, Sinnamon, & Sondergeld, 2011). An analysis of the Australian universities' aggregated data collected by the Council of Australian University Librarians (CAUL, 2012) showed a 512.3% increase from 2008 to 2010 in e-book acquisitions, with an increase of 61.9% between 2009 and 2010.

Patron use continues to be one of the most important and tangible factors that prove the usefulness of library resources; producing usage data for e-books that establishes the level and extent of use is of utmost importance (Crosetto, 2011). Wells and Dumbell (2010) citing King assert that "owing to the financial crisis and subsequent financial restraints that were imposed on academic institutions and libraries, analysis of usage statistics for electronic resources has become more important than ever in recent times" (p.1). Although it is a difficult challenge to find and evaluate methods to judge the worth of library resources in situations of volatility, such methods are required to maintain the utility of libraries into the future (Moore, MacCreery, & Marlow, n.d.).

Ebrary (also written as 'ebrary'), a commercial web-based e-book aggregator/supplier owned by ProQuest in 2011, offers online subject packages (subscription), title by title purchase (perpetual archive), and short-term loan (rental) options to libraries for multiple/unlimited

simultaneous users (Ebrary, 2013; ProQuest, n.d.; Schell, 2011). From 2012, Ebrary e-books can also be downloaded for a 7 to 14 days loan for offline use via Adobe Digital Editions software and Ebrary's app for smartphones and tablets. Utilising a different acquisition model, the recording of COUNTER-compliant usage statistics (COUNTER, 2013) by Ebrary is not the same as that of pay-per-view model. Since the Edith Cowan University (ECU) Library has to pay for the whole database renewed annually as per the subscription acquisition model regardless of use/non-use, data capture is less comprehensive.

Ebrary acquires e-books on a variety of disciplines from different publishers and offer them on their single platform. The Ebrary website was showing 84,829 e-book titles on 20 broad subject areas available to ECU community as at 15 September, 2013, listed in Table 1. (http://site.Ebrary.com.ezproxy.ecu.edu.au/lib/ecu/home.action)

Table 1. Ebrary Subject-wise E-book Collection (Titles)

Rank	Subject	Collection (# of titles)	%
1	Social sciences	18,027	21.25
2	Language and literature	11,403	13.44
3	Science	9,186	10.83
4	Philosophy, psychology, religion	8,198	9.66
5	Medicine	6,726	7.93
6	Technology	6,109	7.20
7	History (general) and history of Europe	4,876	5.75
8	History: America	3,862	4.55
9	Political science	3,130	3.69
10	Education	2,792	3.29
11	Geography, anthropology, recreation	2,744	3.23
12	Law	2,392	2.82
13	Music and books on music	1,317	1.55
14	Fine arts	1,195	1.41
15	Agriculture	1,025	1.21
16	Military science	743	0.88
17	Bibliography, library science, information resources (general)	574	0.68
18	Auxiliary sciences of history	337	0.40
19	Naval science	123	0.14
20	General works	70	0.08
	Total	**84,829**	**100**

Each e-book platform (e.g. EBL, Ebrary) has its own method of recording usage statistics. Usage reports also vary according to the acquisition model, for example, pay-per-view or subscription. Lamothe (2013) points to the confusion over the reporting of e-book usage statistics and asserts that "accesses reported for each page of a book viewed can artificially inflate usage. Conversely, reporting an access per book regardless of how many pages have been viewed can have the opposite effect and suppress real usage" (p. 41). Hence, studies that rely upon usage statistics must be treated with caution.

Ebrary's Digital Rights Management (DRM) restrictions

One page at a time (maximum 30% of pages) can be copied by selecting the desired text. Maximum 30% of pages can be printed from any part of an e-book by selecting a print range. A chapter/range (maximum 30% of pages) of an e-book can be downloaded as a standard image-PDF format to view offline using most computers and devices, including the Kindle, without additional software. Bibliographical detail of the e-book along with copyright information is displayed on every page of downloaded/printed chapters. Additional Ebrary alphanumeric code of nearly 40 characters in a watermark style is also displayed at four different places on every page of a downloaded chapter or range. Ebrary interface displays two separate paginations, for example, page 75 (90 of 209).

The entire e-book in a special format can be downloaded to read offline via Adobe Digital Editions for a 7 to 14 days loan with automatic expiry. A downloaded chapter/range can be printed as per stated limits, but not copied, whereas the entirely downloaded e-book can neither be copied nor printed. Separate user account with Ebrary in addition to institutional one is required to use download and some customization features.

Purpose of the Study

This paper describes the transaction record of Ebrary (one of the aggregator platforms) e-book titles at the Edith Cowan University (ECU), Western Australia to know the way and extent of usage.

Research Methodology

Edith Cowan University (ECU) Library subscribed to the Ebrary online e-book database from 2011 onwards. Ebrary usage statistics for the years, 2011 and 2012, were supplied by the ECU Library for analysis. Data were supplied in different report types and consisted of

brief stats (pages viewed/copied/printed, unique documents, user sessions, and online turnaways), number of monthly searches conducted by users directly with Ebrary platform, and section requests listing unique titles with publishers and most standard numbers used month-wise.

E-book usage reports are automatically, system-generated log files in spreadsheet (Excel) format programmed and maintained by the e-book suppliers. These transaction log files, especially section requests, were analyzed statistically, describing the extent and way of use of Ebrary e-book titles at the case study institution.

Findings of the Study

Patterns of usage: Aggregate trends

ECU's annual report for 2012 reports its population (faculty, students, and general staff) as 25,734 and 25,404 respectively for 2011 and 2012 (Edith Cowan University, 2013). The Ebrary e-book title collection according to Ebrary press releases was over 70,000 and 75,000 respectively in the census months of June 2011 and 2012 (Ebrary, 2011, 2012). Table 2 provides an aggregate trend of Ebrary e-book utilisation at ECU in two years, 2011 and 2012.

Table 2. Ebrary Overall Use Statistics 2011-2012

Parameter	**2011**	**2012**	**% change**
ECU population	25,734	25,404	-1.28
Ebrary collection (# of unique titles)	70,000	75,000	7.14
Collection by # of publishers	379	491	29.55
Unique titles used	10,769	15,975	48.34
User sessions	33,874	56,354	66.36
User searches	14,249	19,888	39.57
Section requests	557,711	804,926	44.33
Pages viewed	521,314	767,456	47.22
Pages copied	6,880	4,853	-29.46
Pages printed	29,517	32,617	10.50
Chapter/range downloads	N/A	2,475	N/A
Full title downloads	N/A	1,757	N/A
Wait queues/turnaways	N/A	N/A	N/A

As shown in Table 2 an increase is recorded in every variable of Ebrary usage except page copying with 29.46% decrease between 2011 and 2012. Table 1 shows good coincidence between Ebrary subject areas

and the teaching and learning programmes offered by ECU with the exceptions of military and naval science. According to Table 2 the used titles were respectively 0.42 and 0.63 per person in the reported years. Since Ebrary does not record user IDs the number of ECU e-book users on this platform cannot be determined.

ECU academic cycle and user section requests

The use of e-books is linked with ECU academic cycles as evidenced in Table 5 and Figure 1.

Table 5. Month-wise Ebrary Section Requests 2011-2012

Month	Section requests 2011	% of total requests 2011	Section requests 2012	% of total requests 2012	% change, 2011-12
JAN	4	0.001	12,039	1.496	300,875
FEB	6,560	1.176	21,742	2.701	231.43
MAR	68,842	12.344	116,446	14.467	69.15
APR	77,232	13.848	121,759	15.127	57.65
MAY	103,386	18.538	105,614	13.121	2.16
JUN	29,269	5.248	29,641	3.682	1.27
JUL	12,221	2.191	20,795	2.583	70.16
AUG	59,750	10.713	98,888	12.285	65.50
SEP	86,904	15.582	127,041	15.783	46.19
OCT	72,330	12.969	101,820	12.650	40.77
NOV	31,680	5.680	32,633	4.054	3.01
DEC	9,533	1.709	16,508	2.051	73.17
Total	**557,711**	**100**	**804,926**	**100**	**N/A**

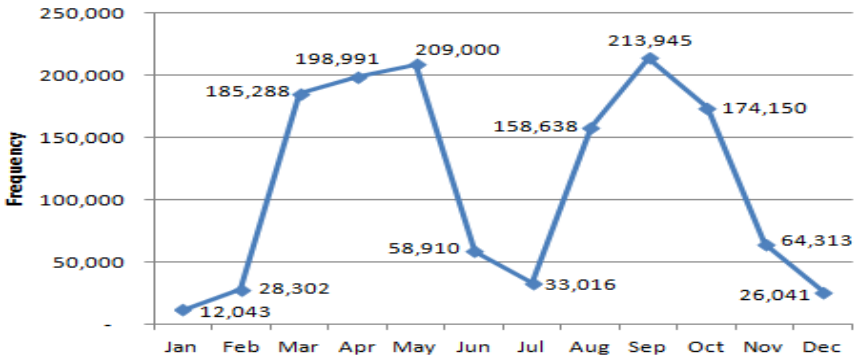

Figure 1. Month-wise user section requests, 2011-2012

May in the first semester and September in the second accounted for most usage followed by April, October, March, and August. These are the months when students prepare and submit their assignments, term papers, and projects. January, February, July, and December are the break months and hence captured comparatively very low usage. Less usage was also seen in the examination months, June and November.

Ebrary e-book titles used

According to Table 2, Ebrary collection (#unique titles) and the titles used increased 7.14% and 48.34% respectively between 2011 and 2012. The ECU community utilised approximately only 15.38% in 2011 and 21.3% in 2012 (average 18.44%) of unique e-books from the Ebrary database. Put differently, 81.56% of Ebrary e-books were never used at ECU in the reported years on average. From among 10,769 titles used in 2011, 2,341 (21.74%) were also used in 2012. In other words, 78% of the titles used in 2011 did not get usage again in 2012. Tables 3 and 4 enlist top 10 most frequently used titles in 2011 and 2012 respectively.

Table 3. Most Frequently Used Ebrary Titles 2011

Rank	Title	Section requests	% of total requests
1	Encyclopedia of elder care: the comprehensive resource on geriatric and social care	5,482	0.98
2	Social psychology	3,088	0.55
3	Discipline with dignity: new challenges, new solutions (3rd edition)	2,620	0.47
4	Teachers and assistants working together: a handbook	2,062	0.37
5	Britannica concise encyclopedia	1,943	0.35
6	Classroom instruction that works: research-based strategies for increasing student achievement	1,940	0.35
7	Perimeter security	1,924	0.35
8	Multiple intelligences: new horizons	1,773	0.32
9	Feminine endings: music, gender, and sexuality	1,717	0.31
10	Strategic human resource management: a guide to action (4th edition)	1,612	0.29
	Total	**24,161**	**4.34**

No definitive conclusion is possible about this behaviour. Changes in reading lists and assessments result in shifts of title use and collection utilisation by subject. However, no data are available about such changes. What is clear, however, is that engagement grew with an increase in titles used by 48.34%.

Ebrary data analysis also showed that the top 10% of the used titles accounted for 60% and 65% (average 62.50%) of usage (section requests) respectively in 2011 and 2012. The trend is even plainer when it comes to the top 20% of titles, where the figures are 77% and 80% respectively. The trend is consistent with some titles having the status of textbooks and/or embedded courseware links. Section requests are calculated as sum of the number of pages viewed/copied/printed, pdf chapter/range and/or full-document downloads. Most variables of Ebrary usage reports are not comprehensive, for example, a unique title used might comprise only a single page view of ten seconds. A page printed/copied might comprise only one sentence or one or fewer lines of a page. Ebrary log files yield fewer insights due to limitations of the nature and extent of data collection.

Table 4. Most Frequently Used Ebrary Titles 2012

Rank	Title	Section requests	% of total requests
1	Britannica concise encyclopedia	10,942	1.36
2	Social work skills: a practice handbook	8,405	1.04
3	Dictionary of human geography (5th edition)	8,269	1.03
4	Why the humanities matter: a commonsense approach	5,298	0.66
5	When chicken soup isn't enough: stories of nurses standing up for themselves, their patients, and their profession	5,188	0.65
6	Humanism	4,399	0.55
7	Historical performance of music: an introduction	4,118	0.51
8	Psychology of food choice (frontiers in nutritional sciences, volume 3)	3,665	0.46
9	Medicines: the comprehensive guide (6th ed.)	3,296	0.41
10	Uprootings/regroundings: questions of home and migration	3,218	0.40
	Total	**56,798**	**7.07**

Subject-wise usage

Tables 6 and 7 list most frequent subjects year-wise. Based on section requests, 211 and 276 Ebrary titles with 400 or more section requests were selected respectively from 2011 and 2012 usage reports.

Table 6. Subject-wise Ebrary Usage 2011

Rank	Subject	Section requests	% of total requests
1	Medicine & Health	29,318	5.26
2	Education	25,384	4.56
3	Social Sciences*	21,884	3.92
4	Psychology	21,003	3.77
5	Business & Management	13,526	2.43
6	Computing	6,826	1.22
7	Engineering & Technology	5,464	0.98
8	Political Science	5,278	0.95
9	History	4,055	0.73
10	Geography & Travel	3,554	0.64
11	Music	3,533	0.63
12	Philosophy	2,949	0.53
13	General	2,413	0.43
14	Language & Literature	2,309	0.41
15	Economics	2,154	0.39
16	Arts	1,736	0.31
Total		**151,386**	**27.16**

*DDC22 (301-307, 360-369) (Dewey, 2003)

These titles were assigned broader subjects using LCSH and descriptors from Google e-books. According to Tables 6 and 7 ranked on the basis of 1,000 or more section requests, sixteen (16) and 21 subjects accounted for 27.16% and 32.4% of usage (section requests) respectively in 2011 and 2012 with medicine & health, education, psychology, and social sciences being the most frequent. Most other subjects in both the years were same except environmental science in 2011 and agriculture, law, media, and physics in 2012. The usage percentage of these subjects would be much more if all the viewed titles are analyzed subject-wise. However, the usage reports provided to researcher did not list subject headings, keywords or Dewey numbers.

Table 7. Subject-wise Ebrary Usage 2012

Rank	Subject	Section requests	% of total requests
1	Social Sciences*	55,069	6.84
2	Medicine & Health	46,383	5.76
3	Education	32,245	4.01
4	Psychology	18,330	2.28
5	General	15,859	1.97
6	Computing	13,258	1.65
7	Business & Management	12,925	1.61
8	Language & Literature	10,518	1.31
9	History	8,608	1.07
10	Political Science	8,405	1.04
11	Economics	7,249	0.90
12	Philosophy	6,157	0.77
13	Music	4,825	0.60
14	Biology	4,113	0.51
15	Engineering & Technology	3,625	0.45
16	Agriculture	3,350	0.42
17	Arts	3,085	0.39
18	Geography & Travel	2,197	0.27
19	Media	1,572	0.20
20	Physics	1,420	0.18
21	Law	1,327	0.17
Total		**260,520**	**32.4**

*DDC22 (301-307, 360-369) (Dewey, 2003)

Publisher analysis

The e-books used in 2011 and 2012 respectively belonged to 379 and 491 publishers. The most frequent 12 publishers each were selected from both the years. These publishers accounted usage for more than 36% of titles and 43% of section requests on average in two reported years (see Tables 8 and 9). In both the years, nine (09) publishers were same and three each were different.

In a nutshell, 28 unique publishers made a lion's share in both the years in terms of number of titles and their section requests. McGraw-Hill, Routledge, Wiley, and Oxford University Press were the most frequent.

Table 8. Publishers Analysis at Ebrary 2011

Rank	Publisher	# of titles used	% of total titles used	Section requests	% of all requests
1	McGraw-Hill	847	7.87	62,424	11.19
2	Routledge	758	7.04	49,356	8.85
3	Oxford University	565	5.25	26,519	4.76
4	Wiley	302	2.80	19,720	3.54
5	Jessica Kingsley	306	2.84	19,125	3.43
6	Open University	150	1.39	16,075	2.89
7	Springer	130	1.21	14,349	2.58
8	Cambridge University	358	3.32	13,091	2.35
9	Ashgate	266	2.47	13,400	2.40
10	ASCD	113	1.05	12,443	2.23
11	John Wiley & Sons	156	1.45	11,049	1.98
12	Sage	129	1.20	10,304	1.85
Total		**4080**	**37.89**	**267,855**	**48.05**

Table 9. Publishers Analysis at Ebrary 2012

Rank	Publisher	# of titles used	% of total titles used	Section requests	% of all requests
1	Wiley	689	4.31	51,580	6.41
2	Routledge	810	5.07	51,398	6.39
3	McGraw-Hill	243	1.52	33,888	4.21
4	Open University	219	1.37	33,425	4.15
5	Oxford University	858	5.37	32,491	4.04
6	Cambridge University	409	2.56	20,247	2.52
7	Jessica Kingsley	405	2.54	20,123	2.5
8	Ashgate	506	3.17	18,160	2.26
9	Continuum International	423	2.65	17,457	2.17
10	Global Media	349	2.19	16,988	2.11
11	Springer	209	1.31	12,528	1.56
12	National Academies	398	2.49	11,992	1.49
Total		**5518**	**34.55**	**320,277**	**39.81**

Other metrics

Searches via the Ebrary interface/site increased 39.57% in 2012 relative to 2011, consistent with the increase in titles used (48.34%), section requests (44.33%), and sessions (66.36%). On average per session 3.37 titles were used, 14.28 pages were viewed, and 15.10 section requests were made in each of the reported years. The searches for e-books via the Library interface were unavailable to researcher and, thus, not included in this study.

The pages viewed in the two surveyed years averaged 1,288,770, with approximately 48 pages per unique title used (N = 26,744). Pages copied in the two reported years averaged 11,733, representing less than 1% of the pages viewed. Copying pages decreased 29.46% in 2012 owing to the introduction of chapter/range downloads and full title downloads, subject to a 7 to 14 days DRM loan expiration restriction. Owing to complications of page copying, page printing increased 10.50% in 2012. In total 62,134 pages were printed in two years, 4.82% of the pages viewed. Chapters/ranges (2,475) and entire e-books (1,757) were downloaded in 2012 when new DRM loan options became available. Full titles downloaded were 11% of the titles used in 2012.

Discussion and Conclusion

The ECU academic community utilised only 15.38% in 2011 and 21.3% in 2012 (average 18.44%) of e-books from the Ebrary database. Put differently, 84.62% and 78.7% (average 81.56%) of Ebrary e-books were never used at ECU in 2011 and 2012, respectively. Twenty-two percent (22%) of the used titles in 2011 received usage again in 2012. The top 20% of the used titles accounted for 77% and 80% (average 78.5%) of usage (section requests) in 2011 and 2012, respectively. The most frequent subject areas included health and medicine, social sciences, and education. This result also is consistent with embedded courseware links as an independent and controlling variable and how academic adoption of e-book texts fundamentally shapes behaviour. The use of Ebrary e-books is linked with ECU academic calendar; May in the first semester and September in the second accounted for most usage followed by April, October, March, and August. These are the months when students study and prepare and submit their assignments, term papers, and projects. Low and lowest usage was observed in exam months, June and November, and during semester breaks, respectively.

An increase in 2012 from 2011 was recorded in different use metrics, for example, searches (39.57%), titles used (48.34%), section requests (44.33%), and sessions (66.36%). On average per session 3.37 titles were

used, 14.28 pages viewed, and 15.10 section requests made in each of two years, 2011 and 2012. Not the entire e-book but only 48 pages per unique title used were viewed in each of two reported years on average. Pages copied in two years were merely 0.91% of the pages viewed. Page copying decreased 29.46% in 2012. Explanation of this decrease includes copy restrictions (maximum 30% of pages) and complications of copying page by page, one page at a time, by selecting the desired text. Contrarily, page printing increased 10.50% in 2012. Pages printed in two years were 4.82% of the pages viewed. Page printing is much easier than page copying owing to option of range selection. Full titles downloaded were 11% of the total titles used in 2012. Figure 2 presents a summary view of Ebrary use at ECU in two years, 2011-2012, across all the variables of interest.

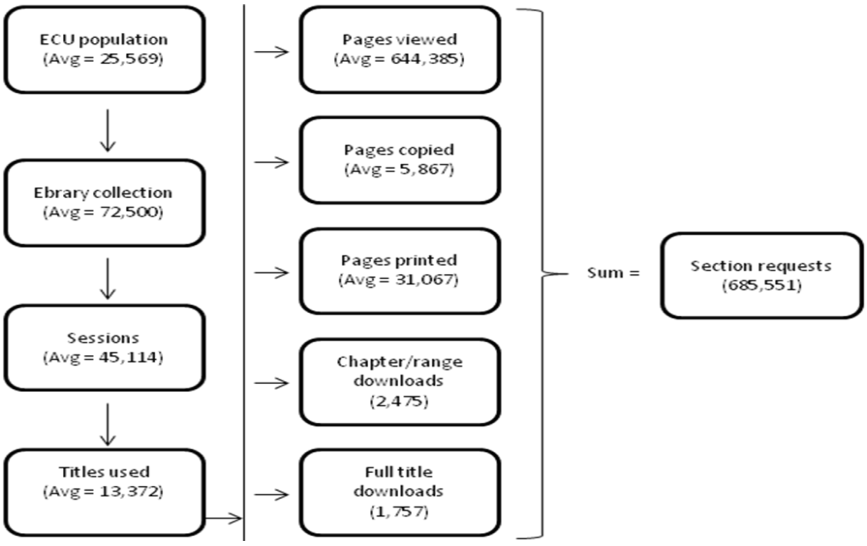

Figure 2. Overall Ebrary e-books use at ECU 2011-2012

The analysis of system-generated dataset explored the patterns of e-book use (way and extent) on Ebrary platform in the case study academic and research library. A pattern of growth was observed with Ebrary, subject to the limitation that log files did not describe browsers, users, and time spent, but only titles used. Increasing engagement of the ECU community was observed with more titles used between 2011 (10,769 titles) and 2012 (15,975 titles) - an increase of 48.34% in the number of titles used. Exploration of titles was disappointing, with only 18.44% of

the Ebrary titles used in the two reported years on average, conforming to Trueswell's 20/80 rule or Juran's Vital Few Principle, sometimes incorrectly referred to as the Pareto Principle (Eldredge, 1998, p. 496). Seventy-eight percent (78%) of the titles used in 2011 did not get usage again in 2012 suggesting that past usage may not be a good predictor of future usage (Bucknell, 2010). A definitive explanation of the lower than expected adoption found in log files is elusive. The contemporary literature showed similar findings, for example, only the 10% of Ebrary titles were used at the Hacettepe University, Turkey (Al, Soydal, & Tonta, 2010); a small number of titles accounted for a large percentage of usage annually, and 97% of the Ebrary e-books were never accessed at the McGill University, Canada (Lannon & McKinnon, 2013). Groves (2014) found through student citations that same e-book titles on Google were used more than those from library collections at the University of Sussex. Other findings in this study are also consistent with Ebrary-based previous studies (e.g. Lamothe, 2010; Sprague & Hunter, 2008; Tucker, 2012). According to Zhang and Kudva (2014), e-book adoption may vary by individual demographic, contextual, and situational factors.

Review of the Ebrary's collection list (vide Table 1) showed that programme subjects are well represented in e-book collections by discipline. Possible reasons of non-adoption, therefore, might include:

- Academics choose not to engage students with e-book titles, preferring journals and p-books. The research did not have access to datasets enabling this problem to be investigated further. The key role played by academic referrers in adoption is widely reported in the literature (e.g., Content Complete and OnlyConnect Consultancy, 2009; JISC, 2009; Lin et al., 2010; Rowlands et al., 2007).
- Users are resistant to the format. The major reasons of non-use explored in the peer reviewed literature (e.g., Ashcroft, 2011; Asunka, 2013; Boness, 2009; Borchert et al., 2009; Croft & Davis, 2010; Howard, 2013; McLure & Hoseth, 2012; Rojeski, 2012; Shelburne, 2009; Walton, 2012) comprised lack of awareness, preference for and use of physical books exclusively, issues of findability in the library catalogue, DRM limitations on e-books, unpleasant to use in terms of difficulty in prolonged screen reading and quality of content, login and internet connectivity problems, cumbersome e-book interface, varied platforms and reader devices, and insufficient especially textbook e-titles.

How can apparent underutilisation of the e-book titles be explained? Lamothe (2013) argues that insight comes from comparing the number of searches with use metrics (e.g., number of viewings, titles browsed and titles read). This may be useful to explore information retrieval and collection issues, for example, query efficiency and discovery tool efficiency in terms of precision and recall (Ahmad & Brogan, 2012), and title sufficiency to meet information needs (Shin, 2011); culture of use, for example, where habit/automaticity operates with the results of searches for e-books as it does with a Google results list where most people do not go beyond the first page of a results list; and immaturity of use – longevity of user experience (e.g. years in higher education), and programme context (undergraduate vs. postgraduate) involve different information behaviour. Most of the collection would consequently remain unexplored if most reading behaviour entailed these factors and crossover effects (culture of use/automaticity) resulting in gaps in the volume of use and the number of users.

The study suggests that ARLs face the challenge not only of building engagement, but also shifting behaviour from nascent to mature use. The research-oriented literature suggests that one element of a successful response to this challenge is the capability of dynamically profiling user behavior contained in log files and to offer individualised experience.

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.

Al, U., Soydal, I., & Tonta, Y. (2010). Analysis of e-book use: The case of Ebrary. *Proceedings of the 14th International Conference on Electronic Publishing* (pp. 315-329). Helsinki, Finland: Hanken School of Economics.

Ashcroft, L. (2011). Ebooks in libraries: An overview of the current situation. *LibraryManagement, 32*(6/7), 398-407.

Asunka, S. (2013). The viability of e-textbooks in developing countries: Ghanaian university students' perceptions. *Open Learning: The Journal of Open, Distance and e-Learning, 28*(1), 36-50.

Boness, M. (2009, January). *E-nhancing e-resourcefulness*. Paper presented at the ALIA, Information Online 2009 Conference, Sydney, Australia. Retrieved July 27, 2011, from http://conferences.alia.org.au/online2009/docs/PresentationA4.pdf

Borchert, M., Hunter, A., Macdonald, D., & Tittel, C. (2009). *A study on*

student and staff awareness, acceptance and usage of e-books at two Queensland universities. Retrieved June 2, 2011, from http://eprints.usq.edu.au/4876/

Bucknell, T. (2010) The 'big deal' approach to acquiring e-books: A usage-based study. *Serials,* 23(2), 126-134.

CAUL. (2012). *Briefing paper on etextbooks and third party elearning products and their implications for Australian university libraries.* Unpublished.

Content Complete Ltd and OnlyConnect Consultancy. (2009). *Study on the management* and economic impact of e-textbook business models on publishers, e-book aggregators and higher education institutions: Phase one report (public version). Retrieved from JISC National E-books Observatory Project website.

COUNTER. (2013). *About COUNTER*. Retrieved August 15, 2013, from http://www.projectcounter.org/about.html

Croft, R., & Davis, C. (2010). E-books revisited: Surveying student e-book usage in a distributed learning academic library 6 years later. *Journal of Library Administration, 50*(5), 543-569.

Crosetto, A. (2011). The use and preservation of e-books. In S. Polanka (Ed.), *No shelf required: E-books in libraries* (pp. 125-134). Chicago: American Library Association.

D'Ambra, J., & Wilson, C. S. (2013). Application of the task-technology fit model to structure and evaluate the adoption of e-books by academics. *Journal of the American Society for Information Science and Technology, 64*(1), 48-64.

Dewey, M. (2003). *Dewey decimal classification and relative index* (22nd ed.). Albany, NY: OCLC.

Ebrary. (2012, June 18). *Ebrary announces extended access* [press release]. Retrieved October, 15, 2013, from http://www.ebrary.com/corp/newspdf/ebrary_extended_access.pdf

Ebrary. (2013). *Company*. Retrieved October 15, 2013, from http://www.ebrary.com/corp/company.jsp

Edith Cowan University. (2013). *Annual report 2012*. Retrieved April 14, 2013, from http://www.ecu.edu.au/about-ecu/reports-and-plans/annual-reports

Eldredge, J. D. (1998). The vital few meet the trivial many: Unexpected use patterns in a monographs collection. *Bulletin of the Medical Library Association*, 86(4), 496-503.

Groves, A. (2014). What's the use?:Analysing student citations to provide new insights into e-book usage. *Insights*, 27(2), 198-204.

Howard, D. (2013, March). *Ebooks: A university perspective*. Paper presented at the ALIA Ebooks and Elending Think Tank, State Library of Western Australian, Perth, Western Australia. Unpublished.

Huthwaite, A., McClintock, A., Sinnamon, B., & Sondergeld, P. (2011, February). *Ebook readers: Separating the hype from reality*. Paper presented at the Information Online Conference, Australian Library and Information Association, Sydney, Australia.

JISC. (2009). *JISC national e-books observatory project: Key findings and recommendations (final report)*. Retrieved April 14, 2011, from JISC National E-books Observatory Project website http://www.jiscebooksproject.org/reports

Lamothe, A. (2010). Electronic book usage patterns as observed at an academic library: Searches and viewings. *Partnership: the Canadian Journal of Library and Information Practice and Research*, 5(1), 1-22.

Lamothe, A. (2013). Factors influencing the usage of an electronic book collection: Size of the e-book collection, the student population, and the faculty population. *College & Research Libraries,* 74(1), 39-59.

Lannon, A., & McKinnon, D. (2013): Business e-books: What can be learned from vendor supplied statistics? *Journal of Business & Finance Librarianship*, 18(2), 89-99.

Lin, C., Tzeng, G., Chin, Y., & Chang, C. (2010). Recommendation sources on the intention to use e-books in academic digital libraries. *The Electronic Library*, *28*(6), 844-857.

McLure, M., & Hoseth, A. (2012). Patron-driven e-book use and users' e-book perceptions: A snapshot. *Collection Building*, 31(4), 136-147.

Moore, W., MacCreery, N., & Marlow, M. (n.d.). *Usage measurements for digital content: White paper.* Retrieved May 11, 2011 from http://www.springer.com

Polanka, S. (Ed.). (2011). *No shelf required: E-books in libraries*. Chicago: American Library Association. Retrieved from ECU-EBL database http://www.ecu.eblib.com.au

ProQuest. (n.d.). *Ebrary*. Retrieved October 15, 2013, from http://www.proquest.co.uk/en-UK/products/brands/pl_Ebrary.shtml

Reitz, J. M. (2017). Electronic book. In *ODLIS – online dictionary for library and information science*. Retrieved August 8, 2017, from

http://www.abc-clio.com/ODLIS/odlis_e.aspx#electronicbook

Rojeski, M. (2012). User perceptions of ebooks versus print books for class reserves in an academic library. *Reference Services Review*, 40(2), 228-241.

Rowlands, I., Nicholas, D., Jamali, H.R., & Huntington, P. (2007). What do faculty and students really think about e-books? *Aslib Proceedings: New Information Perspectives, 59*(6), 489-511.

Schell, L. (2011). The academic library e-book. In S. Polanka (Ed.), *No shelf required: E-books in libraries* (pp. 75-93). Chicago: American Library Association.

Schmidt, L. M. (2013). From the editor: E-books building the new subscription library. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve*, 23(1), 1-3.

Shelburne, W. A. (2009). E-book usage in an academic library: User attitudes and behaviors. *Library Collections, Acquisitions, & Technical Services, 33*, 59-72.

Shin, D. (2011). Understanding e-book users: Uses and gratification expectancy model. *New Media & Society, 13*(2), 260-278.

Sprague, N., & Hunter, B. (2008). Assessing e-books. *Library Collections, Acquisitions, and Technical Services*, 32(3-4), 150-157.

Stokker, J., & Hallam, G. (2009). The right person, in the right job, with the right skills, at the right time: A workforce-planning model that goes beyond metrics. *Library Management, 15*(8/9), 561-571.

Tucker, J. C. (2012). Ebook collection analysis: Subject and publisher trends. *Collection Building*, 31(2), 40-48.

Walton, E. W. (2012). *Factors affecting the adoption of electronic books by undergraduate students in a small, Midwestern, liberal arts university* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database (UMI No. 3535832).

Wells, D., & Dumbell, P. (2010, February). *Ebook usage at Curtin University Library: Patterns, projections and strategy*. Paper presented at the VALA2010 15th Biennial Conference and Exhibition, Melbourne, Australia.

Zhang, Y., & Kudva, S. (2014). E-books versus print books: Readers' choices and preferences across contexts. *Journal of the Association for Information Science and Technology*, 65(8), 1695-1706.