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In 2012, InfoSci@ECU featured research by PhD student Pervaiz Ahmad on E-book Adoption in Academic and Research Libraries. This presentation introduced the methods of deep log analysis of EBL transaction logs in a case study academic library. In 2013 this research has moved on to how transaction log analysis can dynamically inform discovery services in library systems and to research university community perception of E-book services. In the last InfoSci@ECU seminar for 2013, Pervaiz will provide an update on his research addressing the themes of dynamic analysis of log behaviour as a means of shaping user experience and academic and student perceptions and attitudes to E-books.

Audience:

The seminar will be of interest to LIS practitioners interested in E-book adoption and the use of data mining techniques with transaction logs.

This Presentation is posted at Research Online.

<https://ro.ecu.edu.au/cinfosci/5>

InfoSci@ECU

E-book Adoption in Academic & Research Libraries: Self Reported Information Behaviour

Pervaiz Ahmad
(PhD Candidate)
(27 November, 2013)

E-book Adoption in Academic and Research Libraries

- PhD Topic
 - What patterns of E-book use exist in academic and research libraries?
 - How can these patterns of E-books used be understood?
 - Are use and behaviour consistent with the major models of technology adoption?
 - What intervening and control variables significantly affect use and behaviour?

Stage 1 Update on Log analysis

- Stage 1 involved DLA of three years worth of EBL transaction data and 2 years of Ebrary data from the case study library – ECU
- Results previously presented at InfoSci@ECU in 2012 based on 2010 logs
 - Now 2010, 2011 & 2012 (EBL), 2011 & 2012 (Ebrary)



Findings Summary: EBL, 2010-2012

- 38% of ECU population (29,525 users, 21,663 unique) made use of EBL e-books.
- Increase in all use metrics, but decrease in minutes total in 2012 (7% from 2010, and 42% from 2011). Likely reasons: skim or reference use, DRM, preference for offline use via downloading (ADE) or printouts.
- Minutes total, 2010-2012 (Mean 22, Median 2, Mode 0).
- 85% of transactions/views by minutes are below 10 minutes; 0-minute views are 31%.
- 56% of browsing transactions didn't enter the reading mode.
- 46,042 titles (35,620 unique) were used. Overall 8% of EBL e-books were browsed and 5% were read.
- 66% of browsing users, and 55% of browsed titles entered the reading mode.



Findings Summary: EBL, 2010-2012

- 45% of users and 61% of used titles fall below 10 minutes category.
- Top 15% of users consumed 83% of total minutes.
- Top 20% of users made 67% of all views/transactions.
- 15% of all views/transactions and unique users accounted for around half of the sessions.
- Top 10% of titles consumed 83% of total minutes and top 20% of titles accounted for 68% of all views.
- E-book use is around ECU academic cycles. March, April, May (Sem 1) and August, Sept., October (Sem 2) are the frequent use months.
- Monday and 11am to 3pm is the most frequent day and time range of e-book use, respectively.
- 10,735 unique titles (23% of used e-books) owned by ECU Library accounted for 53% of transactions/views and 63% of minutes.

Findings Summary: Ebrary, 2011-2012

- Increase in all use metrics, but 29% decrease in pages copied in 2012. Likely reasons: copying page by page, one page at a time.
- 18% of ebrary titles were used (26,744 titles, 24,403 unique).
- Top 20% of titles accounted for 79% of usage (section requests).
- Frequent e-book subject areas were medicine & health, social sciences, education, psychology, business & management, and computing.
- E-book use is around ECU academic timetable.
- EBL Vs ebrary collection.

Stage I – Why DLA might be useful?

- The researchers wondered whether log analysis could reliably predict user behavior
 - If prediction is possible and reliable the user experience might be customized in ways that enhance the user experience
 - Power users v non-power users

Why DLA might be useful? EBL Power users

- An academic e-book Power user (PU) is conceptualised as a user with a pattern of use that describes intensity very different from the average user. This pattern of use references exploratory and serendipitous behaviour as well as frequency or intensity as measured by minutes spent in browsing and reading unique titles.
- Formula (1000 mins, 10 unique titles, one year).
- Predictor variables: Minutes Max, Sessions, Titles Browsed, Titles Read, and Unique Titles.
- Binary Logistic Regression (BLR) analysis used to generate an equation to classify users as 'power users or non-power users' showed 91.7% success rate (99.2% for PUs, and 89.2% for NPUs). EBL 2010 dataset was used as a base.

Why DLA might be useful? EBL Power users...

- BLR equation:

$$\text{Probability of identifying a PU} = \frac{e^x}{1+e^x}$$

Where $x = \{(0.003 \times \text{minutes max}) + (0.371 \times \text{sessions}) - (0.265 \times \text{titles browsed}) + 0.139 \times \text{titles read} + (0.547 \times \text{unique titles}) - 9.421\}$.

- Validity and Reliability testing of the BLR Model
 - ROC analysis: area under the curve (.990, $p < .001$) for PU.
 - Testing on 2011 and 2012 datasets: overall prediction success was 95.5% (2011) and 86.5% (2012).
- Most PUs are in medicine & health, business & management, social sciences, education, psychology, computing, media, and engineering.

Stage II: Self Reported Information Behaviour

- Why?
 - Multiple methods are required to understand user behavior
 - Not all questions can be answered from log analysis e.g.
 - Reasons for use and non-use
 - Culture of use
 - Accessibility, utility & usability
- Semi-structured questionnaire
- April-September, 2013
- Online with Qualtrics
- ECU community (faculty, students, staff)

ECU Population 2012

Role	#	%
Academics	752	3.96
General staff	1,137	4.48
Students	23,515	92.56
Total	25,404	100

Survey Response Rate (n = 315)

Cluster	Sample size	Response size	% Response rate
Academics	261	26	10
Students	393	232	59
General staff	296	33	11
Sum cluster	950	291	31
Overall	950	315	33

Mode of Student Study (r = 230)

Mode	r	%
On-campus*	162	70
Off-campus	29	13
Both (mixed mode)	39	17

* 62% in ECU student population.

Programme/Level of Student Study ($r = 227$)

Programme	r	%
Undergraduate*	137	60.4
Graduate, Masters (coursework)	62	27.3
Honours and HDR	28	12.3

* 79% in ECU student population.

Major Field of Study/Work (r = 273)

Field	r	%
Faculty of Health, Engineering and Science (FHES)*	166	61
Faculty of Education and Arts (FEA)	69	25
Faculty of Business and Law (FBL)	12	4
Other (non-teaching) departments	26	10

* 44% in ECU population.

Gender (r = 288)

Gender	r	%
Female*	147	51
Male	141	49

* 62% students; approx around 65% overall in ECU population.

Age (r = 287)

Age group	r	%
18-24 years	116	40
25-33 years	53	19
34-42 years	63	22
43-51 years	31	11
52-60 years	18	6
61 years or older	6	2

Years at ECU ($r = 288$)

Year(s)	r	%
Less than a year	100	35
1-2 years	63	22
3-5 years	80	28
6-9 years	19	7
10 or more years	26	9

Use of E-books (r = 315)

	Yes	No	Don't know	Row total
I use ECU Library e-books	213 (68%)	99 (31%)	3 (1%)	315 (100%)
I use e-books sourced from other providers	190 (60%)	112 (36%)	13 (4%)	315 (100%)

Crosstabs: 140 (44%) and 50 (16%) are respectively concurrent users and non-users of ECU E-books and E-books sourced from other providers.

E-book Users/Non-users by role

	I use ECU Library e-books (n = 291)			I use e-books sourced from other providers (n = 291)		
	Yes	No	Don't know	Yes	No	Don't know
Faculty	19	7	0	16	10	0
Students	156	73	3	136	84	12
General staff	21	12	0	21	12	0
Total (%)	196 (67%)	92 (32%)	3 (1%)	173 (59.5%)	106 (36.4%)	12 (4.1%)

Student Non-users:

- Majority of student non-users were:
 - on-campus,
 - undergraduate,
 - FHES,
 - male.
 - 18-24 years of age,
 - Span at ECU < a year
 - Non use is more likely with other e-books than ECU's (n = 300, Chi-Square = 11.654, $p < .002$)
 - For many students the E-book experience is significantly shaped by Library E-books

Crosstab :

Demographic Effects on ECU E-book Use

- Females tend to use ECU e-books more than males (n = 275, Chi-Square = 7.473, $p < .007$).
- Postgraduate coursework students tend to use ECU e-books more than the students in other programmes (n = 214, Chi-Square = 10.904, $p < .005$).
- Age group 43-51 is likely to have less percentage of non-users of ECU e-books than other age groups (n = 274, Chi-Square = 13.215, $p < .022$).
- Respondents with 3-5 years at ECU tend to use ECU e-books more than the respondents in other year categories (n= 275, Chi-Square = 12.443, $p < .015$) (consistent with Walton, 2012) .

Reasons of Non-use (r=98)

Reason	Faculty	Students	Staff	Un-known	Row Total	%
Unaware of the service	3	28	4	6	41	42
Prefer and use hard copy books exclusively	1	32	2	1	36	37
Don't know how to find them in the library catalogue	2	22	3	4	31	32
Limitations on access, copying, printing and download frustrate me	1	19	4	0	24	24
Unpleasant to use	2	19	0	0	21	21

Perception of ECU Library E-books: (Scale: 1-SD, 2-D, 3-U, 4-A, 5-SA)

Statement	Mode	Statement	Mode
Prefer hard copy books to e-books	4	Library interface is easy to use	4
Prior personal experience of using e-books	4	Current Library e-book collections satisfy my needs	3
Using Library e-books when no physical counterpart	4	Library e-book formats are attractive	3
using Library e-books due to convenience & functionality	4	Existing e-book customization features are inadequate	3
Frustration on restrictions (copy, print, download)	4	Using library e-books is a pleasant experience	3
Typically, using embedded links to access e-books	4	Library e-books are suitable for longer reading	2
Typically, skim reading; most use for quick fact finding	4	Satisfaction overall and continuance intention	4

Crosstab : Perception of ECU Library E-books

- Females were likely to be more aware about the ECU provision of e-books than males (n = 279, Chi-Square = 14.28, p < .003).
- Age group 18-24 was more likely to access e-books via embedded courseware links (n = 280, Chi-Square = 38.91, p < .001).
- Age group 25-33 was more likely to make reference use of e-books (n = 278, Chi-Square = 39.39.58, p < .003).

Perception of ECU Library E-books: Preference for Format

- 57% of respondents preferred physical books to e-books. May be around 67% if “undecided” responses divided ($r = 309$) (consistent with Batanek, 2013).
- Crosstab: On-campus students (76%) tend to prefer hard copy books to e-books more than the students in other modes ($n = 228$, Chi-Square = 16.06, $p < .043$).

Crosstab:

Overall satisfaction and dimensions of the user experience

1. Users who were satisfied with e-book collection sufficiency were more likely to be satisfied overall (n = 289, Chi-Square = 165.7, $p < .001$). Also moderate, positive correlation ($r_s = .53$, $p < .001$). Satisfaction increases when perception of e-book collection sufficiency increases.
2. Users who found the library interface for finding e-books easy to use were more likely to be satisfied overall (n = 287, Chi-Square = 129, $p < .001$)
3. Users who found library e-books convenient and accessible to use were more likely to be satisfied overall (n = 289, Chi-Square = 107.7, $p < .001$),
4. Users who found e-book formats attractive were more likely to be satisfied overall (n = 287, Chi-Square = 87.5, $p < .001$),

Crosstab:

Overall satisfaction and dimensions of the user experience

5. Users who found existing library e-book customisation features inadequate were less likely to be satisfied overall (n = 285, Chi-Square = 80, $p < .001$),
6. Users who experienced the use of library e-books pleasant were more likely to be satisfied overall (n = 289, Chi-Square = 71, $p < .001$),
7. Users who were satisfied with e-book searchability were more likely to be satisfied overall (n = 288, Chi-Square = 59.5, $p < .008$),
8. Users who found library e-book access, copy and print frustrating were less likely to be satisfied overall (n = 284, Chi-Square = 54.7, $p < .005$),

Crosstab:

Overall satisfaction and dimensions of the user experience

9. User reaction to the size of e-book text window is related to rated overall satisfaction (n = 286, Chi-Square = 50, $p < .008$),
10. Users who experienced no problems in accessing library e-books over the internet were more likely to be satisfied overall (n = 287, Chi-Square = 54, $p < .013$),
11. Users who found library e-books hard to read on their screen were less likely to be satisfied overall (n = 288, Chi-Square = 40, $p < .010$), and
12. Users who were typically skim readers of e-books were more likely to be satisfied overall (n = 287, Chi-Square = 39, $p < .010$).

Crosstab:

Overall satisfaction v Continuance intention

- Satisfaction has a large effect on continuance intention (57%) (n=290, Chi-Square = 94.53, $p < .002$).
- There is a great probability that a satisfied user would continue using e-books in future.

Use of Electronic Resources and Platforms (scale : 1-Never, 2, 3, 4, 5-Often)

Platform or Resource	r	Mode
Laptop, netbook	296	5
Smartphone	296	5
Social media (e.g., Facebook, Twitter, Youtube)	296	5
Desktop PC	296	5
Library e-journals	296	3
iPad	295	1
Online games	296	1
Tablet (other than iPad)	295	1
E-book reader	296	1

Users' Satisfaction Level with E-book Platforms (scale: 1-VU, 2-U, 3-N, 4-S, 5-VS)

Platform	r	Mode
Laptop, netbook	237	4
Desktop PC	230	4
iPad	221	3
Tablet (other than iPad)	210	3
Kindle	202	3
Other E-book reader	204	3
Smartphone	218	3
Kobo	198	3

Crosstab:

Platforms and overall satisfaction with ECU library E-books & continuance intention

- Users who were dissatisfied with the laptop as a user agent were (1) likely to be dissatisfied overall with ECU e-books ($n=232$, Chi-square = 41.123, $p < .003$), and (2) less likely to express continuance intention ($n=233$, Chi-square = 34.973, $p < .001$).
 - Laptop is the most common user agent!
- Hence, platform plays an important role as an additional factor of user satisfaction overall with ECU e-books and continuance intention.

Purpose of E-book Use (r = 245) (multiple answers)

Purpose	r	%
Assignments (coursework)	171	70
Study (course reading)	156	64
General knowledge	132	54
Thesis/Research	119	49
Fun/recreation	84	34
Exams	71	29

Methods of Accessing E-books (r=240) (multiple answers)

Method	r	%
Library catalogue	169	70
Library's OneSearch	144	60
Library databases	143	60
Google Scholar	119	50
Links via unit's suggested readings	115	48
Links via unit's compulsory readings	99	41
Google search engine	99	41
Google e-books	88	37

Themes of Open-ended Comments ($r = 67$)

Theme	r	%
Limitations/DRM	10	15
Usability	10	15
Verisimilitude, Intimacy, Preference	9	13
Platform/Devices	9	13
Collection sufficiency & integration	6	9
Accessibility	5	7
Miscellaneous	5	7

Open-ended Comments: Limitations/DRM

- “... most eBooks cost a snuck [much] as a physical book. And ... the loan is only for a day and is only accessible via BlueReader app on an iPad ... However, when an ebook is all that is available, and it is only accessible for a day and cannot be printed - the student suffers inconvenience as a result if [of] this technological shift”.

Open-ended Comments: Limitations/DRM

- “Ebooks need to be far more user-friendly -- especially in terms of transferring and reading on mobile devices such as iPads. The 'borrowing' experience should mirror more closely that of a physical book. As in, longer loan periods (especially for postrgrads [sic] I would ideally like to be able to easily download library ebooks onto my iPad and keep them there for at least a couple of months before needing to reissue”.
- “Make E-books permanently available, not so they will disappear after X amount of days after having been downloaded”.

Open-ended Comments: Usability

- Most common issue was the eye strain and headache especially in longer reading.
- “Paper books are easier to read and quicker to scan through”.
- “... Most of the time it [e-book] freezes and cuts you off while doing downloads”.
- Other issues involved jarring text when scrolling, small viewing area, unsmooth and time-consuming navigation between pages, and uneasy flicking.

Open-ended Comments: Verisimilitude, Intimacy and Preference

- “... The actual sensory feeling of picking up a book and reading it, adds to the pleasure - while reading a book on a tablet is devoid of that sense and seems abstract”.
- “I find it more productive to read from hard copy books”.
- “I don't find them [e-books] interested”.



Open-ended Comments: Platform/Devices

- “device's native ebook reader, in particular iOS devices, works fine. ECU library eBook should be integrated with such native app for a seamless [sic] sync and more efficient use”.
- “I use a kindle for ‘recreation reading’ and laptop for accessing [sic] library ebooks for uni coursework & assignments”.

Open-ended Comments:

Collection sufficiency & integration

- “...Unfortunately not all courses have ebooks ...”
- “... E-books are good for general background research but are limited in your ability to have multiple information sources sitting side-by-side for analysis”.
- “I would like to see some of the popular books from the library turned into e-books so that everyone can access them”.
- “Nothing is as good as the real thing but the ability to access it from anywhere makes it a very valuable tool. I wish that they had more books available online”.

Open-ended Comments: Accessibility

- “It is slightly complicated to access the e-books via the links on [ECU] library onesearch”.
- “The proxy access at ecu [ECU] is poor and clearly ignores the students ability to access the desired links and ebooks. There is limited access to the whole information of an ebook and sometimes only shows samples. ECU internet security needs to be updated”.
- Internet connectivity and speed problems (2).

Open-ended Comments: Miscellaneous

- “Sometimes using ebooks provide other challenges in terms of having the correct citations for the ebooks used. Quite often, ebooks have different publication information eg year of publication even though they are the exact edition of the print version. Publication standards for ebook should be improved”.
- Availability of same titles on Google.

Open-ended Comments: Miscellaneous...

- “...prefer E-book on Ipad during lecture time. because tables in lecture theatures [sic] are too small for large, heavy textbooks. Prefer physical textbooks at home/library due to personal experience”.
- “... Academic e-books are for skimming and finding useful information for assignments etc”.
- “Tend to use ebooks for specific technical knowledge rather than general research”.

Open-ended Comments: Miscellaneous...

- “I think that the ECU Library One Search can be a little non-user friendly. If i search for a phrase or keywords from a certain date in texts that aren't newspaper articles, then when I change my search in the search box, I have to then input all my parameters again which gets frustrating after a while, especially if you keep forgetting that you have to input your preferences again”.

Open-ended Comments: Miscellaneous...

- “ePub are currently poorly defined, iBooks, pdfs are different and many journals are coming out with their own readers”.
- “... Older generations ... are generally less multimedia literate. Especially across the elderly where text size begins to play a big part in the popularity of e-books”.
- “I am a middle aged ... I am not at all confident with technology and feel very intimidated by it”.

Thanks

Questions and feedback