

Lib-Value Report: Australian National University Postgraduate Students



Carol Tenopir, Rachel Volentine, Lisa Christian, and Miranda Orvis

Center for Information and Communication Studies
University of Tennessee, Knoxville

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Executive Summary

The Lib-Value project measures the value, outcomes, and return on investment of academic library collections and services. This study reports on the value of scholarly reading from the collections of the Australian National University by examining postgraduate students' scholarly reading patterns and comparing their use of the library with other sources for scholarly materials.

In August 2013, Australian National University postgraduate students were invited to participate in a survey of their scholarly reading behavior. We received only 38 responses from a total postgraduate population of 6,689 for a response rate of 0.6%. We decided to go ahead with the analysis, but any conclusions must be made extremely cautiously due to this low response rate. In published studies the ANU responses will be included with those from other Australian universities. The survey asked questions about reading of articles, books, and other scholarly materials from all sources (library-provided, other sources, and social media), and focused on use value (outcomes of reading) and exchange value (time spent obtaining and reading).

Important findings include:

- Sixty-four percent of article readings by Australian National postgraduate students are obtained from a library subscription and all obtained through the library are from electronic collections.
- Postgraduate students obtain books (42%) more often from the library than they purchase them, and 25% of those obtained through the library are e-books.
- The majority of article and book readings are related to postgraduate students' theses/dissertations. Other publications are read a thesis or dissertation or for personal interest.
- Postgraduate students participate in social media more than they create it; their use and creation is more often occasional rather than on a regular basis.
- Social media provides value in inspiring new ideas, although social media has not replaced traditional articles and books for postgraduate students.
- Australian National postgraduate students, on average, spend 254 hours per year of their work time with library-provided material, or the equivalent of 31.75 eight-hour days annually.

Introduction

Graduate students now have many choices of where and how to access scholarly articles, books, or other materials. Time, cost, and electronic availability are all factors in their decision of which materials to select, and, by providing the highest-quality material in a convenient manner, libraries can ensure they are receiving the best material to improve their research and teaching. In order to determine the best method to provide graduate students with scholarly material, we need to determine: Why do graduate students read scholarly materials such as journal articles, books, and other materials? Do reading patterns vary according to purpose of reading, source of reading, or individual characteristics of readers such as academic discipline, status, or age? What is the role and value of the college and university library in providing access to scholarly content in this changing digital landscape?

The Value, Outcome, and Return on Investment of Academic Libraries project (Lib-Value) is a three-year study funded by the Institute of Museum and Library Services (IMLS). Part of the project seeks to measure the value of the library's provision of access to scholarly materials by examining scholarly reading patterns and comparing use patterns of the library-provided resources with the use of scholarly materials accessed from other sources. Faculty members, graduate students, and undergraduate students were studied at several universities. The University of Illinois, Seton Hall University, University of Colorado (Boulder), and several universities in Australia, including the University of New South Wales, the University of Queensland, and Australian National University participated in the third phase. This report focuses on the results from the survey of postgraduate students at the Australian National University.

The Lib-Value project is led by a research team at the University of Tennessee, the University of Illinois at Urbana-Champaign (UIUC), Syracuse University, and the Association of Research Libraries (ARL).

Previous Studies

Since 1977, Tenopir and King have conducted reading surveys of scientists and faculty in the university and non-university setting (King et al. 1981; Belefant-Miller and King 2001). In 2005, Tenopir and King conducted a reading survey of graduate and undergraduate students in the United States and expanded it to Australia, Finland, and Japan (Tenopir et al. 2010). The early studies focused on scholarly article readings and the use of e-journals, while this study expands the scope to include scholarly book readings and social media. The surveys found that faculty and graduate students are reading more articles per year and that the majority of these articles are from e-journals (Wolverton and Tenopir 2006). The early studies focused on scholarly article readings and the use of e-journals, while this study expands the scope to include scholarly book readings and social media. The surveys found that faculty and graduate students are reading more articles per year and that the majority of these articles are from e-journals (Wolverton and Tenopir 2006). Furthermore, with the exception of science faculty, graduate students working on their theses or dissertations read more articles per year than any other group. A more recent study of postgraduate reading habits at two universities in Australia also shows that the majority of book readings are related to postgraduates' dissertations/theses, while articles are read more often to complete assignments (Tenopir et al. 2013). The results from the Australian National University (ANU) tend to confirm these earlier findings. The

results from Australian National University are a part of a larger scale study of universities in the United States, United Kingdom, and Australia.

Other multi-university studies focus on how faculty uses electronic journals, online resources, and libraries (Healy et al. 2002). Further studies show that access and convenience, especially electronic access, are important to academic faculty (Maughan 1999). Other studies show the huge impact subject discipline has on reading patterns (Talja and Maula 2003), and different disciplines have varying traditions of the importance of journals compared to other types of information (Fry and Talja 2004). In addition, faculty members in the sciences prefer and read more electronic journal articles than in humanities or social science disciplines (Brown 2003). A 2011 study by the Research Information Network (RIN) found a link between the library and the institution's research performance. These studies provide a basis for our findings with graduate students.

Many recent studies have reported on the future of e-books in academia. A 2009 CIBER report found that nearly two-thirds of teaching staff and students in the United Kingdom have used an e-book to support their work or study or for leisure purposes, and more than half of users said the last e-book they used was provided by their university library. A study at the Health Sciences Library System at Pittsburgh University discovered that over half of the surveyed faculty, graduate students, and undergraduate students used library-provided e-books for their job duties, and it concluded that respondents are willing to use alternative formats (Folb et al. 2011). Another study at the University of Illinois in 2008 shows that faculty, graduate students, and undergraduate students value the convenience and time saving capabilities this format offers them, as well as the ability to search full-text content of e-books, but there are still disadvantages with its format on the

screen (Shelburne 2009). Many other studies have reported similar findings, showing that e-books are becoming a valuable library resource (Chrzastowski 2011; Tenopir et al. 2012).

A report by CIBER on the use of social media in the research environment found that social media have found applications in the research process, and the most popular tools are those for collaborative authoring, conferencing, and scheduling meetings (Rowlands et al. 2011). The report did not find age to be a good predictor on social media use, but humanists and social scientists used more social media. It concludes social media do not replace traditional material.

Methodology

Earlier surveys examined just the reading of scholarly articles, but for this survey, we expanded it to examine the reading of scholarly books and book chapters and the use and creation of social media. The survey maintained a consistent core of questions and maintained similar questions in each section in order to compare the survey results over time. The questions are based on two principal sections—reader-related (demographics) and reading-related. Reader-related questions focus on the demographics of the respondent; the questions include age, gender, and major.

The reading-related questions mostly use the *critical incident technique* first developed by Flanagan (1954). The critical incident technique has since been applied to many contexts, including libraries and readings (Radford 2006; Andrews 1991). The survey used the last scholarly reading as the “critical” incident of reading (Griffiths and King 1991). By asking about a specific most recent reading, respondents should have a better memory of that reading, rather than having to reflect back on multiple readings over

a longer period of time. While the last reading may not be representative of a typical reading, it allows us to find details and patterns of reading and use. The questions cover many details of that reading, including time spent on the reading, source of reading, purpose of reading, and value of the reading to the purpose. A complete survey instrument is found in the appendix of this report.

In August 2013, an Australian National University librarian sent an e-mail message to the graduate student population of approximately 6,689. The message included an embedded link to a survey housed on the University of Tennessee's server. We received 38 responses to the first question for a response rate of 0.568%. The low response rate may make it hard to generalize across the population, and while our results are not weighted, weighting the results may help improve the generalizability of the responses. Since respondents were allowed to leave the survey at any time, skip questions, or were timed out automatically if they began the questionnaire and did not complete it, most of the questions have a lower number of responses. All respondents for a particular question equal 100% for that question. Note that all analysis is done without weighting responses, although since we asked demographic questions and know the demographic characteristics of the total population for some of the questions (age, gender, and discipline, for example), responses and subsequent analysis could be weighted

Demographics of Respondents

Academic Major

We asked the postgraduate students to list their major, and for analysis we collapsed the majors into four categories (Table 1). We combined the majors based on

similarities in their fields and redistributed the “other” disciplines into a corresponding category. Psychology, business, and education were combined with social sciences, while law was combined with humanities. The “other” disciplines included environmental science, which was redistributed into sciences, and science communication and economics, which were redistributed into social sciences.

Table 1. Academic Majors of ANU Postgraduate Students

	Frequency	Percent
Sciences	2	10.0
Medical Sciences	0	0
Engineering & Technology	2	10.0
Social Sciences	8	40.0
Humanities	8	40.0
Total	20	100.0

Academic Status, Age, and Gender

Twenty percent of the respondents are pursuing a coursework Master’s degree, and 75% are doctoral students (Table 2). One respondent identified their academic status as ‘other’: “Adjunct Staff and recent postgraduate coursework student.”

Table 2. Academic Status of ANU Postgraduate Students

	Respondents		All Postgraduates¹	
	N	%	N	%
Master’s (coursework)	4	20	3,592	43.4
Master’s (research)	0	0	162	1.9
Doctoral (PhD)	15	75	2,411	29.1
Other	1	5	2,118	25.6
Total	20	100.0	8,283	100.0

¹ Figures based on total enrollment numbers reported in the ANU Statistical Summary 2011 (Murdoch 2011).

Forty-seven percent of the respondents are under thirty-two years of age (Table 3). The average (mean) age of the respondents is 38 years of age. The respondents' ages range from twenty-four to 66 years of age.

Table 3. Age Range of ANU Postgraduate Students

	Frequency	Percent
18 ~ 23	0	0
24 ~ 28	4	21.1
29 ~ 32	5	26.3
33 ~ 38	3	15.8
Over 38	7	36.8
Total	19	100.0

In our study, 55% of the respondents are female. 50% of Master's students and 60% of Doctoral students are female. Older respondents are more likely to be male (8 of 15), while 75% of respondents under 29 are female (3 of 4).

There are some differences based on discipline. Seventy-five% of respondents in the humanities are female (6 of 8), while no respondents in the engineering/technology disciplines are female (0 of 2). Half of the respondents are female in both the sciences (1 of 2) and the social sciences (4 of 8) (Table 4).

Table 4. Gender of ANU Postgraduate Students

	Male	Female	Row Total
Sciences	1 50%	1 50%	2 100%
Medical Sciences	0 0%	0 0%	0 0%
Engineering/Technology	2 100%	0 0%	2 100%
Social Sciences	4 50%	4 50%	8 100%
Humanities	2 25%	6 75%	8 100%
Column Total	9 45%	11 55%	100.0%

More of the respondents are full-time students than part-time students (Table 5). We expect full-time students to be heavier user of scholarly materials because they take more courses than part-time students. The majority of respondents in the social sciences (5 of 8) and humanities (6 of 8) disciplines are full-time; however, half of the respondents in the sciences (1 of 2) and engineering and technology (1 of 2) are part time. Fifty-seven percent of part-time respondents are thirty-three years old and over (4 of 7), and 50% of full-time respondents are over thirty-three (6 of 12). Twenty-five percent of full-time respondents are under twenty-eight years of age (3 of 12), while only 14% of part-time respondents are under twenty-eight (1 of 7). The majority of Master's respondents are part-time (1 of 4), but the majority of Doctoral respondents are full-time (12 of 15).

Table 5. Status of ANU Postgraduate Students

	Frequency	Percent
Full-time	13	65
Part-time	7	35
Total	20	100.0

Article Reading

Total Amount of Article Reading

An initial step in exploring journal article reading patterns is determining the total number of article readings in the past month. To improve the accuracy of their response and minimize the inherent bias of self-reporting, we ask for a relatively short period of time (one month) rather than asking the respondents to reflect back over a longer period of time and we define the key terms very specifically. The survey was released in August 2013, and we assume the last month is an accurate representation of a typical month of reading. The first question stated, “*In the **past month (30 days)**, approximately how many scholarly articles have you read? (Articles can include those found in journal issues, Web sites, or separate copies such as preprints, reprints, and other electronic or paper copies. Reading is defined as going beyond the table of contents, title, and abstract to the body of the article).*” The actual number is less important than the relative amounts among types of respondents and over time. For convenience, we often report results as readings per year, by taking the monthly number reported by the respondent and multiplying it by 12 (or 10 for a more conservative estimate).

As expected there is a wide-range of responses, with students reporting from zero to 120 readings in the past month. In the last month, postgraduate students read an average of 19 articles ($M=19.23$, $SD=17.823$).² Less than 15% of the respondents reported no article readings in the past month; zero readings are included in the average. Extrapolated to an entire year, the average postgraduate student reads 228 articles or 190 articles in a

² Excludes outliers over 100. Including the outliers the mean is 22.

ten month year. Sixteen percent of the respondents report over thirty readings in the past month (Table 6).

Table 6. Number of Article Readings by ANU Postgraduate Students

Readings Per Month	Frequency	Percent
0	4	12.9
1 ~ 15	14	45.2
16 ~ 30	8	25.8
31 ~ 60	4	12.9
Over 60	1	3.2
Total	32	100.0

We asked respondents how many of the readings were for a class and determined the percentage of readings for class by dividing the respondent's number of article readings for class by the total number of article readings, and multiplying by 100. Sixty-three percent of respondents report that none of their article readings in the past month are for a class (Table 7). Seven percent of the respondents report all of their readings are for class.

Table 7. Percent of Monthly Article Readings for Class by ANU Postgraduate Students

Percent for class	Frequency	Percent
0-25%	17	63.0
26% ~ 50%	2	7.4
51% ~ 75%	2	7.4
Over 75%	6	22.2
Total	27	100.0

Last Incident of Reading and Date of Publication

The next set of questions asked the respondents to focus on the last scholarly article they read. This variation of the critical incident technique assumes the last article reading is random and provides detailed information on a random sample of the readings by postgraduate students. We asked, *"The following questions in this section refer to the*

SCHOLARLY ARTICLE YOU READ MOST RECENTLY, even if you had read the article previously. Note that this last reading may not be typical, but will help us establish the range of reading patterns.” We then asked for the title or topic of the journal article from which the last reading took place in order to focus their minds on the article for the rest of the critical incident questions.

The next question asked for the publication or posting date of the last article reading. We found that 36% of the readings are from within the first eighteen months of publication (Table 8). Since the survey was conducted in the summer of 2013, we included the first six months of the year in our analysis. The year of publication ranges from 1992 to 2013, with only one article reading over fifteen years old.

Table 8. Age of Article Reading by ANU Postgraduate Students

Year	Frequency	Percentage
Over 15 years (Before 1998)	1	4.5
11 ~ 15 years (1998-2002)	4	18.2
6 ~ 10 years (2003-2007)	4	18.2
2 ~ 5 years (2008-2011)	5	22.7
Less than 2 years (2012-2013)	8	36.4
Total	22	100.0

Although the number of readings of articles eighteen months old or less is nearly split between Master’s (3 of 8) and Doctoral students (4 of 8), readings of articles older than ten years are reported only by Doctoral students. Older students are also more likely to use older articles ($F=1.818, p=.193$). Respondents of 38 years and younger account for 67% of readings of articles of fifteen years or less (10 of 16). Respondents in the sciences

(2 of 16) and engineering (2 of 16) accounted for 25% of readings of articles published within the last ten years. However, respondents in the social sciences (1 of 4) and humanities (3 of 4) accounted for readings of all articles older than ten years.

Novelty of Information in the Reading

Since this is a random sample of article readings, the article may have been previously read. In this study, 32% of the article readings by postgraduate students are re-readings (7 of 22). We also wanted to find out the reader's knowledge of the article content before this reading (i.e., was the information familiar to them before the reading).

Together, these questions indicate if articles are often used as sources of new information.

Twenty-seven percent of the respondents say they knew parts of the information in the article prior to this reading (6 of 22).

We asked those who knew about all or part of the information in the article reading where they originally found it. Another journal article and informal discussions with colleagues are the main sources of information found in articles (Table 9). The "other" responses include: web searches, assigned reading, a book chapter, an alert email, fieldwork, and "Blindly downloading!".

Table 9. Source of Information Not Obtained Through Last Article Reading by ANU Postgraduate Students

	Frequency	Percent
Conference or workshop	1	4.8
Informal discussion with colleagues	2	9.5
Listserv or blog	1	4.8
Journal article	7	33.3
E-mail from colleague	1	4.8
Preprint/e-print service	1	4.8
Other	8	38.1
Total	21	100.0

Thoroughness of Last Article Reading and Time Spent Reading

Economist Fritz Machlup described two types of value in the information context: *purchase or exchange value* and *use value* (1979). Time spent represents an *exchange value*, assuming graduate students spend a large portion of their work time on reading because they consider it valuable. In order to get an indication of the exchange value of reading, we asked respondents to describe the thoroughness of their last scholarly article reading and how much time they spent on the reading. Eighty-six percent of the readings are read with great care and attention to all or parts of the article. Only 4.5% of the readings are skimmed (Table 10). Eighty-six percent of re-readings and 86.7% of first-time readings are read with great care and attention to all or parts of the article. Just 14.3% of re-readings and 6.7% of first time readings are readings only of specific sections or figures. There is no significant difference between whether a reading is a first time reading or re-reading and thoroughness of the reading.

Table 10. Thoroughness of Last Article Reading by ANU Postgraduate Students

	Frequency	Percent
I read all of it with great care	9	40.9
I read parts of it with great care	8	36.4
I read it with attention to the main points	2	9.1
I read only specific sections	2	9.1
I skimmed it just to get the idea	1	4.5
Total	22	100.0

Another aspect of the thoroughness of the article reading is the amount of time spent per reading. The average time spent per reading is 41 minutes ($M=40.91$, $SD=30.885$), with a range of 5 to 120 minutes. Eighteen percent of readings are over an hour (Table 11).

Table 11. Average Time Spent Per Article Reading by ANU Postgraduate Students

Minutes	Frequency	Percent
1-10	3	13.6
11-30	9	40.9
31-60	6	27.3
61-90	2	9.1
Over 90	2	9.1
Total	22	100.0

To get a full picture of the exchange value of scholarly article readings, we multiplied the average number of monthly article readings ($M= 19$) by the average time spent per reading ($M=41$ minutes). Postgraduate students spend, on average, 13 hours per month dedicated to scholarly article reading. Assuming the month represents a typical month of reading and multiplying the total by twelve to estimate an annual total, the average postgraduate student at the Australian National University spends 156 hours per year, or the equivalent of 19.5 eight-hour work days, reading scholarly articles. Or, using

the conservative estimate of ten months, the average Australian National postgraduate students spends 130 hours per ten-month year, or the equivalent of 16 eight-hour days.

Source of Article

An important part of our analysis of postgraduate student reading patterns is determining how they become aware of articles. In the survey we asked, *“How did you or someone on your behalf become aware of this last article you read?”* There are many means of becoming aware of articles, and their answers reflect their myriad of options (Table 12). We followed up the question by asking what source they searched or browsed, indicating whether it was a print or electronic source. For the purposes of the survey, we defined browsing as “without a specific objective in mind” and searching as having some sort of starting point such as author’s name or by subject. We included a “don’t know/don’t remember” option for those who may not remember how they became aware of the article.

Approximately 18% of the readings are found through searching, and 14% are found through browsing. Another 68% of the readings are found through one of the other listed methods, including a citation, an instructor, or course outline/reading list. Only 27% (7 of 22) of the readings are found through a method not included in our answer selection. These include: a reading group, an emailed table of contents, web search, and browsing Google Scholar.

Table 12. How ANU Postgraduate Students Initially Become Aware of Articles

	Frequency	Percent
Browsing	3	13.6 (100.0)
1. Personal subscription	(1)	(33.3)
2. Library subscription	(1)	(33.3)
3. School, department subscription	(0)	(0.0)
4. Website	(0)	(0.0)
5. Other	(1)	(33.3)
Searching	4	18.2 (100.0)
1. Web search engine	(2)	(50.0)
2. Electronic indexing/abstracting service	(0)	(0.0)
3. Online journal collection	(1)	(25.0)
4. Other	(1)	(25.0)
Other	15	68.2 (100.0)
1. Cited in another publication	(6)	(40.0)
2. An instructor told me about it	(3)	(20.0)
3. It was in the course outline/reading list	(1)	(6.67)
4. Don't know/Do not remember	(0)	(0.0)
5. Other	(5)	(33.33)
Total	22	100.0

Of the readings found through browsing, one third came from the library subscription and one third came through a personal subscription. The other source of browsing includes Google Scholar. Readings found through searching often came from an electronic source, including half from a web search engine and one quarter from an online journal collection. The other source of searching include was not specified. Overall, electronic sources are the primary means of becoming aware of the last article reading. The library still plays a large role in helping respondents become aware of articles, through a variety of electronic aids, including the online journal collection, indexes, and electronic library subscription.

Influence of Source of Article

Electronic methods of becoming aware of articles provide graduate students with access to more articles beyond their current article need. Many searching or browsing queries identify multiple articles; to find how that influences their total readings we asked, “As a result of searching or browsing for this article, how many other articles have you read or plan to read?” Including all browsing and searching methods of becoming aware of the last article reading, respondents read or plan to read, on average, five articles in addition to the last article reading ($M=5.14$, $SD=5.083$). Only 22.7% of respondents do not plan on reading any additional articles (5 of 22). Respondents who browsed for the last article reading plan on reading an additional six articles ($M=5.67$), and those who searched for the last article also reading plan on reading six articles ($M=6.25$).

Respondents are more likely to read additional articles when they became aware of the last article through an instructor or through searching ($F=.762$, $p=.590$). Respondents who found the article through an instructor plan to read eight articles ($M=8$), followed by those found through searching ($M=6.25$), a citation ($M=6.0$), browsing ($M=5.67$), and a course outline ($M=0$).

Respondents spent an average of 23 minutes browsing for the last article reading ($M=30.67$, $SD=29.006$). Browsing for a journal article takes approximately two minutes to one hour.

Obtaining the Article

Once a postgraduate student becomes aware of the article, we asked them where they obtained it. Sixty-four percent of the last article readings were obtained from a library

subscription (14 of 22) (Table 13). Of the articles obtained from the library, all are from the electronic collections (14 of 14). Nine percent of the readings are obtained from a school or department subscription and 9% are obtained from a free web journal; we assume many of these readings are from the library subscription, but postgraduate students cannot always differentiate what is provided by the library and what is free on the web. Nine percent are from an instructor or colleague. Only one reading is from a personal subscription. Postgraduate students also used other websites to obtain the last article reading, but did not specify the site. Including all sources, 86% of the article readings are obtained from an electronic source (19 of 22).

Table 13. How ANU Postgraduate Students Obtain Articles

	Frequency	Percent
Personal subscription (print)	1	4.5
Library subscription (electronic)	14	63.6
School/department subscription	2	9.1 (100.0)
• Print	(1)	(50.0)
• Electronic	(1)	(50.0)
Course reserves	0	0.0
Free web journal (electronic)	2	9.1
Preprint copy	0	0
Copy from a colleague, instructor, author, etc.	2	9.1 (100.0)
• Print	(1)	(50.0)
• Electronic	(1)	(50.0)
Electronic Interlibrary loan or document delivery service	0	0
An author's website	0	0
Other website (electronic)	1	4.5
Other source	0	0
Total	22	100.0

Regardless of how the reading is found, the majority are obtained from a library subscription. Readings found by citations and searching, in particular, are likely to be

obtained from a library subscription. The majority of readings found through an instructor (66.7%), searching (75%), or a citation (100%) are obtained from a library subscription. One third of readings found through browsing are also obtained through a library subscription. A further third of readings found through browsing are obtained from a library or school/department subscription, and a final third are obtained through a free web journal. All readings found through a course outline and one third found through an instructor are obtained from a colleague or instructor.

Alternative Source to Obtain Article

Another measure of value is *contingent valuation*, which measures value based on whether the respondent would obtain the information from another source if the original source was not available (Imholz and Arns 2007). This method assumes if the information is important the respondent will try multiple methods to obtain the information, but their initial source is the most convenient, either due to speed or low cost. We asked, "*Thinking back to the source of the article (e.g., library collection, department collection, interlibrary loan, etc.), where would you obtain the information if that source were not available?*"

Twenty-three percent of the readings would not be obtained from another source (5 of 22).

Seventy-one percent of the readings obtained from a library subscription and all of the readings obtained through a personal subscription, school or department subscription, or free web journal would be obtained from another source if the original source were no longer available. Half of those obtained through an instructor would not be obtained from an alternative source. Value would be lost if these original sources were not available

because postgraduate students would either not receive the same information or would have to spend additional money or time to use an alternative source.

Format of Article and Location of Reading

Just because 86% of the article readings are obtained from an electronic source, does not mean the articles are read on a computer screen. In a survey of academic staff at the Australian National University (reported separately), we found that nearly half (46.7%) of the readings by academic staff at the Australian National University are on a computer screen (28 of 60), even though 87% (55 of 62) are obtained from an electronic source. In contrast, 63.6% of the readings by postgraduate students are read on-screen, including one respondent who specified another format as “Mendeley (pdf viewer and organizer)”, while the rest are read on print-on-paper, either from a print journal or downloaded and printed out (Table 14). One respondent remarks, “I absolutely rely on electronic access as I am both part-time and external (live approx. 1500 km from my university) and I work full-time. Being able to access journal articles in particular online any time of the day or night is wonderful.” Thirty-two percent of the readings are from a downloaded and printed article, and 5% of the readings are from a print article in a print journal. Five percent of article readings are read on a mobile, e-reader, or tablet screen rather than computer screen. Other formats include “Mendeley (pdf viewer and organizer).”

Table 14. Final Format of Article Reading by ANU Postgraduate Students

	Frequency	Percent
Print article in a print journal	1	4.5
Photocopy or Fax copy	0	0
Online computer screen	4	18.2
Previously downloaded/saved and read on computer screen	8	36.4
On a mobile, e-reader or tablet screen	1	4.5
Downloaded and printed on paper	7	31.8
Other	1	4.5
Total	22	100.0

Readings obtained from a free web journal and a school subscription are the most likely to be read from an online computer screen (50%), with the other half being saved and read on a computer screen. Readings obtained from the library are saved and read on a computer screen (42.9%), downloaded and printed on paper (35.7%) and read from an online computer screen (7.1%). Readings obtained from a colleague or instructor are downloaded and printed on paper (100%). Readings from a personal subscription are the most likely to be read in print, in a print journal (100%).

While postgraduate students are using the library's resources, they are often accessing the library's resources remotely and are rarely reading articles in the library. The majority of article readings by postgraduate students take place outside the library (Table 15). Thirty-six percent of article readings by postgraduate students are read at home, and 45.5% are read in the office/lab. Nine percent read while traveling or commuting. Postgraduate students also read in a home office and on a weekend away. None of the readings take place in the library. Location is no longer a major factor in access to academic sources because the scholarly articles can be accessed and read from a variety

of locations. This convenience and saving time of the reader from having to physically come to the library building is another measure of value to readers.

Table 15. Location of Article Reading by ANU Postgraduate Students

	Frequency	Percent
Office or lab	10	45.5
Library	0	0
Residential college	0	0
Home (off-campus)	8	36.4
Traveling or commuting	2	9.1
Elsewhere	2	9.1
Total	22	100.0

Of the 14 article readings obtained from a library subscription, the majority of are read in the office or lab (42.9%) or the home (42.9%).

Since articles can be read in a variety of formats, academics are able to read in a variety of locations. Both article readings that occur while traveling/commuting are downloaded and printed (100%, 2 of 2). One quarter of the readings that occur in the home are from a downloaded and printed copy, and 62.5% are read on a computer screen (2 and 5 of 8). Thirteen percent of readings in the home are from a mobile screen (1 of 8). In the lab/office, 10% of the readings are from a print journal; 50% are from a computer screen, and 30% are downloaded and printed.

Purpose and Value of Article Reading

Survey data provides a picture of the purpose, value, and outcomes of article readings, which usage data cannot provide. The first question in this series of questions was, “*For what principal purpose did you use, or do you plan to use, the information obtained from the article you last read?*” Sixty-eight percent of the readings by postgraduate

students are for their thesis or dissertation (Table 16). Fourteen percent of article readings are to keep informed about developments in their main field of study. The other principal purposes include redesigning teaching at the university. Article readings support nearly all of postgraduate work activities.

Table 16. Principal Purpose of Article Reading by ANU Postgraduate Students

	Frequency	Percent
Required reading for course	1	4.5
Help complete assignment or paper	1	4.5
For thesis or dissertation	15	68.2
Assist in teaching duties	1	4.5
Keep informed	3	13.6
Other	1	4.5
Total	22	100.0

We found some differences between the year of publication and the principal purpose of article reading ($\chi^2=18.582$, $p=.362$).³ All of the readings to keep informed (3) and 20% for thesis or dissertation (3 of 15) have been published within the last eighteen months. However, readings for a thesis or dissertation (26.7%, 4 of 15) are more likely to be published within the last two to five years (2008-2011).

We also found significant differences between purpose and how the respondent becomes aware of the article reading ($\chi^2=25.487$, $p=.063$). Readings for a thesis or dissertation are discovered through a citation in another publication (40%, 6 of 15), and one third of readings to keep informed are found through browsing (33.3%, 1 of 3). The article reading for teaching is discovered through searching, the single reading to complete

³ Ninety-seven percent of cells have expected count less than five, therefore the likelihood ratio is used. Unless otherwise noted the likelihood ratio will be used throughout the report.

an assignment is found through an instructor, and the required reading is found through a course outline.

Regardless of purpose, most readings are obtained from a library subscription ($\chi^2=21.488$, $p=.156$). Seventy-three percent of those read for thesis or dissertation and one third to keep informed are from the library. Readings to keep informed are just as likely to be from a personal subscription or a free web journal. However, it should be noted that postgraduates are not always aware that online resources that they perceive to be free web journals are actually library subscriptions.

There is some significance between the principal purpose of reading and the format of reading ($\chi^2=22.678$, $p=.141$). Readings for a dissertation or thesis are also usually read on a computer screen: 13.3% on an online computer screen, and 46.7% downloaded and read on a computer screen; only 33.3% of readings for a dissertation or thesis are downloaded and printed on paper. The majority of readings to keep informed are read on a computer screen, with 33.3% being read online and 33.3% being downloaded and read later on a computer screen; 33.3% are read in a print journal. The required reading and the reading for teaching duties are read in print form, downloaded and printed on paper. However, the single reading to help complete an assignment is read on a mobile or tablet screen.

Most article readings for a thesis or dissertation (46.7%), keeping informed (66.7%), and teaching duties (100%) are read in the office or lab ($\chi^2=14.821$, $p=.357$). The single reading to complete an assignment is read at home and the required reading is read while traveling or commuting.

After establishing the principal purpose, we asked respondents to describe the value of the article reading by ranking the article’s importance to the principal purpose and the outcome the reading has on their work. Respondents ranked the article reading on a five-point scale from “absolutely essential” to “not at all important.” Nearly all the readings are considered at least “somewhat important” (4.5%) and 40.9% are considered “absolutely essential” or “very important” to the principal purpose (Table 17).

We received many comments on the importance of article reading. One respondent states, “Almost all journal articles I read are electronic. They are essential to the work I do.” Similarly, many respondents consider article readings “critical” and “vital” to their work activities. It is clear from their comments that scholarly articles are important to postgraduate work beyond the principal purpose of reading.

Table 17. Importance of Article Reading to the Principal Purpose of ANU Postgraduate Students

	Frequency	Percent
Absolutely essential	1	4.5
Very important	9	40.9
Important	2	9.1
Somewhat important	9	40.9
Not at all important	1	4.5
Total	22	100.0

There were no significant differences between principal purpose of reading and the importance ($\chi^2=10.178$, $p=.848$).

Readings obtained from a library subscription, school or department subscription, free web journal, or instructor are considered more important than readings obtained from personal subscriptions ($\chi^2=18.032$ $p= .330$). Half of readings from library subscriptions are considered “somewhat important” (7 of 14), while nearly half of readings from library

subscriptions are considered “important” or “very important” (42.8%, 6 of 14), while all from a school or department subscription are considered “important” or “very important” (100%, 2 of 2). All readings from a free web journal are considered “very important” (100%, 2 of 2). Half of the readings from an instructor are considered “very important” (1 of 2), while only readings from an instructor are considered “absolutely essential” (50%, 1 of 2). The single reading from a personal subscription was considered “somewhat important.”

Outcomes of Article Reading

In order to establish how the article was important to the principal purpose, we asked respondents to select one or more outcomes of the reading. The most frequent outcomes are “inspired new thinking,” “improved the result,” and “narrowed/broadened/changed the focus” (Table 18). In the open-ended comments one respondent describes article readings: “Almost all journal articles I read are electronic. They are essential to the work I do.” None of readings are considered a waste of time, and only 9.1% of readings made the respondent question his or her work. Some of the other outcomes of reading are: “Broadened knowledge about subject more generally in a peripheral way,” “Gave Historical context,” and “Key to changing the university's approach to teaching.”

Table 18. Outcomes of Article Reading for ANU Postgraduate Students*

	Frequency	Percent
Inspired new thinking	11	50.0
Improved the result	10	45.5
Narrowed/broadened/changed the focus	8	36.4
Others	3	13.6
Saved time or resources	2	9.1
Made me question my work	2	9.1
Resulted in collaboration/joint research	1	4.5
Resolved technical problems	0	0.0
Resulted in faster completion	0	0.0
Wasted time	0	0.0
Total	22	

*Respondents could select more than one outcome.

Fifty-five percent of the article readings have been or will be cited (Table19). As the article reading's importance to the principal purpose increases, so does the chance it will be cited ($p=.494$). Only 18.2% will not be cited (4 of 22). Of those that will not be cited, only 25% are "not at all important" (1 of 4), while half are "very important" (2 of 4). One third of article readings that have been or will be cited are "somewhat important" (4 of 12). Eight percent are "important" (1 of 12) and 8.3% are "absolutely essential" (1 of 12). Half are "very important." Of those article readings that may be cited, only one third are "important" or "very important" (2 of 6); two-thirds are only "somewhat important" (4 of 6).

Table 19. Article Citation by ANU Postgraduate Students

	Frequency	Percent
No	4	18.2
Maybe	6	27.3
Already did	6	27.3
Will in the future	6	27.3
Total	22	100.0

Thirteen percent of readings for a thesis or dissertation and one third of readings for keeping informed will not be cited. Sixty percent of the readings for a thesis or dissertation have been or will be cited. The single reading to help complete a course assignment, for teaching duties, and for “other purposes” have been or will be cited. No required readings have been or will be cited.

Differences of Article Reading Patterns by Demographics

Differences of Article Reading Patterns by Discipline

We found some differences between respondent’s discipline and the number of article readings ($F=.848$, $p=.489$). Respondents in the social sciences ($M=31.75$) and humanities ($M=27.71$)⁴ read, on average, more articles per month than respondents in the engineering/technology/math fields ($M=10.00$) and sciences ($M=20.00$). There was a significant association between discipline and time spent per article reading ($F=7.405$, $p=.002$). Engineering/technology/math postgraduates spent nearly two hours ($M=110.00$), followed by science postgraduates ($M=45.00$), social science postgraduates ($M=39.38$), and humanities postgraduates ($M=28.13$).

There are some variations between where the reading is obtained and the respondent’s discipline ($\chi^2=16.851$, $p=.328$). The library is the most popular way to obtain an article reading: 100% of the readings by scientists (2 of 2), 75% by social scientists (6 of 8), and 75% of the readings by humanists (6 of 8) are obtained through the library. Free web journals are the second most common way of obtaining article readings, with 50% of engineering/math students (1 of 2) and 12.5% of social scientists (1 of 8) obtaining article

⁴ Excludes outliers over 100. Including outliers, the mean is 39.

readings through free web journals. Only social science (12.5%, 1 of 8) students report obtaining their reading through a personal subscription, and only humanists (12.5%, 1 of 8) report obtaining their reading through school or department subscriptions. The two engineering/technology/math postgraduates report obtaining article readings through a free web journal and through an instructor

Science postgraduates report more readings for theses or dissertations than postgraduates in the engineering/technology/math fields, social sciences, or humanities ($\chi^2=11.135$, $p=.517$) (Table 20). All of the readings by science majors are for theses or dissertations versus 87.5% of those by humanities majors, 50% by engineering/technology/math majors, and 50% by social science majors.

Table 20. Principal Purpose of Article Reading and Discipline of Australian National Postgraduate Students

	Sciences	Engineering/ Technology /Math	Social Sciences	Humanities	Row Total
Help complete assignment or paper	0 0%	0 0%	1 12.5%	0 0%	1 5.0%
For thesis or dissertation	2 100.0%	1 50.0%	4 50.0%	7 87.5%	14 70.0%
Teaching duties	0 0%	0 0%	1 12.5%	0 0%	1 5.0%
Keep informed	0 0%	0 0%	2 25.0%	1 12.5%	3 15%
Other	0 0%	1 50.0%	0 0%	0 0%	1 5.0%
Column Total	2 100.0%	2 100.0%	8 100.0%	8 100.0%	20 100.0%

Half of all article readings by social scientists (50%), humanities (50%), scientists (50%), and engineering/technology students (50%) are read from the office/lab ($\chi^2=11.538$, $p=.241$). The home is the second overall most popular reading location: 50%

of the readings by social scientists and 37.5% by humanities students are read in the home. Half of readings by scientists occur during travel or commute (50%). The remaining readings take place elsewhere: 50% by engineering/technology students and 12.5% by humanities students.

The majority of the readings by social scientists (62.5%) have been downloaded or saved to read on a computer screen ($\chi^2=18.912$, $p=.218$). All readings by scientists and half by engineering and technology students are downloaded and printed on paper. The majority of the readings by humanists (37.5%) and half by engineering/technology students read articles in an online computer screen format. Article readings by social scientists are also read from print journals (12.5%), on a mobile, e-reader, or tablet (12.5%), and downloaded and printed on paper (12.5%). Article readings by humanists are downloaded and printed on paper (25%), as well as downloaded and read on screen (25%).

We did not find an association between discipline and importance of the reading to the principal purpose.

Differences of Article Reading Patterns by Status, Age, and Gender

Doctoral students read far more articles than other postgraduates ($F=.639$, $p=.545$). Doctoral students read, on average, 29 articles per month ($M=29.14$)⁵, followed by master's by coursework students ($M=22.50$). Similarly, doctorate students spend the most time per reading ($F=2.188$, $p=.143$). They spend, on average, 42 minutes per reading ($M=41.67$). Master's by coursework students spend 31 minutes per reading ($M=31.25$).

⁵ Excludes outliers over 100. Including outliers, mean is 35.2.

There is no significant association between respondents' status and the way article readings are discovered. Readings by master's in coursework students are discovered through browsing (25%, 1), citations (25%, 1), an instructor (25%, 1), and by other means (25%, 1). Readings by doctoral students are discovered through citations (33.3%, 5 of 15), searching (26.7%, 4), other means (20%, 3), an instructor (13.3%, 2), and browsing (6.7%, 1).

Most readings by all postgraduate students are obtained through the library ($\chi^2=13.242$, $p=.210$). However, only half of the readings by master's in coursework students are obtained from the library, whereas 80% by doctoral students (12 of 15) are obtained through the library.

We found a significant association between academic status and purpose of reading ($\chi^2=16.473$, $p=.036$) (Table 21). Eighty-seven percent of the readings by doctoral students are read for thesis or dissertation, while half of those by master's students are to keep informed about field of study.

Table 21. Principal Purpose of Article Reading and Academic Status of ANU Postgraduate Students

	Master's (coursework)	Doctoral	Others	Row Total
Help complete assignment or paper	1 25%	0 0%	0 0%	1 5%
For thesis or dissertation	1 25%	13 86.7%	0 0%	14 70%
Teaching duties	0 0%	1 6.7%	0 0%	1 5%
Keep informed	2 50%	1 6.7%	0 0%	3 15%
Other	0 0%	0 0%	1 100%	1 5%
Column Total	4 100.0%	15 100.0%	1 100.0%	100.0%

Most readings by master's in coursework students (75%, 3 of 4) are read in the home ($\chi^2=8.662$, $p=.193$). However, most readings by doctoral students (60%, 9 of 15) are read in the office or lab.

There were some differences between academic status and format of article reading ($\chi^2=11.850$, $p=.295$). Readings by master's in coursework postgraduates were evenly distributed among print (50%, 2 of 4) and electronic (50%, 2 of 4) formats. One was read from a print journal and one downloaded and printed. One reading by a master's in coursework postgraduate was downloaded and read on a computer screen and one on a mobile screen. More readings by doctoral students are read on a screen (60%). Forty percent (6 of 15) are downloaded and read on a computer screen and 20% are read on an online computer screen (3). One third of the readings by doctoral students are downloaded and printed (5).

Furthermore, the majority (66.7%) of the article readings by doctoral students have been or will be cited ($\chi^2=8.264$, $p=.219$). Only one reading by a master's in coursework student has been or will be cited.

In order to examine the differences in responses by age, respondents were grouped into two age categories: under 33 and 33 years and older. Slightly more readings by postgraduates 33 and older (20%, 2 of 10) are discovered through searching than readings by younger postgraduates (11.1%, 1 of 9). In addition, more readings by students 33 and over are discovered through an instructor (20%, 2) than readings by younger students (11.1%, 1).

We found some differences in age and purpose of article reading as well ($\chi^2=8.964$, $p=.062$). More readings by students under 33 are to help complete an assignment, while slightly more readings by students 33 and older are for a thesis or dissertation (Table 22).

Table 22. Principal Purpose of Article Reading and Age of Australian National Postgraduate Students

	Students under 33	Students 33 and older	Column Total
Help complete assignment or paper	0 0%	1 10.0%	1 5.3%
For thesis or dissertation	5 55.6%	8 80.0%	13 68.4%
Teaching duties	1 11.1%	0 0%	1 5.3%
Keep informed	3 33.3%	0 0%	3 15.8%
Other	0 0%	1 10.0%	1 5.3%
Row Total	9 100.0%	10 100.0%	19 100.0%

We found some association between respondent's age and the format of reading ($\chi^2=11.319$, $p=.045$). Eighty percent of the readings by students over 33 and 33% of those by students under 33 read on a computer or mobile screen. Students under 33 reported more article readings downloaded and printed. Over half (56%) of the readings by students under 33 and just 10% of those by students over 33 are downloaded and printed on paper.

We did not find any other associations between age of respondent and article reading patterns.

Male postgraduates spent more time per article reading ($F=1.836$, $p=.192$). Male students spent approximately 53 minutes per article reading ($M=52.78$), while female students spent about 34 minutes ($M=34.09$).

Female students read articles in a variety of settings ($\chi^2=2.917$, $p=.405$). Two-thirds of the readings by male postgraduates are in the office or lab (6 of 9), 22% are in the off-campus home (22.2%, 2 of 9), or elsewhere (1). Forty-six percent of the readings by female postgraduates are at home (5 of 11), 36% in the office or lab (4), while travelling or commuting (1) and elsewhere (1).

Slightly more article readings by women (27%, 3 of 11) are discovered by searching ($\chi^2=8.797$, $p=.066$). Only 11% of the readings by men (1 of 9) are discovered through searching. However, 22% readings by men (2) are found through browsing, while no reading by a female student was found by that method. By contrast, 46% of the readings by women are found through citations (5 of 11) and 18% through instructors (2). Only one reading by a male student discovered through an instructor and one through a citation.

We found a significant association between gender and purpose of reading ($\chi^2=10.774$, $p=.029$). Ninety percent of the readings by female postgraduates are read for a thesis or dissertation (10 of 11) and one reading to help complete an assignment. Forty-four percent of the readings by male postgraduates (4 of 9) are read for a thesis or dissertation and one third to keep informed (3). No male student reports a reading to complete an assignment, and no female student reports a reading for teaching duties or to keep informed.

We found no other significant associations between gender and reading habits.

Book Reading

In other Tenopir & King studies, the *critical incident* of reading focused only on the last scholarly article reading. A 2011 study in the United Kingdom expanded the survey to examine the last book/book chapter and other publication readings of faculty members (Tenopir et al. 2012). This study is the first time we also included readings from books, book chapters, and other publications of postgraduate students. In this section of the report, we focus on book or book chapter readings by postgraduate students at Australian National University.

Total Amount of Book Reading and Last Incident of Reading

As in the section on scholarly article reading, we started this section by carefully defining book reading and focusing the respondent on the books they recently read or read from. We asked, "*In the past month (30 days) approximately from how many books or parts of books did you read for work? Include reading from a portion of the book such as skimming or reading a chapter. Include classroom text, scholarly, or review books read in print or electronic format.*" We are more concerned with the relative amounts of reading than the actual number, and for convenience, we often report readings per year by multiplying the monthly total by 12. Postgraduate students at Australian National University report an average of eight book or book chapter readings per month or approximately 96 per year ($M=8.04$, $SD=8.147$).⁶ Using the conservative ten-month estimate, the average postgraduate student reads 80 book or book chapters per year. Nineteen percent of the

⁶ Excludes one outlier over 80. Including outlier the mean is 12.35.

respondents did not report any book readings in the past month, and 26.9% report over ten book readings (Table 23).

Table 23. Number of Book Reading by ANU Postgraduate Students

Readings per month	Frequency	Percent
0	5	19.2
1 ~ 2	2	7.7
3 ~ 5	7	26.9
6 ~ 10	5	19.2
Over 10	7	26.9
Total	26	100.0

We followed the same variation of critical incident technique we used in the article section by asking respondents to focus on the last scholarly book reading. We explicitly stated, *“The following questions in this section refer to the BOOK FROM WHICH YOU READ MOST RECENTLY. Note that this last reading may not be typical, but will help us establish the range of reading patterns across a range of postgraduate, disciplines, and institutions.”* We assume the book readings will be a random sample of readings and will give us detailed information on a wide range of scholarly book readings. We asked the respondents to list the title or topic of the last book or book chapter they read, in order to help the respondent focus on the last reading from a book, book chapter, or part of a book.

Total Time of Book Reading

To get an indication of *exchange value*, we asked, *“On how many occasions did you read from this book in the past month (30 days)”* and *“About how much total time (in minutes) did you spend reading this book in the past month (30 days)?”* We did not define what constitutes an occasion, and so an occasion could be any length of time. On average,

postgraduate students read from a book or book chapter on five occasions (M=4.67, SD=4.09). Five percent of book or book chapter readings occur on only one occasion, while 15% of the readings occur on more than five occasions (Table 24).

Table 24. Occasions of Last Book Reading by ANU Postgraduate Students

	Frequency	Percent
1	1	5.0
2 ~ 3	7	35.0
4 ~ 5	9	45.0
6 ~ 10	2	10.0
Over 10	1	5.0
Total	20	100.0

The average time spent reading, including on all occasions of reading, is 156 minutes (M=156.05, SD=102.12).⁷ Eighty percent of book readings take over one hour (Table 25). Only 5% of book or book chapter readings are thirty minutes or less.

Table 25. Time Spent on Last Book Reading by ANU Postgraduate Students

Minutes	Frequency	Percent
0-15	1	5.0
16-30	0	0
31-60	3	15.0
61-90	4	20.0
91-120	2	10.0
Over 120	10	50.0
Total	20	100.0

Source of Book and Time to Become Aware

After establishing the last book reading and how long they spent per reading, we focused on how they became aware of the book from which they read. We asked, “*How did you or someone on your behalf become aware of this last book from which you read?*” We kept the question and answers similar to the last article reading, and maintained the same

⁷ Excludes one outlier over 599. Including outlier mean is 178.25.

definitions of browsing and searching. The last book or book chapter readings are found through a variety of methods: 20% through searching, 20% through another person, 20% through a citation, and 10% through browsing (Table 26). Fifteen percent are found through a source we did not list in our answer choices; these included a course text, a reading group, and a Google search. We did not ask the respondents to tell us what sources they browse or search.

Table 26. How ANU Postgraduate Students Initially Become Aware of Books

	Frequency	Percent
Found while browsing	2	10.0
Found while searching	4	20.0
Cited in another publication.	4	20.0
Another person told me about it	4	20.0
Promotional email or web advertisement	1	5.0
Don't know or don't remember	2	10.0
Other	3	15.0
Total	20	100.0

Postgraduate students spend an average of 14 minutes becoming aware of a book or book chapter reading (M=14.25, SD=23.39). Readings found by searching (M=49) take, on average, more time to become aware of than those found through a citation (M=0.5), another person (M=8), or through browsing (M=3).

Obtaining the Book

We asked, “*After you became aware of this book, from where did you obtain it?*” The wording was kept similar to the other sections for comparison, but the answer choices were modified to reflect the different sources for books. Forty-two percent of the book readings are obtained from a library collection (Table 27). Nearly as many book readings

are from purchased books as from a library collection (36.8%). Book readings are also obtained from interlibrary loan (10.5%) or from the publisher (5.3%).

Table 27. How ANU Postgraduate Students Obtain Books

	Frequency	Percent
I bought it for myself (print)	7	36.8
The library or archives collection	8	42.1 (100.0)
• Print	(6)	(75.0)
• Electronic	(2)	(25.0)
Interlibrary loan or document delivery service (print)	2	10.5
School or department collection	0	0
A colleague, author or other person provided it to me	0	0
A free, advance, or purchased copy from the publisher (electronic)	1	5.3
Other source (print)	1	5.3
Total	16	100.0

Much has been discussed recently about the future of electronic books. A 2009 CIBER study in the U.K. found that 65% of staff and students have read an e-book for work, study, or leisure, and over half of those readings were obtained through the library (51.9%). Similar studies in the U.S. have also shown that e-books are gaining in popularity and are a valuable library resource (CIBER 2009; Chrzastowski 2011). In our study, we found postgraduate students are reading from more e-books than academic staff. Sixteen percent of the book readings by postgraduate students are obtained from an electronic source (3 of 19), and 11.8% of book readings by academic staff are from e-books (6 of 51). While electronic resources for books have yet to reach the popularity of journals, e-books are becoming a part of academic culture.

Alternative to Obtain Book

To determine contingent valuation, we asked, “*Thinking back to where you obtained the book (e.g., library collection, department collection, interlibrary loan, etc.), where would you obtain the information if that source were not available?*” Eleven percent of respondents would not bother getting the information from another source (2 of 19). We did not specify what alternative source they would use.

Readings from the library are the least likely to be obtained from another source. One of the readings obtained from the library would not be obtained from an alternative source (13%, 1 of 8). Value to academic work, therefore, would be lost if the library collection were not available. One of the purchased copies (14%, 1 of 7) would not be obtained from another source if the original source were no longer available. Most readings, however, would be obtained from another source, costing postgraduates time and/or money to obtain them.

Purpose and Value of Book Reading

The last set of questions focuses on the principal purpose of the last book reading and the value and importance of the reading. We asked, “*For what principal purpose did you use, or do you plan to use, the information obtained from the book you last read?*” Reading for a thesis or dissertation is by far the most frequent principal purpose of reading (Table 28). Sixty-eight percent of the readings are for a thesis or dissertation, and 11% are for keeping informed. The other principal purpose is redesigning higher education for online learning.

Table 28. Principal Purpose of Book Reading by ANU Postgraduate Students

	Frequency	Percent
Required reading for course	1	5.3
For thesis or dissertation	13	68.4
To keep informed	2	10.5
Personal interest	1	5.3
Writing proposals, reports, articles	1	5.3
Other	1	5.3
Total	19	100.0

We found significant differences between where the book reading is obtained and the principal purpose of reading ($\chi^2=24.549$, $p=.219$). Readings for a thesis or dissertation were obtained through more varied means (Table 29). Sixty-two percent of the readings for thesis or dissertation are obtained through a library, followed by 23% by purchases, and 15% by interlibrary loans.

Table 29. Association between Purpose and Where Australian National Postgraduate Students Obtain Book Readings

	Required reading	Thesis or dissertation	To keep informed	Personal interest	Writing proposals, reports, etc.	Others	Row Total
I bought it myself	1 100%	3 23.1%	2 100%	1 100%	0 0%	0 0%	7 36.8%
Library or archive collections	0 0%	8 61.5%	0 0%	0 0%	0 0%	0 0%	8 42.1%
Interlibrary Loan	0 0%	2 15.4%	0 0%	0 0%	0 0%	0 0%	2 10.5%
A copy from the publisher	0 0%	0 0%	0 0%	0 0%	1 100%	0 0%	1 5.3%
Others	0 0%	0 0%	0 0%	0 0%	0 0%	1 100%	1 5.3%
Column Total	1 5.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

To measure value in relation to principal purpose, we asked, “*How important is the information contained in this book to achieving your principal purpose?*” All of the book or book chapter readings are considered at least “somewhat important” (Table 30). Seventy-nine percent of the book readings are considered “absolutely essential” or “very important” to the principal purpose (15 of 19). No book reading is considered “not at all important.” Overall, postgraduate students considered book readings to be more important to the principal purpose than article readings.

Table 30. Importance of Book Reading to Principal Purpose of ANU Postgraduate Students

	Frequency	Percent
Absolutely essential	5	26.3
Very Important	10	52.6
Important	3	15.8
Somewhat important	1	5.3
Not at all important	0	0
Total	19	100.0

We found a slight association between the importance of book readings and whether the information would be obtained from an alternative source if the original source was not available ($\chi=3.964$, $p=.265$). Overall, almost 90% of readings would be obtained elsewhere (89.5%, 17 of 19). However, only two thirds of “important” book readings would be obtained from an alternative, while 80.0% of “absolutely essential” book readings would be. We did not find a significant association between the importance of book readings and the principal purpose, length of reading, method of becoming aware of book readings, where book readings are obtained.

Outcomes of Book Reading

To look at value to principal purpose more closely, we asked, “*In what ways did the reading of the book affect the principal purpose?*” “Inspired new thinking,” “improved the result” and “narrowed/broadened/changed the focus” are the most frequent outcomes (Table 31). No book readings are considered a waste of time. The other outcomes of the book reading include “providing key insights about alternative forms of university,” and “it has a great bibliography.”

Table 31. Outcome of Book Reading for ANU Postgraduate Students*

	Frequency	Percent
Improved the result	13	68.4
Inspired new thinking	13	68.4
Narrowed/broadened/changed the focus	9	47.4
Saved time or resources	3	15.8
Resulted in faster completion	2	10.5
It made me question my work	2	10.5
Others	2	10.5
Resolved technical problems	1	5.3
Resulted in collaboration/joint research	1	5.3
Wasted time	0	0
Total	19	100.0

*Respondents could select more than one outcome.

Seventy-nine percent of the book or book chapter readings will be cited or have been cited (Table 32). Five percent (1 of 19) of the readings will not be cited. Readings considered more important to the principal purpose are more likely to be cited ($p=.082$).

Table 32. Citation of Last Book Reading by ANU Postgraduate Students

	Frequency	Percent
No	1	5.3
Maybe	3	15.8
Already cited	3	15.8
Will in the future	12	63.2
Total	19	100.0

We found a significant association between principle purpose of reading and whether the reading will be cited ($\chi^2=25.133$, $p=.048$). Most book readings have been or will be cited. The required book reading for writing has been cited. Eighty-five percent of the readings for a thesis or dissertation (11 of 13) and half to keep informed (1 of 2) have been or will be cited. No book reading for personal interest has been or will be cited.

Differences of Book Reading Patterns by Demographics

Differences of Reading Patterns by Discipline

Postgraduate students in the social sciences and humanities report more book readings than students in the sciences and engineering/technology ($F=3.492$, $p=.042$). Humanists report an average of sixteen books ($M=16.14$)⁸ and social scientists report an average of eight book readings per month ($M=8.13$), while engineers report three book readings ($M=3.00$) and scientists report two book readings ($M=2.00$). However, engineering/technology/math postgraduates spend the least time per book reading ($F=.329$, $p=.804$). Engineers spend, on average, 1 hour per book reading ($M_{\text{minutes}}=60$)⁹, followed by social scientists ($M_{\text{minutes}}=158.6$), humanists ($M_{\text{minutes}}=165.6$), and scientists ($M_{\text{minutes}}=190$).

⁸ Excluding outlier of 120. Including outlier, mean is 29.13.

⁹ Excluding outlier of 600. Including outlier, mean is 390 minutes.

Respondents in the engineering/technology fields and humanities are the most likely to obtain a book reading from the library, while those in the sciences and social sciences are most likely to purchase readings ($\chi^2=17.907$, $p=.119$). Fifty percent of readings by engineers, 75% by humanists, and 14.3% by social scientists are obtained from the library. Nearly two thirds of readings by social scientists (57.1%), 25% by humanists, and 50% by scientists are purchased. Half of the readings by scientists and 14.3% by social scientists are obtained from interlibrary loan or a document delivery service.

We found some association between the discipline of postgraduates and the principal purpose of book reading ($\chi^2=16.231$, $p=.367$) (Table 33). Nearly half (42.9%) of social science postgraduates' readings are for a thesis or dissertation, as are 50% of the readings by engineering/technology/math and science postgraduates, and all by humanities students.

Table 33. Principal Purpose of Book Reading and Discipline of ANU Postgraduate Students

	Sciences	Engineering/ Technology /Math	Social Sciences	Humanities	Row Total
Required reading for course	0 0%	0 0%	1 14.3%	0 0%	1 5.3%
For thesis or dissertation	1 50%	1 50%	3 42.9%	8 100%	13 68.4%
Keep informed	1 50%	0 0%	1 14.3%	0 0%	2 10.5%
Personal interest	0 0%	0 0%	1 14.3%	0 0%	1 5.3%
Writing proposals, reports, articles	0 0%	0 0%	1 14.3%	0 0%	1 5.3%
Other	0 0%	1 50%	0 0%	0 0%	1 5.3%
Column Total	2 100.0%	2 100.0%	7 100.0%	8 100.0%	19 100.0%

We did not find any other associations between discipline and book pattern readings.

Differences of Reading Patterns by Status, Age, and Gender

Doctoral postgraduates read far more book per month ($F=1.750$, $p=.205$). Doctoral students read, on average, 12 minutes per month ($M=11.93$) compared to just 5 book readings ($M=4.75$) for master's in coursework students. However, postgraduate Master's by coursework students spend the more time per reading ($F=.363$, $p=.555$). They spend, on average, over three hours per book reading ($M_{\text{minutes}}=193.33$), followed by doctoral students ($M_{\text{minutes}}=153.00$).

We found a slight association between the respondent's academic status and how he/she became aware of the book ($\chi^2=11.919$, $p=.452$). Two thirds of the book readings by master's students are discovered through searching and one third through other means. By contrast, nearly one third of the readings by doctoral students are found through citations, 20% through another person, and 13.3% through searching. A further 13.3% of PhD students do not know or remember, and 13.3% found book readings through other means.

More book readings by doctoral students are obtained through the library than through a purchase or interlibrary loan ($\chi^2=9.651$, $p=.290$). Nearly half (46.7%, 7 of 15) of doctoral students' book readings are obtained through the library; only one of the book readings by master's in coursework students (1 of 3) are obtained through the library. On the other hand, 66.7% of the book readings by master's students (2 of 3) are obtained

through purchases, as opposed to just 33.3% by doctoral students (5). Doctoral students also obtain readings through interlibrary loan (13.3%, 2).

Most readings by doctoral students (80.0%, 12 of 15) are for a thesis or dissertation ($\chi^2=17.005$, $p=.074$). Doctoral students' readings are also for keeping informed (13.3%, 2).

One book reading by a doctoral student is for writing proposals, reports, or articles.

However, book readings by master's students are split between being for required readings, a thesis or dissertation, or personal interest (Table 34).

Table 34. Principal Purpose of Book Reading and Academic Status of ANU Postgraduate Students

	Master's in coursework students	Doctoral (PhD) students	Others	Row Total
Required reading for course	1 33.3%	0 0%	0 0%	1 5.3%
For thesis or dissertation	1 33%	12 80.0%	0 0%	13 68.4%
Keep informed	0 0%	2 13.3%	0 0%	2 10.5%
Personal interest	1 33.3%	0 0%	0 0%	1 5.3%
Writing proposals, reports, articles	0 0%	1 6.7%	0 0%	1 5.3%
Other	0 0%	0 0%	1 100%	1 5.3%
Column Total	3 100.0%	15 100.0%	1 100.0%	19 100.0%

We found some association between academic status and the importance of the book reading ($\chi^2=6.097$, $p=.412$). One third of the readings by PhD students are “absolutely essential” to the principal purpose (5 of 15). Forty percent of the readings by PhD students and all of those by master's in coursework students are “very important.” However, none

of the readings by master's in coursework students are reported to be "important" versus 20% of those by PhD students.

We found a significant association between academic status and citations of book readings ($\chi^2=10.580$, $p=.102$). Seventy-three percent of the book readings (11 of 15) by PhD students will be cited, but only 6.7% of the readings (1 of 15) have already been cited. Two thirds of the book readings by masters in coursework students (2 of 3) have been or will be cited. A single book reading by a masters' student will not be cited.

We found no significant associations between the respondent's academic status and the format of reading.

In order to examine the differences in responses by age, respondents were grouped into two age categories: under 33 and 33 years and older. Younger postgraduates read more books than older postgraduates ($F=.661$, $p=.427$). Postgraduates under 33 years read approximately 12 books per month ($M=11.56$) compared to just 8 books ($M=8.40$) by postgraduates 33 years and older. Students 33 years and older spend more time reading books than younger students ($F=1.750$, $p=.204$). Older students spend, on average, 3.17 hours per book reading ($M_{\text{minutes}}=190.00$), whereas students younger than 33 years spend 2.42 hours per book reading ($M_{\text{minutes}}=145.00$).

Younger students read more e-books than older students ($\chi^2=3.561$, $p=.059$). A quarter (25%) of younger students' book readings (2 of 8) are in electronic form, while none of the book readings by students older than 33 years (0 of 10) are e-books.

We found no other significant associations between the respondent's age and book reading patterns..

Female postgraduate students read more books than male postgraduate students ($F=1.508$, $p=.236$). Female students read, on average, 12 books or book chapters per month ($M=12.10$), while male postgraduate students read 7 books or book chapters ($M=7.44$). Women also spend more time per book reading ($F=.527$, $p=.478$). On average, women spend 3 hours ($M_{\text{minutes}}=174.09$) and men spend just over 2 hours reading ($M_{\text{minutes}}=137.14$).

Forty-six percent of the book readings by female postgraduates (5 of 11) are and 38% by male postgraduates (3 of 8) are obtained through the library ($\chi^2=5.718$, $p=.221$). Eighteen percent of the readings by women are obtained through interlibrary loan.

Ninety percent of the book readings by women (10 of 11) were for a thesis or dissertation ($\chi^2=11.819$, $p=.037$). Over one third (38%, 3 of 8) of the readings by men are for a thesis or dissertation and one-quarter to keep informed (2).

We did not find any other associations between gender and book readings.

Other Publications

This section focuses on the other types of publications that may inform academic work but which are not journal article or book readings. We left the definition relatively broad, and the “other publications” encompass a wide range of items, including government documents, trade journals, and conference proceedings. The 2011 study in the United Kingdom is the first time the Tenopir and King surveys have included other publication readings (Tenopir et al. 2012).

Total Amount of Other Publication Reading and Last Incident of Reading

As in the previous sections, we started the section by defining terms and asking respondents to estimate total readings in the past month. We asked, “*In the past month (30 days), approximately how many other publications or parts of publications (non-article or book readings) have you read for your work? Include conference proceedings, government documents, technical reports, magazines, trade journals, etc.*” We are more concerned with the relative amounts of reading than the actual number, and for convenience, we often report readings per year by multiplying the monthly total by 12. Postgraduate students at Australian National University report an average of six other publications read per month, or approximately 71 per year (M=5.91, SD=7.813).¹⁰ Using the conservative ten-month estimate, the average postgraduate student reads 60 other publications per year. Thirty-five percent of the respondents did not report any other publication readings in the past month, and 21.7% report over ten other publication readings (Table 35).

Table 35. Number of Other Publication Readings by ANU Postgraduate Students

Readings per month	Frequency	Percent
0	8	34.8
1 ~ 2	3	13.0
3 ~ 5	5	21.7
6 ~ 10	2	8.7
Over 10	5	21.7
Total	23	100.0

Type of Other Publications Read and Total Time of Reading

As in the article and book reading sections, we used the critical incident technique to focus the questions on the other publication most recently read, regardless if it is typical.

¹⁰ Excluding one outlier of 100. Including outlier, mean is 10.

Since the type of publication could vary, we asked what type of other publication they most recently read. Over half of the other publications read by Australian National University postgraduates are government documents or other technical reports (53.3%, 8 of 15) (Table 36). Thirteen percent read magazines/trade journals (13.3%, 2 of 15), and news sources are read by the same number (13.3%, 2 of 15). Other types of other publications include a university course web page, another website, and a “Lobby group reaction to government document.”

Table 36. Type of Other Publications Read by ANU Postgraduate Students

Type of Reading	Frequency	Percent
Conference Proceedings	0	0
Government Document/ Technical Report	8	53.3
Magazine/ Trade Journal	2	13.3
News Source	2	13.3
Other	3	20.0
Total	15	100.0

The average time spent reading is 32 minutes ($M=32.0$, $SD=25.27$).¹¹ Twenty percent of other publication readings take over one hour (Table 37). Over 50% of other publication readings are thirty minutes or less.

Table 37. Time Spent on Last Other Publication Reading by ANU Postgraduate Students

Minutes	Frequency	Percent
0-15	4	26.7
16-30	5	33.3
31-60	3	20.0
61-90	1	6.7
91-120	0	0
Over 120	2	13.3
Total	15	100.0

¹¹ Excludes two outliers over 300. Including outliers mean is 135.73.

Time to Become Aware of Other Publication

After establishing the last other publication reading and how long they spent per reading, we focused on how long it took them to become aware of the other publication from which they read. We asked, “*Approximately how much time (in minutes) did you or someone spend becoming aware of this last other publication from which you read?*”

Postgraduate students spend an average of 4 minutes becoming aware of other publication reading ($M=4.15$, $SD=6.322$).¹²

Obtaining the Other Publication

We asked, “*After you became aware of this publication, where did you obtain it?*” The wording and answer choices were kept similar to the other sections for comparison. Fourteen percent of the other publication readings are obtained from a library collection (Table 38). The same amount of readings are purchased as from a library collection (14.3%). However, other publications are more often obtained from the publisher (21.4%) or through other means (42.9%), several including free web pages, a lobby group website, a government website, and one “It was on the internet, yo.”

¹² Excluding one outlier of 120. Including outlier, mean is 12.4 minutes.

Table 38. How ANU Postgraduate Students Obtain Books

	Frequency	Percent
I bought it for myself (print)	2	14.3
The library or archives collection	2	14.3 (100.0)
• Print	(1)	(50.0)
• Electronic	(1)	(50.0)
Interlibrary loan or document delivery service	0	0
School or department collection (electronic)	1	7.1
A colleague, author or other person provided it to me	0	0
A free, advance, or purchased copy from the publisher	3	21.4 (100.0)
• Print	(2)	(66.7)
• Electronic	(1)	(33.3)
Other source (electronic)	6	42.9
Total	14	100.0

Sixty-four percent of the other publication readings by postgraduate students are obtained from an electronic source (9 of 14), including half of the readings obtained from the library (50%, 1 of 2) and all of those obtained through another source (6 of 6).

Alternative to Obtain Other Publication

To determine contingent valuation, we asked, “*Thinking back to where you obtained the publication (e.g., library collection, department collection, interlibrary loan, etc.), where would you obtain the information if that source were not available?*” Over half of respondents would not bother getting the information from another source (57.1%, 8 of 14). We did not specify what alternative source they would use.

Purchased readings are the least likely to be obtained from another source (2 of 2). However, half of books originally obtained from the library would not be obtained from an

alternative source (1 of 2). Value to academic work, therefore, would be lost if the library collection were not available. Two thirds of readings obtained from other sources would not be obtained, and one third of readings obtained from a publisher would not be obtained. Over 40% of readings, however, would be obtained from another source, costing postgraduates time and/or money to obtain them.

Purpose and Value of Other Publication Reading

The last set of questions focuses on the principal purpose of the last other publication reading and the value and importance of the reading. We asked, “*For what principal purpose did you use, or do you plan to use, the information obtained from the publication you last read?*” Reading for a thesis or dissertation is the most frequent principal purpose of reading (Table 39). Twenty-nine percent of the readings are for a thesis or dissertation, and 21.4% are for personal interest. The other principal purposes (21.4%) include, “Relevant to paid work,” “Paid research work,” and “Work/employment-related.”

Table 39. Principal Purpose of Other Publication Reading by ANU Postgraduate Students

	Frequency	Percent
For thesis or dissertation	4	28.6
Teaching duties	1	7.1
To keep informed	2	14.3
Personal interest	3	21.4
Writing proposals, reports, articles	1	7.1
Other	3	21.4
Total	14	100.0

To measure value in relation to principal purpose, we asked, “*How important is the information contained in this publication to achieving your principal purpose?*” Almost three-quarters of the other publication readings are considered at least “somewhat important” (Table 40). Half of the readings are considered “absolutely essential” or “very important” to the principal purpose (7 of 14).

Table 40. Importance of Other Publication Reading to Principal Purpose of ANU Postgraduate Students

	Frequency	Percent
Absolutely essential	4	28.6
Very Important	3	21.4
Important	2	14.3
Somewhat important	2	14.3
Not at all important	3	21.4
Total	14	100.0

We found an association between the importance of other publication readings and whether the information would be obtained from an alternative source if the original source was not available ($\chi=15.302$, $p=.012$). Overall, only 42.9% of readings would be obtained elsewhere (6 of 14). Only readings considered “very important” (66.7%, 2 of 3) and “absolutely essential” (100%, 4 of 4) would be obtained from an alternative source.

We also found a significant association between the importance of other publication readings and the principal purpose. All readings for a thesis or dissertation (4) are considered “very important” or “absolutely essential” ($\chi^2=31.938$, $p=.044$). But, the publications for personal interest (3 of 3) are considered “not at all important.” Similarly, both of the publications for keeping informed were considered “somewhat important.”

We did not find a significant association between the importance of other publication readings and where the readings are obtained.

Outcomes of Other Publication Reading

To look at value to principal purpose more closely, we asked, “*In what ways did the reading of the publication affect the principal purpose?*” “Inspired new thinking,” “improved the result” and “narrowed/broadened/changed the focus” are the most frequent outcomes (Table 41). The other outcomes of the other publication reading include “part of Case Study,” “primary source,” and “it backed up my work.”

Table 41. Outcome of Other Publication Reading for ANU Postgraduate Students*

	Frequency	Percent
Improved the result	8	57.1
Inspired new thinking	5	35.7
Narrowed/broadened/changed the focus	4	28.6
Others	3	21.4
Resolved technical problems	2	14.3
Saved time or resources	2	14.3
It made me question my work	2	14.3
Resulted in faster completion	1	7.1
Wasted time	1	7.1
Resulted in collaboration/joint research	0	0
Total	14	

*Respondents could select more than one outcome.

Fifty-seven percent of the other publication readings (8 of 14) will be cited or have been cited (Table 42). Thirty-six percent (5 of 14) of the readings will not be cited. Readings considered more important to the principal purpose are more likely to be cited ($p=.064$).

Table 42. Citation of Last Other Publication Reading by ANU Postgraduate Students

	Frequency	Percent
No	5	35.7
Maybe	1	7.1
Already cited	6	42.9
Will in the future	2	14.3
Total	14	100.0

We found a significant association between principle purpose of reading and whether the reading will be cited ($\chi^2=21.389$, $p=.088$). All other publication readings for a thesis or dissertation (4 of 4) have been or will be cited. Half of other publication readings to keep informed may be cited (1 of 2), and half will not be cited (1). No other publication reading for personal interest has been or will be cited.

Differences of Other Publication Reading Patterns by Demographics

Differences of Reading Patterns by Discipline

Postgraduate students in the social sciences and humanities report more other publication readings than students in the sciences and engineering/technology ($F=.611$, $p=.618$). Humanists report an average of five other publications ($M=5.38$) and social scientists report an average of nine other publication readings per month ($M=9.00$), while engineer/technology/math students report two other publication readings ($M=2.00$)¹³ and scientists report two other publications readings ($M=1.50$). In addition to reading the fewest other publications, engineering/technology/math postgraduates spend the least time reading per other publication reading ($F=.398$, $p=.758$). Engineers spend, on average, fifteen minutes per other publications reading ($M_{\text{minutes}}=15.5$). Scientists spend half an

¹³ Excluding outlier of 100. Including outlier, mean is 51.00.

hour ($M_{\text{minutes}}=30.0$), and humanists about the same ($M_{\text{minutes}}=31.0$). Social scientists read for the longest, nearly three quarters of an hour ($M_{\text{minutes}}=42.5$).¹⁴

Humanities respondents report more other publication readings obtained through the library ($\chi^2=14.797$, $p=.253$). Forty percent of the readings by humanities (2 of 5) postgraduates are obtained through the library. No other discipline reports obtaining other publication readings from the library. Half of the readings by social scientists (3 of 6) are obtained through a publisher. Both (2) readings by engineering/technology/math postgraduates and the single other publication reading by a science student are obtained through other means. Furthermore, 40% (2) of the readings by humanists are obtained through other means.

We found some association between the discipline of postgraduates and the principal purpose of other publications reading ($\chi^2=17.570$, $p=.286$) (Table 43). Nearly half (40.0%, 2 of 5) of humanities postgraduates' readings are for a thesis or dissertation, as are one third of the readings by social science postgraduates. Half of the readings by engineering/technology postgraduates are for keeping informed (1 of 2), and half for personal interest (1).

¹⁴ Excluding outliers over 300. Including outliers, mean is 298.33 ($F=.769$, $p=.537$).

Table 43. Principal Purpose of Other Publications Reading and Discipline of ANU Postgraduate Students

	Sciences	Engineering/ Technology /Math	Social Sciences	Humanities	Row Total
For thesis or dissertation	0 0%	0 0%	2 33.3%	2 40.0%	4 28.6%
Teaching duties	0 0%	0 0%	1 16.7%	0 0%	1 7.1%
Keep informed	0 0%	1 50.0%	1 16.7%	0 0%	2 10.5%
Personal interest	0 0%	1 50.0%	0 0%	2 40.0%	3 21.4%
Writing proposals, reports, articles	1 100.0%	0 0%	0 0%	0 0%	1 5.3%
Other	0 0%	0 0%	2 33.3%	1 20.0%	3 21.4%
Column Total	1 100.0%	2 100.0%	6 100.0%	5 100.0%	14 100.0%

We did not find an association between the respondent's discipline and the format of the reading, the importance of the reading to the principal purpose, or whether the reading will be cited.

Differences of Reading Patterns by Status, Age, and Gender

Master's in coursework postgraduates report more other publication readings per month ($F=1.748, p=.204$). Masters in coursework students read approximately 11 other publications per month ($M=11.00$), while doctoral students read 5 ($M=5.07$). Postgraduate Master's by coursework students spend the most time per reading ($F=6.033, p=.022$). They spend, on average, over one and a half hours per other publication reading ($M_{\text{minutes}}=90.0$), followed by doctoral students ($M_{\text{minutes}}=29.5$).

We found some association between academic status and the importance of the other publication reading ($\chi^2=10.160$, $p=.254$). Twenty percent of the readings by PhD students (2 of 10) and two-third of those by master's students (2 of 3) are "absolutely essential" to the principal purpose. Thirty percent of the readings by PhD students are "very important" (2 of 10), and 10% are considered "important." A single reading by master's students is considered "important" (1 of 3).

We found some differences between academic status and citations of other publication readings ($\chi^2=8.067$, $p=.233$). Two thirds of the readings by master's in coursework students (2 of 3) and 60% by doctoral students (6 of 10) have been or will be cited.

We found no other significant associations between the respondent's academic status and other publication reading patterns.

Younger postgraduates read more other publications per month than older postgraduates ($F=.857$, $p=.368$). Students under 33 years read about 8 ($M=8.22$) other publications per month and those 33 years and older read 5 ($M=4.56$). We did not find a significant association between age and time spent per reading.

Younger students read more electronic other publication than older students ($\chi^2=2.356$, $p=.125$). Over three quarters (83.3%) of younger students' other publication readings (5 of 6) are in electronic form, while just under half of the other publication readings by students older than 33 years (42.9%, 3 of 7) are electronic.

Half of other publication readings by respondents under 33 (3 of 6) are "absolutely essential," while none are considered "very important" ($\chi^2=11.353$, $p=.023$). However, no readings by older students are considered "absolutely essential" (0 of 7), while 42.9% are

“very important.” Seventeen percent of readings by younger students are “important” or “somewhat important,” but 42.9% of readings by older students are. One third of younger students’ readings (2 of 6) and 14.3% of older students’ readings (1 of 7) are considered “not at all important.”

We found no association between the respondent’s age and amount of time spent on reading, where the reading was obtained, number of other publication readings, purpose of other publication reading, or whether the other publication will be cited.

Female postgraduate students spend more time reading other publications than male postgraduate students ($F=2.280$, $p=.154$). On average, women spend 40 minutes ($M_{\text{minutes}}=40.0$) and men spend just over 15 minutes reading ($M_{\text{minutes}}=16.5$).¹⁵ We did not find any differences between gender and number of other publications read per month.

Female respondents are more likely than males to read readings in a print format ($\chi^2=2.240$, $p=.134$). All five of the other publication readings by male postgraduates are read in an electronic format. Over half (56%, 5 of 9) of the readings by female postgraduates are in print and 44% are in electronic format (4).

The majority of the readings by female postgraduates are for a thesis or dissertation (44.4%, 4 of 9), while this was not the principal purpose for any male postgraduates ($\chi^2=7.838$, $p=.165$) (Table 44). Forty percent of the readings by men (2 of 5) are for personal interest. Only one other publication reading by a woman is read for that purpose.

¹⁵ Excluding outliers over 400. Including outliers, means are 253.2 (male) and 82.2 (female).

Table 44. Principal Purpose of Other Publication Reading and Gender of ANU Postgraduate Students

	Male	Female	Row Total
For thesis or dissertation	0 0%	4 44.4%	4 28.6%
Teaching duties	1 20.0%	0 0%	1 7.1%
Keep informed	1 20.0%	1 11.1%	2 14.3%
Personal interest	2 40.0%	1 11.1%	3 21.4%
Writing proposals, reports, or articles	0 0%	1 11.1%	1 7.1%
Other	1 20.0%	2 22.2%	3 21.4%
Column Total	5 100.0%	9 100.0%	14 100.0%

We did not find a significant association between gender and number of other publication readings, alternative sources to obtain readings, importance of reading, or whether readings will be cited.

Social Media: Participation and Creation

The use of social media has increased in the last few years in both the academic and non-academic world. In this study, we wanted to see if use of social media has an influence on reading of traditional materials. According to the JISC website, social media or Web 2.0 technologies are, “innovative online tools designed to enhance communication and collaboration.” Social media includes blogs, twitter, online videos, social networks, and other online and electronic tools.

A 2010 RIN study found that social media tools (blogs, wikis, file-sharing services) are being used as supplements to the traditional forms of information (monographs, journal articles, etc.). Academics place value on the traditional publications because they receive recognition and rewards for their work. In the RIN study, only 13% of the respondents used social media tools frequently, and 39% did not use them at all. The study found that academics are supportive of social media because it allows them to freely share ideas and collaborate with a broader scholarly community. While they found a few slight associations between social media use and demographics, for the most part age, discipline, and position are not key factors. They concluded that while social media will continue as a supplement to traditional publications, academics' lack of trust and quality will keep it from creating a radical change in scholarly communications (RIN 2010). Our findings support the 2010 RIN findings.

Participation and Creation of Social Media

Postgraduate students participate in social media more than they create it; however, their use and creation is more often occasional rather than on a regular basis. More respondents participate in blogging than any other social media tool, but more participate in social networking websites daily than any other social media tool (Table 45). Sixty-five percent of the respondents participate in blogging at least occasionally. Social networking, commenting on articles, and video and audio sharing are also popular social media tools. Over half of the respondents participate in social networking (60.0%) and video sharing (55.0%), and 45% participate in audio sharing and commenting on articles at least

occasionally. The majority of respondents never participate in social tagging (90.0%) or collaborative authoring (80.0%).

Table 45. Participation in Social Media by ANU Postgraduate Students

	Daily	Weekly	Monthly	Occasionally	Never	Total
Blogging	3 15.0%	5 25.0%	0 0%	5 25.0%	7 35.0%	20 100.0%
Microblogging	4 20.0%	1 5.0%	0 0%	3 15.0%	12 60.0%	20 100.0%
RSS Feeds	2 10.0%	0 0%	0 0%	4 20.0%	14 70.0%	20 100.0%
Social Networking	7 35.0%	0 0%	2 10.0%	3 15.0%	8 40.0%	20 100.0%
Social Tagging	0 0%	0 0%	0 0%	2 10.0%	18 90.0%	20 100.0%
Collaborative Authoring	0 0%	0 0%	0 0%	4 20.0%	16 80.0%	20 100.0%
Comments in articles	3 15.0%	2 10.0%	0 0%	4 20.0%	11 55.0%	20 100.0%
Image sharing	0 0%	1 5.0%	2 10.0%	4 20.0%	13 65.0%	20 100.0%
Audio sharing	1 5.0%	0 0%	2 10.0%	6 30.0%	11 55.0%	20 100.0%
Video sharing	2 10.0%	4 20.0%	0 0%	5 25.0%	9 45.0%	20 100.0%

As with social media participation, blogging and social networking are the most frequently created (Table 46). Nearly a quarter (20.0%) of the respondents create social networking content daily, weekly, or monthly, and 20.0% create it occasionally. Twenty percent also create blogging daily, weekly, or monthly, and 10% create it occasionally. Twenty-five percent of the respondents create microblog content at least occasionally. Less than 5% of the respondents create RSS feeds.

Table 46. Creation of Social Media by ANU Postgraduate Students

	Daily	Weekly	Monthly	Occasionally	Never	Total
Blogging	1 5.0%	3 15.0%	0 0%	2 10.0%	14 70.0%	20 100.0%
Microblogging	3 15.0%	2 10.0%	0 0%	0 0%	15 75.0%	20 100.0%
RSS Feeds	1 5.0%	0 0%	0 0%	0 0%	19 95.0%	20 100.0%
Social Networking	3 15.0%	1 5.0%	0 0%	4 20.0%	12 60.0%	20 100.0%
Social Tagging	0 0%	0 0%	0 0%	2 10.0%	18 90.0%	20 100.0%
Collaborative Authoring	0 0%	0 0%	0 0%	3 15.8%	16 84.2%	19 100.0%
Comments in articles	1 5.0%	0 0%	0 0%	2 10.0%	17 85.0%	20 100.0%
Image sharing	0 0%	0 0%	2 10.0%	0 0%	18 90.0%	20 100.0%
Audio sharing	0 0%	0 0%	0 0%	2 10.0%	18 90.0%	20 100.0%
Video sharing	0 0%	0 0%	0 0%	2 10.0%	18 90.0%	20 100.0%

Participation and Creation of Social Media and Scholarly Reading

One reason we examined the use and creation of social media was to see how it influenced the use of traditional scholarly material. Are postgraduate students using social media for information instead of journal articles? Are they using and creating social media as a form of collaboration and to share ideas? Is social media replacing traditional material? Do postgraduate students who participate in and create social media read fewer articles, books, and other publications? By comparing the respondent's reading patterns with his or her use and creation of social media, we hope to address these questions.

Australian National postgraduates who participate in between one and five social media tools read more articles ($F=7.335, p=.001$) and books ($F=3.028, p=.052$).

Postgraduates who use one or two social media tools read, on average, 41 articles (M=40.80)¹⁶ and 12 books per month (M=12.20)¹⁷; those who use between three and five social media tools read 21 articles (M=21.29) and 7 books (M=6.57) per month. Students using six or more tools read 24 articles (M=24.17) and 13 books (M=13.00). Students who use none of the social media tools listed read only 8 articles (M=7.54) and 2 books (M=2.29) per month.

Participation in Social Media and Demographics

For our analysis, we define participation and use of social media as using the tool occasionally to daily. Table 47 represents the number of respondents and the percentage within each discipline who participate in the social media tool daily, weekly, monthly, or occasionally. Overall, more humanists and scientists participate in social media than respondents in medical sciences or social sciences, though the engineering/technology disciplines participate almost as much as scientists.

¹⁶ Excludes outliers over 100. Including outliers mean is 54.00.

¹⁷ Excludes outliers over 100. Including outliers mean is 30.17.

Table 47. Percentage of ANU Postgraduate Students Who Participate in Social Media by Discipline

	Sciences	Engineering/ Technology	Social Sciences	Humanities
Blogging	1 50%	2 100%	4 50%	6 75%
Microblogging	0 0%	2 100%	2 25%	4 50%
RSS Feeds	0 0%	1 50%	1 12.5%	4 50%
Social Networking	2 100%	2 100%	3 37.5%	5 62.5%
Social Tagging	0 0%	1 50%	0 0%	1 12.5%
Collaborative Authoring	0 0%	2 100%	0 0%	2 25%
Comments in articles	2 100%	1 50%	4 50%	2 25%
Image sharing	1 50%	1 50%	1 12.5%	4 50%
Audio sharing	1 50%	1 50%	1 12.5%	6 75%
Video sharing	2 100%	0 0%	4 50%	5 62.5%

Eighty percent of doctoral students participate in blogging (80%), but no master's in coursework students do (0%) ($\chi^2=10.886$, $p=.004$). Only one master's in coursework postgraduate reported participating in social networking ($\chi^2=3.326$, $p=.190$), user comments ($\chi^2=2.299$, $p=.317$), and audio sharing ($\chi^2=2.299$, $p=.317$). Two-thirds of doctoral students participate in social networking, 47% in user comments, and 47% in audio sharing. We did not find any other significant differences between the postgraduate student's status and participation in social media.

We did not find significant differences between the respondents' age and participation in all social media tools.

We did find some differences in gender and use of microblogging ($\chi^2=8.430$, $p=.064$), collaborative authoring ($\chi^2=1.857$, $p=.173$), and audio sharing ($\chi^2=.910$, $p=.340$). Male postgraduates participate more in microblogging and collaborative authoring than female students, while females participate slightly more in image sharing (Table 48).

Table 48. Percentage of ANU Postgraduate Students Who Participate in Social Media by Gender

	Male	Female
Microblogging	5 55.6%	3 27.3%
Collaborative authoring	3 33.3%	1 9.1%
Audio sharing	3 33.3%	6 54.5%

Creation of Social Media and Demographics

For our analysis, we defined the creation of social media as daily to occasionally. More respondents in each discipline do not create each social media tool than create it. In fact, those who create social media content tend to read less articles ($F=.694$, $p=.570$) per month. Australian National postgraduates who create content for only one or two social media tools read the most articles ($M=26.67$). Students creating content for between three and five social media tools read only 25 articles ($M=25.0$), while those creating content for six or more social media tools read just 10 articles ($M=10.0$) per month. On the other hand, students who create no social media content read, on average, 31 articles ($M=30.89$)¹⁸ per month. Book readings differ slightly from article readings, but there is an association between the number of books read per month and the creation of social media ($F=1.146$,

¹⁸ Excluding outliers over 100. Including outliers, mean is 39.80.

p=.363). Respondents who create the most social media content, six or more tools per month, read an average of only 5 books per month (M=5), while respondents creating content on one to two social media tools read an average 7 books (M=7.17), and those who do not create any content read an average of 11 books (M=11.0)¹⁹. But the respondents who create social media on three to five tools read the most books, with an average of 18 (M=18.0).

Overall, more engineering/technology students create social media than scientists, social scientists or humanists (Table 49). We discovered many differences among disciplines and creation of social media content for various tools.

Table 49. Percentage of ANU Postgraduate Students Create Social Media Content by Discipline

	Sciences	Engineering/ Technology	Social Sciences	Humanities
Blogging	0 0%	1 50%	3 37.5%	2 25%
Microblogging	0 0%	1 50%	1 12.5%	3 37.5%
RSS Feeds	0 0%	1 50%	0 0%	0 0%
Social Networking	2 100%	2 100%	1 12.5%	3 37.5%
Social Tagging	0 0%	1 50%	0 0%	1 12.5%
Collaborative Authoring	0 0%	2 100%	0 0%	1 12.5%
Comments in articles	0 0%	1 50%	2 25%	0 0%
Image sharing	0 0%	1 50%	0 0%	1 12.5%
Audio sharing	0 0%	1 50%	0 0%	1 12.5%
Video sharing	0 0%	0 0%	1 12.5%	1 12.5%

¹⁹ Excluding outliers over 100. Including outliers, mean is 21.90.

All the respondents that report creating social media are doctoral students. Otherwise, we did not find any significant associations between the respondent's academic status or age and the creation of content for social media.

We found some differences between the postgraduate student's gender and their creation of social media. As in participation of social media tools, male students tend to create more social media content. Male students create video sharing content (22%) more than female students (0%) ($\chi^2=3.469$, $p=.063$), audio sharing content (22%) more often than female students (0%) ($\chi^2=3.469$, $p=.063$), and image sharing content (22.2%) more often than female students (0%) ($\chi^2=3.469$, $p=.063$). Male students (44.4%) microblog more than female students (9.1%) ($\chi^2=1.684$, $p=.194$) and create social networking content (66.7%) more than females (18.2%) ($\chi^2=3.039$, $p=.081$). Thirty-eight percent of males create collaborative authoring content, but no females do ($\chi^2=5.989$, $p=.014$).

Open-Ended Questions

At the end of the survey, we asked, "*What role do electronic resources play in your school work?*" We hoped the open-ended questions would provide the forum for the respondents to address any issues or topics that were not addressed in the survey. In addition, the open-ended comments provide another dimension to understand the value of scholarly reading and library resources. We received 18 comments in response to the question.

The majority of the comments praised the role of electronic journals in their course work and research activities, and also noted the importance of the library's electronic

collections. Several respondents also emphasized the use of electronic resources as a way to research and collaborate through online social media. The following are the comments we received:

- *They play a crucial role indeed, and make literature search and use much more efficient. I am also relying more and more on technology (iPad) in my work to collect and read papers, to minimize printing, and even use some apps to take notes on the e-paper.*
- *Very large component. Except for courses where I need to use specific software in the university library I do all of my assignments entirely through e resources at home or on occasion while travelling both domestically and overseas.*
- *Vital. But some resources which are not online I have to search four university libraries to find: <http://blog.tomw.net.au/2012/06/usq-online-pedagogy-course-let-down-by.html>*
- *They are essential. I download 95% or more articles online. The university has more and more ebooks which I have bookmarked. I use social media daily for research purposes. Our research centre has a popular website which I edit. I found out about my PhD topic through the internet and search for resources online. To be honest, I can't imagine how I would do this work without the internet.*
- *A vital role. E-resources have revolutionised research in the social sciences because the articles are searchable and storable.*
- *Vital. As a distance student, I rely on electronic access to the ANU Library, and their diverse journal subscriptions immensely in my research.*
- *I live in a regional area - in a different state from my institution and 3h from the nearest law library at any other academic institution. E-resources are vital to enabling me to study. That said, many historical reports, records, and texts are not available electronically, which means that the Off-Campus Service is also pivotal to my study. Without these two research tools I would be unable to undertake higher level studies.*
- *e-resources are essential. My library holds very little material that is relevant to my research.*
- *almost everything*
- *E resources play a huge role in my university work. I no longer go to school I am too old for that. I use resources on a daily basis to locate and obtain journal articles and other types of information relevant to my studies. I feel forced to print out journal articles however as the only tablets that properly support journal article formats are all led lit and I want to get away from my computer. I also still frequently rely on books and printed material for my studies and am sometimes frustrated by the lack of access to these items.*

- *I absolutely rely on electronic access as I am both part-time and external (live approx 1500 km from my university) and I work full-time. Being able to access journal articles in particular online any time of the day or night is wonderful*
- *Almost all journal articles I read are electronic. They are essential to the work I do.*
- *Most information is at least initially source through searching e-resources*
- *I use them largely because I must. I despise reading articles and ebooks for academic purposes. I will always print them if possible. I think the library's new found obsession with purchasing ebooks, one which limit the amount of printing at that, to be a annoying waste of time. This usually results in me having to buy the proper version of the book*
- *They are a standard and daily part of my research toolkit.*
- *A significant role. All journal articles are downloaded through the library subscription (or by request). I have around 20 academic texts as ebooks and have accessed another 20 ebooks through the library. I also access resources through podcasts and onine video (youtube, vimeo)*
- *Very important - journal articles downloaded via e-library is crucial to save me trip to the library, I can work from home!*
- *Vital. I mostly use e-journals for my assignments.*

Overall, the comments show a dependence on e-resources by postgraduate students.

The advent of technology and the adaptation of technology into classwork have made it almost essential for students to have access to e-resources to complete their work. Many respondents note that they are “essential,” “vital,” and “critical” to their roles as researchers, students, and instructors. They appreciate the convenience and accessibility of e-resources, including those provided by the library, and e-resources are quickly becoming the first and often only resource of scholarly information.

Role of Library Collections

We re-categorized how someone obtains scholarly reading material into three basic categories: “library-provided,” “personal subscription/purchase,” and “other.” We included interlibrary loan and school or department collection or subscription with the “library-provided” category because we assume students cannot always differentiate between what is provided by the library and what is provided by other e-resources. We included free web journal, course reserves, colleague or another person, preprint, publisher, and website in “other.” While articles are primarily obtained from a library or school-provided subscription (72.7%), postgraduate students obtain book readings from a variety of sources (Table 50). Over half (52.6%) of book readings are obtained from a library or school-provided collection, 36.8% are purchased and 10.5% are from another source, including colleague or publisher. Most other publications (64%) are obtained through other means such as a colleague or publisher.

Table 50. Source of Reading by ANU Postgraduate Students

	Article		Book		Other publications	
	N	%	N	%	N	%
Library-provided	16	72.7	10	52.6	3	21.4
Personal source	1	4.5	7	36.8	2	14.3
Others	5	22.7	2	10.5	9	64.3
Total	22	100.0	19	100.0	14	100.0

The library’s collections provide access to older articles in addition to the current collections. Sixty-nine percent of the library-provided articles are two years old or older (Table 51). Regardless of the age of the publication, the majority of library-provided articles are from its electronic collections. All of the library-provided articles published

over fifteen years ago are from an electronic subscription. Our findings show the library's back files in addition to current subscriptions are a key investment.

Table 51. Association between Source of Article and Year of Publication for ANU Postgraduate Students

	Library Provided	Personal Subscription	Others	Row Total
Over 15 years (Before 1998)	1 6.3%%	0 0%	0 0%	1 4.5%
11 ~ 15 years (1998-2002)	2 12.5%	0 0%	2 40.0%	4 18.2%
6 ~ 10 years (2003-2007)	3 18.8%	0 0%	1 20.0%	4 18.2%
2 ~ 5 years (2008-2011)	5 31.3%	0 0%	0 0%	5 22.7%
Less than 2 years (2012-2013)	5 31.3%	1 100.0%	2 40.0%	8 36.4%
Column Total	16 100.0%	1 100.0%	5 100.0%	22 100.0%

We found some differences between the principal purpose of reading and the source of article reading ($\chi^2=12.817$ and $p=.102$) and the source of book reading ($\chi^2=21.776$, $p=.001$). Eighty-seven percent of articles read for theses/dissertations and 33.3% to keep informed are obtained from the library, while 13.3% of articles read for a thesis or dissertation are obtained from other means. Only 33.3% to keep informed are obtained through personal subscriptions.

Three quarters (76.9%) of the book readings for theses/dissertations are obtained from the library and 23.1% are obtained through personal purchases. Since the library does not usually carry textbooks (required readings), that explains why there is a lower percentage of library-provided article and book readings; instead, what it shows is that students turn to the library for course material because they depend on the library for material to support course work but not specifically assigned.

One measure of value of the library for scholarly work and the research can be represented by how many hours per year each postgraduate student dedicates to library-provided reading. Based on past methodology that creates a formula to measure postgraduate output based on library input, we measured the library's value by the time spent using library reading material, assuming that scholarly readings are important for quality postgraduate work and their professional development (Luther 2008). We can illustrate the total amount of reading by each postgraduate student by using a simple formula of time spent reading each material in minutes multiplied by the number of each material read per month multiplied by 12 to calculate an annual total.²⁰ We then multiply the total amount by the percentage obtained from the library and divide by 60 to determine the number of hours per year each postgraduate student devotes to library-based work (Table 52).

Table 52. Value of Library Resources to ANU Postgraduate Students

	Time per reading (minutes)	Number read per month	Multiplied by 12 months	Percent from library	TOTAL
Article	40.91	19.23	12	72.7	114 hours
Book	156.05	8.04	12	52.6	132 hours
Other publication	32.0	5.91	12	21.4	8 hours

Postgraduate students spend the most time on library-provided book readings, approximately 132 hours each year. They spend approximately 114 hours on library-provided article readings and 8 hours on other publication readings. Annually, postgraduate students spend 254 hours of their work time with library-provided material, or the equivalent of 31.75 eight-hour days. Clearly, the amount of time spent reading

²⁰ Excludes outliers.

library-provided material has a profound impact on the quality and focus of postgraduate work.

Postgraduate students are prolific readers of journal articles and books, and the library is an important resource for them. They often face strict personal budgets and are pressed for time, and the library's collections, in particular its e-collections, provide free resources in a timely manner. Scholarly reading remains a vital part of graduate work, as the students increase their knowledge in their field, work on their own research, and start out in their academic career. Maintaining the quality of the library's collections will enable the budding professionals to have access to important information, and will improve the future of the academic endeavor.

Bibliography

- Andrews, J. "The Use of the Critical Incident Research Technique in an Academic Library." *Library & Information Research News* 14, no. 50 (1991): 22-27.
- Belefant-Miller, Helen and Donald W. King. "How, What and Why Science Faculty Read." *Science and Technology Libraries* 19, no. 2 (2001): 91-112.
- Brown, Cecelia M. "The Role of Electronic Preprints in Chemical Communication: Analysis of Citation, Usage and Acceptance in the Journal Literature." *Journal of the American Society of Information Science and Technology* 54, no. 5 (2003): 362-371.
- Chrzastowski, Tina E. "Assessing the Value of Ebooks to Academic Libraries and Users." *Proceedings of the 9th Northumbria International Conference on Performance Measurement in Libraries and Information Services. University of York, United Kingdom.* 2011. In Press. <http://www.ideals.illinois.edu/handle/2142/28612>.
- CIBER. *JISC National E-Books Observatory Project: Key Findings and Recommendations Final Report.* London: CIBER, 2009. <http://observatory.jiscebooks.org/reports/jisc-national-e-books-observatory-project-key-findings-and-recommendations/>.
- Flanagan, J.C. "The Critical Incident Technique." *Psychological Bulletin* 52, no. 4 (1954): 327-358.
- Folb, Barbara L., Charles B. Wessel, and Leslie J. Czechowski. "Clinical and Academic Use of Electronic and Print Books: The Health Sciences Library System E-book Study at the University of Pittsburgh." *Journal of the Medical Library Association* 9, no. 3 (2011): 218-228. doi: 10.3163/1536-5050.99.3.009.
- Fry, Jenny and Sanna Talja. *The Cultural Shaping of Scholarly Communication: Explaining Ejournal Use within and across Academic Fields.* Proceedings of the American Society for Information Science and Technology, 41 (2004): 20-30. Washington, DC: American Society for Information Science.
- Griffiths, J.M. and Donald W. King. *A Manual on the Evaluation of Information Centers and Services: NATO, AGARD.* New York: American Institute of Aeronautics and Astronautics, 1991.
- Healy, Leigh Watson, Lynn Dagar, and Katherine Medaglia Wilkie. Custom Report Prepared for the Digital Library Federation/Council on Library and Information Resources.

- Burlingame, CA: Outsell, 2002.
- Imholz, Susan and Jennifer Weil Arns. "Worth Their Weight: An Assessment of the Evolving Field of Library Valuation." New York: Americans for Libraries Council, 2007.
www.ala.org/research/files/librarystats/worththeirweight.pdf.
- JISC. "Activities by Topic: Web 2.0." Last modified 20 September 2010.
<http://www.jisc.ac.uk/whatwedo/topics/web2.aspx>.
- King, Donald W., Dennis D. McDonald, and Nancy K. Roderer. *Scientific Journals in the United States: Their Production, Use and Economics*. Stroudsburg, PA: Hutchinson Ross Publishing Company (Division of Academic Press), 1981.
- Luther, Judy. "University Investment in the Library: What's the Return? A Case Study at the University of Illinois at Urbana-Champaign." San Diego: Elsevier Library Connect White Paper, 2008. <http://libraryconnectarchive.elsevier.com/whitepapers/0108/lcwp0101.pdf>.
- Machlup, Fritz. "Uses, Value, and Benefits of Knowledge." *Science Communication* 1, no. 1 (1979): 62-81. doi: 10.1177/107554707900100104.
- Maughan, P.D. "Library Resources and Services: A Cross-Disciplinary Survey of Faculty and Graduate Student Use and Satisfaction." *Journal of Academic Librarianship* 25, no. 5 (September 1999): 354-366.
- Murdoch, Lachlan. *ANU Statistical Summary 2011*. Australian National University Statistical Services Department, Canberra ACT 0200 Australia, 2011. Retrieved from <http://unistats.anu.edu.au/statistics/quickstats/card2011s.pdf>.
- National Science Foundation, Division of Science Resources Statistics. *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2011*. Special Report NSF 11-309. Arlington, VA. <http://www.nsf.gov/statistics/wmpd/>.
- Radford, M.L. "The Critical Incident Technique and the Qualitative Evaluation of the Connecting Libraries and Schools Projects," *Library Trends* 55, no. 1 (2006): 46-64.
- Research Information Network (RIN). *If You Build It, Will They Come? How Researchers Perceive and Use Web 2.0*. London: A RIN Report, July 2010.
- . *The Value of Libraries for Research and Researchers*. A RIN and RLUK Report. March

2011. http://www.rluk.ac.uk/files/Value%20of%20Libraries%20TG_0.pdf.
- Rowlands, Ian, David Nicholas, Bill Russell, Nick Canty, and Anthony Watkinson. "Social Media Use in the Research Workflow," *Learned Publishing*, 24, no. 3 (2000): 183-195.
- Shelburne W.A. "E-book Usage in an Academic Library: User Attitudes and Behaviors." *Library Collections, Acquisitions, & Technical Services* 33, no. 2-3 (2009): 59-72. doi: 10.1016/j.lcats.2009.04.002.
- Talja, Sanna and Hanni Maula. "Reasons for the Use and Non-use of Electronic Journals and Databases: A Domain Analytic Study in Four Scholarly Disciplines." *Journal of Documentation* 59, no. 6 (2003): 673-691.
- Tenopir, Carol, Concepcion S. Wilson, Pertti Vakkari, Sanna Talja, and Donald W. King. "Cross Country Comparison of Scholarly E-Reading Patterns in Australia, Finland and the United States." *Australian Academic & Research Libraries* 41, no. 1 (March 2010): 26-41.
- Tenopir, Carol, Donald W. King, Peter Boyce, Matt Grayson, and Keri-Lynn Paulson. "Relying on Electronic Journals: Reading Patterns of Astronomers." *Journal of the American Society for Information Science and Technology (JASIST)* 56, no. 8 (June 2005): 786-802.
- Tenopir, Carol, Rachel Volentine, and Donald W. King. *UK Scholarly Reading and the Value of Library Resources: Summary Results of the Study Conducted Spring 2011* Study on behalf of JISC Collections, 2012. <http://www.jisc-collections.ac.uk/reports/ukscholarlyreadingreport/>.
- Tenopir, Carol, Rachel Volentine, and Lisa Christian. *Scholarly Reading by Postgraduate Students: Summary Results of a Study Conducted in 2012 at Two Universities in Australia*. Knoxville, TN: University of Tennessee, 2012.
- Tenopir, Carol, Xiang Zhou, John Upchurch, and Donald W. King. 2006. University of New South Wales Student Journal Reading Patterns: Factual Summary of Results of the Survey Conducted September-October 2004. University of Tennessee, <http://scholar.cci.utk.edu/carol-tenopir/pages/university-new-south-wales-surveys>.
- Wolverton, Robert and Carol Tenopir. "Conference Report – Discovering the Magic: Faculty and Student Use of Electronic Journals." *The Serials Librarian*. 49, no.3 (2006): 159-164. doi: 10.1300/J123v49n03_14.

Copy of Survey

International and National Postgraduate Reading Survey

You are invited to participate in an international study that examines scholarly reading. Gaining a better understanding of how academics and post graduate students use journal collections will aid in decision making processes as well as assisting in understanding the evolving nature of scholarly reading. This survey will take approximately 20 to 30 minutes to complete. It consists of five sections: scholarly/academic article reading, book reading, other publication reading, social media engagement, and a short section about you. You may skip any question or exit the survey at any time. All answers are anonymous.

Please read the attached participant information sheet (LINK) for information for further information including background on the study, Confidentiality, Data Storage, Queries and Concerns and Ethics Committee Clearance.” With “For more information including the participant information sheet see <http://anulib.anu.edu.au/news/academic-reading-survey/index.html>

Any papers or conference presentations based on the collected data will contain only summary data without direct links to an individual survey response. If you have questions at any time about the study or the procedures, you may contact the ANU contact, Roxanne Missingham on (02) 6125 2003 or email Roxanne.missingham@anu.edu.au.

Thank you for taking the time to complete the survey.

By clicking on NEXT, you give permission to gather and analyse the answers you give to the questions that follow.

Section 1: Scholarly Article Reading (print and online)

1. In the past month (30 days), approximately how many scholarly articles have you read? Articles can include those found in journal issues, websites, or separate copies such as preprints, reprints, and other electronic or paper copies. Reading is defined as going beyond the table of contents, title, and abstract to the body of the article. Number of articles read (including skimmed) in the past month:

2. Approximately how many of these articles were for a class you were taking?

The following questions in this section refer to the SCHOLARLY ARTICLE YOU READ MOST RECENTLY, even if you had previously read this article. Note that while this last reading may not be typical, it will help to establish the range of patterns in reading behavior.

3. What is the title of the journal from which this last article was read or, if not from a journal, what is the topic of the article?

4. What year was the last article you read published/posted?

5. How thoroughly did you read this article?

- I read all of it with great care
- I read parts of it with great care
- I read with attention to the main points
- I read only specific sections (e.g., figures, conclusions)
- I skimmed it just to get the idea

6. Had you previously read this article, i.e., is this a re-reading?

- Yes
- No

7. Prior to your first reading of this article, did you know the information reported or discussed in this article?

- Yes
- No

8. How did you first find out about the information?

- Conference or workshop
- Informal discussion with colleagues
- Listserv or news group
- Journal article
- E-mail from colleague
- Preprint / e-print service (e.g., arXiv.org)
- Website of author
- Institutional Repository
- Other (please specify): _____

9. How did you become aware of the last article you read?
- Found while browsing (without a specific objective in mind)
 - Found while I (or someone on my behalf) was searching (e.g., by subject or author's name)
 - Cited in another publication
 - An instructor told me about it
 - It was in the course outline / reading list
 - Do not know / Do not remember
 - Other (please specify): _____

10. Found while browsing:
- Personal subscription
 - Library subscription
 - School, department, etc. subscription
 - Website
 - Other (please specify): _____

11. Approximately how much time did you spend browsing:
In minutes: _____

12. Found while I (or someone on my behalf) was searching:
- Web search engine (e.g., Google or Google Scholar)
 - Electronic indexing / abstracting service (e.g., Academic Search Premier, ERIC)
 - Print index or abstract
 - Online journal collection (e.g., Current Contents)
 - Preprint / e-print service (e.g., arXiv.org)
 - Other (please specify): _____

13. As a result, how many articles did you read and/or plan to read?

14. After you became aware of this article, from where did you obtain it?

- Personal subscription
- Library subscription
- School, department, etc. subscription
- Course reserves
- Free web journal
- Preprint copy
- Copy of the article from a colleague, instructor, author, etc.
- Interlibrary loan / document delivery service
- An author's website
- Other website
- Other (please specify): _____

15. This source was:

- Print
- Electronic

16. Where were you when you read this article?

- Office or lab
- Library
- Dormitory
- Home (off-campus)
- Traveling or commuting
- Elsewhere (please specify): _____

17. How long did you spend reading this last article?

In minutes: _____

18. In what format was the article when you read it?

- Print article in a print journal
- Photocopy or fax copy
- Online computer screen
- Previously downloaded / saved and read on computer screen
- On a mobile, e-reader, or tablet screen
- Downloaded and printed on paper
- Other (please specify): _____

19. Thinking back to the source of the article, where would you obtain the information if that source were not available (e.g., library or personal subscription, archive, etc.)?

- I would not bother getting the information
- I would obtain the information from another source

20. For what principal purpose was this article read? (Choose only the best answer)

- This article was required reading in a course
- I read this article to help complete a course assignment or a course paper (but it was not specifically required)
- This article was for my thesis or dissertation
- This article assisted in my teaching duties
- I read this article to keep informed about the developments in my main field of study
- This article was just of personal interest
- Writing proposals, reports, or articles
- Other (please specify): _____

21. How important is the information contained in this article to achieving your principal purpose?

- Not at all important
- Somewhat important
- Important
- Very important
- Absolutely essential

22. In what ways did the reading of the article affect the principal purpose? (Choose all that apply)

- It improved the result
- It narrowed / broadened / changed the tone
- It inspired new thinking / ideas
- It resulted in collaboration / joint research
- It wasted my time
- It resulted in faster completion
- It resolved technical problems
- It made me question my work
- It saved time or other resources
- Other (please specify): _____

23. Did you cite this article or do you plan to cite it in a paper or report?

- No
- Maybe
- Already did
- Will in the future

Section 2: Book Reading (print and online)

24. In the past month (30 days) approximately how many books or parts of books did you read for school work? Include reading from a portion of the book such as skimming or reading a chapter. Include books read in print or electronic format. (If none, please enter "0" instead of leaving a blank.)

The following questions in this section refer to the BOOK FROM WHICH YOU READ MOST RECENTLY. Note that this last reading may not be typical, but will help establish the range of patterns in reading behavior.

25. What is the approximate title or topic of the book from which you last read?

26. On how many occasions did you read from this book in the past month (30 days)?

27. About how much total time (in minutes) did you spend reading this book in the past month?

28. How did you become aware of this last book from which you read?

- Found while browsing (without a specific objective in mind)
- Found while I (or someone on my behalf) was searching (e.g., by subject or author's name)
- Cited in another publication
- Another person (e.g., a colleague) told me about it
- Promotional email or web advertisement
- Do not know / Do not remember
- Other (please specify): _____

29. Approximately how much time (in minutes) did you or someone on your behalf spend becoming aware of this publication? (e.g., browsing, searching)

30. After you became aware of this book, from where did you obtain it?

- I bought it for myself
- The library or archive collections (including main or branch)
- Interlibrary loan or document delivery service
- School or department collection (e.g., not managed by library)
- A colleague, author, or other person provided it to me
- A free, advanced, or purchased copy from the publisher
- Other (please specify): _____

31. In what format was the book when you obtained it?

- Print
- Electronic

32. Thinking back to where you obtained the book (e.g., library collection, department collection, interlibrary loan), where would you obtain the information if that source were not available?

- I would not bother getting the information
- I would obtain the information from another source

33. For what principal purpose was this book read? (Choose only the best answer)

- This book was required reading in a course
- I read this book to help complete a course assignment or a course paper (but it was not specifically required)
- This book was for my thesis or dissertation
- This book assisted in my teaching duties
- I read this book to keep informed about the developments in my main field of study
- This book was just for personal interest
- Other (please specify): _____

34. How important is the information contained in this book to achieving your principal purpose?

- Not at all important
- Somewhat important
- Important
- Very important
- Absolutely essential

35. In what ways did the reading of the book affect the principal purpose? (Choose all that apply)

- It improved the result
- It narrowed / broadened / changed the tone
- It inspired new thinking / ideas
- It resulted in collaboration / joint research
- It wasted my time
- It resulted in faster completion
- It resolved technical problems
- It made me question my work
- It saved time or other resources
- Other (please specify): _____

36. Did you cite this book or do you plan to cite it in another publication (e.g., article, report, book, published proceeding)?

- No
- Maybe
- Already did
- Will in the future

Section 3: Other Publication Reading (print and online)

37. In the past month (30 days) approximately how many other publications did you read for school work? Include conference proceedings, government documents, technical reports, magazines, trade journals, etc. (If none, please enter "0" instead of leaving a blank.)

The following questions in this section refer to the OTHER PUBLICATION FROM WHICH YOU READ MOST RECENTLY. Note that this last reading may not be typical, but will help establish the range of patterns in reading behavior.

38. What type of other publication did you most recently read?

- Conference proceedings
- Government document or other technical report
- Magazine / trade journal
- News source
- Other (please specify): _____

39. About how much total time (in minutes) did you spend reading this other publication in the past month?

40. Approximately how much time (in minutes) did you or someone on your behalf spend becoming aware of the publication? (e.g., browsing, searching)

41. After you became aware of this other publication, from where did you obtain it?

- I bought it for myself
- The library or archive collections (including main or branch)
- Interlibrary loan or document delivery service
- School or department collection (e.g., not managed by library)
- A colleague, author, or other person provided it to me
- A free, advanced, or purchased copy from the publisher
- Other (please specify): _____

42. In what format was the publication when you obtained it?

- Print
- Electronic

43. Thinking back to where you obtained the publication (e.g., library collection, department collection, interlibrary loan), where would you obtain the information if that source were not available?

- I would not bother getting the information
- I would obtain the information from another source

44. For what principal purpose was this publication read? (Choose only the best answer)
- This book was required reading in a course
 - I read this book to help complete a course assignment or a course paper (but it was not specifically required)
 - This book was for my thesis or dissertation
 - This book assisted in my teaching duties
 - I read this book to keep informed about the developments in my main field of study
 - This book was just for personal interest
 - Other (please specify): _____
45. How important is the information contained in this publication to achieving your principal purpose?
- Not at all important
 - Somewhat important
 - Important
 - Very important
 - Absolutely essential
46. In what ways did the reading of the publication affect the principal purpose? (Choose all that apply)
- It improved the result
 - It narrowed / broadened / changed the tone
 - It inspired new thinking / ideas
 - It resulted in collaboration / joint research
 - It wasted my time
 - It resulted in faster completion
 - It resolved technical problems
 - It made me question my work
 - It saved time or other resources
 - Other (please specify): _____
47. Did you cite this publication or do you plan to cite it in another publication (e.g., article, report, book, published proceeding)?
- No
 - Maybe
 - Already did
 - Will in the future

Section 4: Social Media

48. How often do you read / view / participate in each of the following electronic / social media for *school related purposes*?

	Daily	Weekly	Monthly	Occasionally	Never
Blogging (e.g., WordPress, Blogster)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Microblogging (e.g., Twitter)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
RSS feeds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social networking (e.g., Facebook)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social tagging (e.g., Delicious)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collaborative authoring (e.g., Google docs, CiteULike)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
User comments in articles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Image sharing (e.g., Flickr)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Audio sharing (e.g., Podcasts)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video sharing (e.g., YouTube)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

49. How often do you create each of the following electronic / social media tools for *school related purposes*?

	Daily	Weekly	Monthly	Occasionally	Never
Blogging (e.g., WordPress, Blogster)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Microblogging (e.g., Twitter)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
RSS feeds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social networking (e.g., Facebook)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social tagging (e.g., Delicious)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collaborative authoring (e.g., Google docs, CiteULike)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
User comments in articles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Image sharing (e.g., Flickr)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Audio sharing (e.g., Podcasts)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video sharing (e.g., YouTube)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 5: Demographics

This section is about you. The purpose of collecting this information is to give us the opportunity to search for additional meaningful patterns in the collected data. You are almost finished!

50. What is your academic status?

- Master's by coursework student
- Master's by research student
- Postgraduate diploma student
- Doctoral (PhD) student
- Other (please specify): _____

51. What is your major?

52. What is your age?

53. Are you:

- Male
- Female

54. Are you a full- or part-time student?

- Full-time
- Part-time

55. What role do e-resources play in your school work?

You've reached the end of the survey. We appreciate your participation. Thank you!