Electronic Book Usage Patterns as Observed at an Academic Library: Searches and Viewings

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ebooks, electronic books, usage statistics, searches, viewings, reference, monograph

Abstract

This paper presents the results of a quantitative study exploring the online usage of the electronic book collection at the J.N. Desmarais Library at Laurentian University, Canada. In 2009, e-book usage statistics were evaluated to provide a better understanding of how the e-book collection has been utilized. Both current electronic book usage data and data from previous years are reported in order to present and understand general patterns in how the electronic book collection is, and has been utilized. The number of e-books, the number of viewings and the number of searches were examined. The size of the collection grew from a single book in 2002 to more than 60,000 in 2008. The pattern of purchase varied from that of bulk purchasing of large e-book collections, to selective purchasing between 2005 and 2007, and then back to bulk purchasing in 2008. Both viewings and searches have increased from year to year at a greater pace than the size of the e-book collection. The number of searches also appeared to provide a viable means of measuring the use of an e-book collection rather than relying entirely on viewings or downloads. Ratios were calculated to compare viewings and searches to the size of the collection. The highest viewings per e-book and searches per e-book ratios were observed in those years when purchasing was done more selectively. It is also clear that the electronic reference collection has seen far greater use than the electronic monographs. Furthermore, usage of electronic monographs appeared to be directly proportional to the size of the collection.

Introduction

This paper presents the results of a quantitative study exploring online usage of the electronic book collection at the J.N. Desmarais Library at Laurentian University. It is the first such study to be undertaken at Laurentian University. Both current electronic book usage data and data from previous years are reported in order to present and understand general patterns in how the
electronic book collection is, and has been utilized. The number of viewings and the number of searches performed on publisher and aggregator websites are explored. A comparison between electronic reference and monographic books is also presented.

Laurentian University is a multi-campus university founded in 1960, with its main campus located in Sudbury, Ontario, Canada. It is considered by the Carnegie classification of institution scale (Carnegie Foundation for the Advancement of Teaching 2009) to be medium in size with a total full-time student population of 7,500 in 2008 and over 550 enrolled in various graduate programs. Also in 2008, over 420 full-time faculty members taught and performed research. Programs cover multiple fields in the sciences, social sciences and humanities with 94 undergraduate, 18 Master's and 6 doctoral degrees offered.

Between 2002 and 2008, the number of electronic books available to the Laurentian University community jumped from 1 to over 60,000. Current expenditures at the J.N. Desmarais Library for its electronic books amount to $93,000 (CDN$) accounting for about 20% of the library's total book expenditures. Additionally, electronic monographs currently represent 14% of all monographic titles held by the library. This is similar to the 13% observed in CARL libraries (Owen et al. 2008).

There has been confusion throughout the literature about the term itself, with e-book or ebook, electronic book, electronic text, or even e-text being commonly used (Dinkelman and Stacy-Bates 2007). The term "e-book" will be used in this paper.

The fact that web-based e-books do not require the presence of a particular viewing device but only a connection to the Internet and a web browser makes this model extremely appealing (Bry and Krause 275-287; Dillon 113-124; Tannery et al. 305-309). As pointed out by Anuradha and Usha (662-679), a "web interface allows the user not only to read the text, but also opens up possibilities of linking to other resources, cross-text searching, utilization of dictionaries and so on." Furthermore, access to web-based content is neither impeded nor restricted by any particular reading device (Connaway 340-349). Both patrons and library personnel have repeatedly been frustrated by the operation of available reading devices which typically require more training than that needed for web-browsers (Dearnley, McKnight and Morris 175-182; McKnight and Dearnley 235-242). One must also consider the extra cost of purchasing necessary readers for the library community. For the reasons mentioned above, the J.N. Desmarais Library has been exclusively purchasing web-based e-books.

Creating a bibliographic record for each e-book in the library's collection has been shown to significantly increase e-book use (Bailey 52-59; Dillon 113-124; Gibbons 363-367; Langston 19-32; Levine-Clark 7-14) with some libraries
doubling usage (Nicholas et al. 311-334). Furthermore, other studies have demonstrated that a library's website is an important access point to an e-book collection with, in some cases, 65% of students relying on the library's website as their primary e-book discovery tool (Roesnita and Žainab 1-23; Rowlands et al. 489-511).

As such, the J.N. Desmarais Library has not only included links to the various e-book collections on its website, but has also been making individual e-books available through its online catalogue. Links to e-book collections are added as soon as access has been granted by the publisher or vendor. The length of time required to catalogue new e-books will vary with the size of the collection purchased and the availability of pre-existing MARC records. Although e-books purchased individually are immediately catalogued, cataloguing e-books purchased in bundles can take anywhere from one week to six months.

**Methods**

For the purpose of this study, and in order to examine usage patterns for the entire e-book collection, an e-book was defined as including both reference and non-reference e-books, whether single or multivolume sets. Reference e-books would include dictionaries (e.g. Oxford English Dictionary Online), encyclopedias (e.g. Kirk-Othmer Encyclopedia of Chemical Technology), treatises (e.g. Treatise in Geochemistry), manuals, handbooks (e.g. CICA Handbook) or any other item that would typically be held in the library's reference collection. Non-reference e-books would include items normally found in a circulating collection such as monographs that have been digitally converted into electronic format.

Some e-books were purchased as packages or bundles from publishers and aggregators, such as Springer-Verlag, Elsevier, NetLibrary, ebrary and CRC Press, whereas other e-books were bought individually, mainly from aggregators such as NetLibrary and MyiLibrary.

All reference e-books will henceforth be referred to as e-reference and all non-reference e-books as e-monographs.

Usage for a total of 60,264 e-books was examined. Statistics tracked included the number of searches performed on publisher and aggregator sites, the number of viewings as well as the number of e-books available at the J.N. Desmarais Library.

The number of searches, rather than sessions, is presented as a more accurate method of measuring usage in that it represents a deliberate action on the user's part (Blecic, Fiscella and Wiberley, 26-44). A session may be a connection accidentally initiated by the user clicking on the wrong link. Although the duration of a session may be a good indication of use (Nicholas et al. 106-132), such statistics are not always made available to subscribers.
During the gathering of this data, it was observed that publishers and aggregators do not report their usage statistics in any standardized way. Some have reported the number of viewings, whereas others report the number of downloads. In most cases, the number of viewings or downloads can be reported for a specific chapter, whereas in other cases a viewing can only be associated with the use of an entire book. Others only report pages viewed or downloaded. The fact that viewings are reported for each page viewed can artificially inflate usage. On the other hand, reporting viewings by the simple act of opening a book can have the opposite effect and suppress real use. For the purpose of this study a viewing has been defined as the act of either opening or downloading a page or chapter from an e-book.

Changes in the number of e-books were monitored in order to determine if there was a relationship between use and the size of the e-book collection.

Usage data include figures from 2002 to 2008. All service providers made historical statistics available to subscribers.

In order to better quantitatively understand e-book usage, ratios were calculated to compare the number of viewings and searches to the size of the e-book collection. This was achieved by dividing the number of viewings by the number of e-books (# viewings / # e-books) and the number of searches by the number of e-books (# searches / # e-books). The act of dividing one number by another is often done to control for an extraneous factor, such as population size (Pendleton, 6967-6971). In this case, population size refers to the size of the e-book collection. All ratios are expressed in decimal form.

The viewings / e-book and searches / e-book ratios can give a comparative indication of the level of use of a particular collection for a given period of time. The greater the value of the ratio, the greater the relative use. It is also very important to note that such a ratio should never be interpreted as representing actual usage per e-book but rather as a relative or comparative value. For instance, a viewings to e-book ratio of 204 should never be interpreted as meaning that each e-book in a collection was viewed 204 times.

A correlation coefficient was calculated to determine the relationship strength, if any, between variables such as the number of viewings and the number of searches.

**Usage Analysis**

1) General E-book Usage Patterns

Figure 1 graphically illustrates observations pertaining to the number of e-books available at the J.N. Desmarais Library, the number of viewings and the number
of searches performed on the search engines offered on the various publisher or aggregator websites. It is clear that all three variables have seen positive growth over the years. However, since 2004 both the number of viewings and the number of searches have been growing faster than the actual size of the e-book collection. Prior to this, all three variables closely matched one another in value.

Data from the number of e-books, the number of viewings and the number of searches will be presented and discussed separately.

![Figure 1: General Usage Trends comparing the Number of Searches Performed, the Number of Viewings, and the Number of E-books in the Collection.](image)

**i) Number of e-books:**

The number of e-books has been gradually increasing over the past 7 years with a sudden increase in 2008. Table 1 further demonstrates the growth of the library’s e-book collection from a single item in 2002, the *Oxford English Dictionary Online*, to a little over 60,000 in 2008.
Table 1: Number of E-Books Available at Laurentian University.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of E-books</th>
<th>% Change From Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>1</td>
<td>N/A</td>
</tr>
<tr>
<td>2003</td>
<td>3426</td>
<td>342%</td>
</tr>
<tr>
<td>2004</td>
<td>9229</td>
<td>169%</td>
</tr>
<tr>
<td>2005</td>
<td>11433</td>
<td>24%</td>
</tr>
<tr>
<td>2006</td>
<td>12130</td>
<td>6%</td>
</tr>
<tr>
<td>2007</td>
<td>15510</td>
<td>28%</td>
</tr>
<tr>
<td>2008</td>
<td>60264</td>
<td>288%</td>
</tr>
</tbody>
</table>

In 2003, the J.N. Desmarais Library purchased the COOL I collection from NetLibrary, consisting of 3,425 individual titles of a monographic nature. These were the first e-monographs purchased by the library. Incidentally, COOL (Consortium of Ontario Libraries) is a library consortium based in the Province of Ontario, Canada, which represents public, university, college and school libraries' interests. COOL negotiates license agreements with service providers, particularly for online resources (Anonymous 31; Dorsey 34-35; Southern Ontario Library Services 2008).

The following year, in 2004, the purchase of a second COOL negotiated e-book package from NetLibrary (COOL II collection) brought the total number of e-books available to the Laurentian community to 9,229.

Between 2005 and 2007, the e-book collection increased steadily, albeit at a slower pace, with an average of about 2,000 titles added per year. E-books were no longer purchased in large bundles but rather on a title-by-title basis with a particular focus on individual program needs and faculty requests.

In 2008, however, the library began to aggressively purchase e-books in large bundles, but directly from publishers, such as Springer-Verlag and Elsevier, rather than aggregators such as NetLibrary. This increased the collection by almost 300%. By the end of 2008, the total number of e-books available to the Laurentian community was 60,264.

As with the COOL packages, these large e-book bundles were purchased through consortia, namely OCUL (Ontario Council of University Libraries) and CRKN (Canadian Research Knowledge Network). OCUL represents the 21 academic universities in the Province of Ontario and concerns "itself with the improvement and development of university library resources" (OCUL, 2010). CRKN is an ever larger consortium with 73 member universities from across Canada. Its mission is to expand "digital content for the academic research enterprise." (CRKN, 2010).
ii) Number of viewings:

As shown in Figure 1, the number of viewings has increased from year to year but at a much greater pace than the increase in the number of e-books. Table 2 further illustrates the rate of increase in viewings over the years.

Table 2: Number of Viewings of Laurentian University E-books.

<table>
<thead>
<tr>
<th>Year</th>
<th>Viewings</th>
<th>% Change From Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>2246</td>
<td>N/A</td>
</tr>
<tr>
<td>2003</td>
<td>3389</td>
<td>51%</td>
</tr>
<tr>
<td>2004</td>
<td>9680</td>
<td>185%</td>
</tr>
<tr>
<td>2005</td>
<td>23493</td>
<td>142%</td>
</tr>
<tr>
<td>2006</td>
<td>37809</td>
<td>38%</td>
</tr>
<tr>
<td>2007</td>
<td>40431</td>
<td>7%</td>
</tr>
<tr>
<td>2008</td>
<td>71198</td>
<td>76%</td>
</tr>
</tbody>
</table>

In 2002, the single e-book held by the J.N. Desmarais Library (Oxford English Dictionary Online) saw 2,246 viewings.

Between 2003 and 2004, the number of viewings and the number of e-books closely matched one another. Actually when comparing values from Table 3, the number of viewings (3,389) in 2003 is virtually identical to the number of e-books (3,426) for the same year. A similar observation can be noted for 2004 with 9,680 viewings for 9,229 e-books.

Table 3: The Viewings / E-Book Ratio Illustrating the Relationship Between the Number of E-Books and the Number of Viewings.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of E-Books</th>
<th>Number of Viewings</th>
<th>Viewings / E-book Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>3426</td>
<td>3389</td>
<td>0.99</td>
</tr>
<tr>
<td>2004</td>
<td>9229</td>
<td>9680</td>
<td>1.05</td>
</tr>
<tr>
<td>2005</td>
<td>11433</td>
<td>23493</td>
<td>2.05</td>
</tr>
<tr>
<td>2006</td>
<td>12130</td>
<td>37809</td>
<td>3.17</td>
</tr>
<tr>
<td>2007</td>
<td>15510</td>
<td>40431</td>
<td>2.61</td>
</tr>
<tr>
<td>2008</td>
<td>60264</td>
<td>71198</td>
<td>1.18</td>
</tr>
</tbody>
</table>

After 2004, the library decided to steer away from any additional COOL negotiated e-book packages and instead began to purchase e-books on a case-by-case basis in association with the University's specific programs. It is true that a library can "realize significant cost savings by participating in consortial eBook purchases" (Wicht, 26-30), but if such deals do not reflect the particular needs of the population the library serves, such purchases become wasteful, especially if the resources are not used at all. The contents of the COOL I and COOL II deals were mainly aimed at public library patrons and contained a large proportion of
popular literature which is of little interest to the University’s academic community. Although each participating library had direct input in selecting titles, with public libraries comprising close to 65% of the membership (NetLibrary 2005), much of the COOL collections did not fit Laurentian’s academic setting. Moreover, the COOL packages were not seeing a significant number of viewings and some librarians at the J.N. Desmarais Library thought that this was due to the lack of appropriate content.

Since, in 2003 and 2004, the library's entire e-book collection consisted only of the Oxford English Dictionary Online and the COOL negotiated NetLibrary collections, it was easy to separate those viewings observed for the COOL collections from those observed from the Oxford English Dictionary Online. In 2003, the COOL collection saw no viewings whatsoever and only 637 in 2004. On the other hand, in 2003 the Oxford English Dictionary Online had over 3,000 viewings showing that there was a demand for certain e-books.

In 2005, viewings were more than double that of the previous year and reached 23,493. Actually, the increase in the number of viewings (142% from Table 2) surpassed the increase in the number of e-books (24% from Table 1). Upon further examination, it was observed that of all the e-monographs owned by the library, those that had been purchased on a case-by-case basis were seeing the greatest number of viewings.

In 2006, viewings increased by about 14,000 to a total of 37,809. The increase was less in 2007, with about 4,000 more viewings than that reported for the previous year. The sudden increase in the number of e-books in 2008, was also reflected in the number viewings, which increased from 40,431 to 71,198, a 76% increase. However, this was far lower than the 288% increase in the collection's size.

Table 3 provides further information pertaining to the viewings / e-book ratio. In 2002, the library’s single e-book saw 2,246 viewings. The viewings / e-book ratio is, of course, 2,246 which is extremely high compared to those of subsequent years. With the purchase of the COOL I collection, the increase in the size of the e-book collection was not reflected in the number of viewings. There were 3,389 viewings observed for 3,426 e-books. Consequently, the viewings / e-book ratio dropped sharply to 0.99. Compared to subsequent viewings / e-book ratios, this is the lowest ratio and may be an indication of an under-used collection. A similar ratio was observed in 2004 with 9,680 viewings for 9,229 e-books and a viewings / e-book ratio of 1.05.

The viewings / e-book ratio doubled from 1.05 to 2.05 in 2005 and tripled to 3.17 in 2006. In 2007, there were a total of 40,431 viewings of 15,510 e-books and the viewings / e-book ratio continued to be more than twice that observed in 2004 or earlier. But in 2008, the ratio decreased to 1.18, back to nearly what it had been in 2003 and 2004.
These results initially came as a surprise since the e-books purchased in 2008 were all academic in nature. Could this smaller ratio therefore be a result of the library purchasing e-books again in large quantities without considering the specific needs of Laurentian University’s programs? This may also be due to poor marketing on the library’s side. Student and faculty may still be ignorant of these new purchases. It has been previously demonstrated that without aggressive marketing, it may take an academic community up to three years to discover a new online resource (Luther 119-147; Townley and Murray 32-39). Regardless, further observation of e-book usage is required before any firm conclusion can be reached.

iii) Number of searches:

As indicated previously, the number of searches on publisher and aggregator-provided search engines was explored. As observed with both the number of e-books and the number of viewings, searches have increased at a steady pace, year after year. The continual increase in searches can be observed in both Figure 1 and Table 4.

Table 4: Number of Searches Performed on Laurentian University E-book Collections.

<table>
<thead>
<tr>
<th>Year</th>
<th>Searches</th>
<th>% Change From Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>1841</td>
<td>N/A</td>
</tr>
<tr>
<td>2003</td>
<td>3368</td>
<td>83%</td>
</tr>
<tr>
<td>2004</td>
<td>11625</td>
<td>245%</td>
</tr>
<tr>
<td>2005</td>
<td>22190</td>
<td>91%</td>
</tr>
<tr>
<td>2006</td>
<td>39876</td>
<td>80%</td>
</tr>
<tr>
<td>2007</td>
<td>51798</td>
<td>30%</td>
</tr>
<tr>
<td>2008</td>
<td>101262</td>
<td>95%</td>
</tr>
</tbody>
</table>

This annual increase remained relatively constant until 2008 when a sudden spike in searches occurred, coinciding with the purchase of large bundles of e-books. Whereas the number of searches typically increased by about 10,000 a year, there were almost 50,000 more searches in 2008 than in the previous year, representing an increase of 95%.

Such an increase in the number of searches may be the result of a much larger collection or a greater awareness of the library’s e-collection but it may also be influenced by better, more effective search engines on publisher and aggregator websites.

As stated previously, at Laurentian, all e-books have been included in the library’s catalogue. Even so, patrons have still searched within the e-book collections in great numbers. In recent years some e-book publishers have greatly improved the structure and usability of their websites, adding features to
ease the discoverability of content on their site (Coker 179-184). With the use of a survey, Coker further demonstrated that those publishers who have improved the searching and navigability of their websites have become more attractive to patrons who will consequently spend more time searching and finding relevant information on their site rather than going haphazardly from one e-book site to another. Hernon et al. (3-13) further suggest that if patrons know that they can search an e-book platform for relevant content by either keyword or subject terms, they will use the features. A well-structured platform with easily identified search features will encourage patrons to return time and again for further exploration (Coker 179-184) as patrons have identified the searchability of e-books as being one of their most important benefits (Chu 340-346).

As can be seen from Table 5, there were 1,841 searches performed in 2002 on the Oxford English Dictionary Online resulting in a search / e-book ratio of 1,841. This in itself may not be surprising since searching for a quick answer rather than browsing through a dictionary's or an encyclopedia's content is a preferred method of locating desired information (Ramaswamy, Baillargeon and Simser 1-10; Safley 445-457). Roesnita and Zainab (1-23) reported that nearly 60% of their survey's respondents preferred to use electronic reference books rather than their print equivalent. Additionally, in their 2009 study, Jian et al. (503-514) demonstrated that students clearly preferred electronic dictionaries over printed dictionaries citing their ease of use and the speed at which information could be found compared to manually browsing through a printed dictionary. To the researcher, the speed at which he or she would find relevant information has always been a key factor in the preference of any particular online resource (Sewell and Teitelbaum 234-245).

In fact, searches nearly doubled in number (from 11,625 to 22,190; Table 4) when the library added additional e-reference books from the Gale Virtual Reference Library (GVRL) and the Oxford Digital Reference Shelf (ODRS) to its collection in 2005. At this point in time, the e-reference collection nearly quintupled in size from 11 books to 50 (Table 6).

**Table 5: The Searches / E-Books Ratios Illustrating the Relationship between the Number of E-Books and the Number of Searches.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of E-Books</th>
<th>Number of Searches</th>
<th>Searches / E-book Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>3426</td>
<td>3368</td>
<td>0.98</td>
</tr>
<tr>
<td>2004</td>
<td>9229</td>
<td>11625</td>
<td>1.25</td>
</tr>
<tr>
<td>2005</td>
<td>11433</td>
<td>22190</td>
<td>1.94</td>
</tr>
<tr>
<td>2006</td>
<td>12130</td>
<td>39876</td>
<td>3.28</td>
</tr>
<tr>
<td>2007</td>
<td>15510</td>
<td>51798</td>
<td>3.34</td>
</tr>
<tr>
<td>2008</td>
<td>60264</td>
<td>101262</td>
<td>1.68</td>
</tr>
</tbody>
</table>
In 2003, there were 3,368 searches performed, which almost coincides with the number of e-books (3,426; Table 5) and the number of viewings (3,389; Table 2). The searches / e-book ratio was 0.98, almost exactly that of the viewings / e-book ratio (0.99) observed in Table 3. Furthermore, when comparing the searches / e-book ratio to the viewings / e-book ratio, a pattern surfaces. As with viewings / e-book, the highest searches / e-book ratios occurred between 2005 and 2007. As with the viewings / e-book ratio, the searches / e-book ratio later dropped back to a lower value in 2008.

Furthermore, judging from the results graphically demonstrated in Figure 1, it might even be feasible to use the number of searches as an indication of the level of use a given e-book collection has experienced. Since it was observed during the gathering of the data for this study that there does not seem to be any marked standardization from one publisher or aggregator to the next in regards to the reporting of e-book viewings, using searches rather than viewings might provide more accurate or more realistic, e-book usage data.

In fact, both Figure 1 and Table 5 show that the number of viewings and the number of searches closely followed one another. It is apparent that the first three years have seen little searching but as the library began to expand its e-book collection centered appropriately on the University community’s specific program needs, searching increased proportionally to viewings.

Not only can the number of viewings be used as a measure of e-book usage but also the number of searches can be seen as being just as valuable a metric. In fact, a correlation coefficient of 0.99 was calculated when comparing viewings to searches, indicative of a very strong relationship between the two variables. The ability to search across e-books comprising a collection or even across chapters of any particular e-book has been shown to be of great benefit to patrons (Coyle 8-12; Dillon 113-124; Nicholas et al. 106-132; Schnittman 139-142).

A high number of searches along with a low number of viewings may also indicate that a particular e-book collection may not necessarily reflect the needs of the University community. It may be an indication that patrons are not finding what they need, either due to the lack of appropriate content or even a poorly structured e-book site. It may become just as important to critically evaluate the site as to evaluate the content.

2) Comparative Usage between E-Reference and E-Monograph Collections

In order to compare usage between the e-reference and e-monograph collections, usage data associated with e-reference books was separated from that associated with e-monographs for the total number of e-books, viewings and searches reported earlier.
As before, usage ratios were calculated to compare the relationship between the e-reference and e-monograph collections. Since the actual size of each collection differed greatly, the e-monograph collection being much larger, using a ratio was the best approach to express relative values.

![Graph of usage trends for e-books reported as reference in nature](image)

**Figure 2: Usage Trends for those E-books Reported as Being Reference in Nature.**

Figure 2 graphically illustrates e-reference usage in terms of searches, viewings and number of books in the collection. Since the number of e-books is quite small compared to the number of viewings and searches, the line representing the number of e-books is difficult to discern from the actual x-axis. For this reason, the number of e-books for each year has been inserted next to the corresponding data point.

Whereas the number of e-reference books has only slightly increased over the years, the number of searches and viewings has increased at a far greater pace. Actually, the e-reference collection has seen an extraordinary level of use. With all three variables graphed on the same scale, the number of e-reference books has remained relatively flat compared to the lines representing the number of searches and viewings. This pattern has not been observed for the e-monograph collection.

Instead, Figure 3 illustrates a very different pattern of use. Up until 2006, the number of viewings was always lower than the number of e-monographs available. However, in 2006 the opposite occurred. For the first time viewings
surpassed quantity. It was also in 2005 that the library began to steer away from large bundled e-book purchases, such as the COOL deals, in favour of individual purchases based on program needs.

Figure 3: Usage Trends for those E-books Reported as Being Monographic in Nature.

The addition of e-books that would be more valuable or appropriate to the University's student and faculty population may have led to an increase in e-monograph use. Rowlands et al. (489-571) reported that e-books in an academic environment are associated with "work and study rather than leisure". In fact, only 6% of students at the University of Malaya have used the library's e-books for leisure (Roesnita and Zainab 1-23).

However with the decision to return to the purchasing of large e-book packages in 2008, the number of e-monographs once again surpassed the number of viewings.

The number of searches in the e-monograph collection closely followed the number of viewings, although searches increased at a greater pace. It would also seem clear that usage, both in terms of searches and viewings, closely followed the number of e-monographs in the collection. A correlation coefficient of 0.95 was calculated when comparing viewings to the size of the collection. It
would seem that the more e-monograph books in the collection, the more the collection is used. Hawking and Robertson (99-150) have determined a link between the size of an online collection and information retrieval effectiveness. The larger the collection, the greater will be the number of relevant documents retrieved per search.

It is also clear that when comparing the ratio between e-reference and e-monographs, the e-reference collection has seen greater relative usage (Table 6).

Table 6: Comparison between the Number and Viewings of Reference and Monograph E-Books.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Reference E-books</th>
<th>Viewings</th>
<th>Ratio</th>
<th>Number of Monograph E-books</th>
<th>Viewings</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>6</td>
<td>3389</td>
<td>564</td>
<td>3420</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>11</td>
<td>9043</td>
<td>822</td>
<td>9218</td>
<td>637</td>
<td>0.06</td>
</tr>
<tr>
<td>2005</td>
<td>50</td>
<td>20359</td>
<td>407</td>
<td>11383</td>
<td>3164</td>
<td>0.27</td>
</tr>
<tr>
<td>2006</td>
<td>89</td>
<td>21224</td>
<td>238</td>
<td>12041</td>
<td>16585</td>
<td>1.37</td>
</tr>
<tr>
<td>2007</td>
<td>122</td>
<td>24859</td>
<td>203</td>
<td>15388</td>
<td>15572</td>
<td>1.01</td>
</tr>
<tr>
<td>2008</td>
<td>128</td>
<td>26174</td>
<td>204</td>
<td>60136</td>
<td>45024</td>
<td>0.75</td>
</tr>
</tbody>
</table>

As reported previously, the single e-book the library possessed in 2002 was an e-reference book, the Oxford English Dictionary Online. It experienced a viewings / e-book ratio of 2,246. On the other hand, in 2003, the 3,420 e-books of NetLibrary saw no viewings at all.

By the end of 2008, the Laurentian community had access to 128 e-reference books, which saw 26,174 viewings, giving it a viewings / e-book ratio of 204 (Table 6). When looking at values for e-monographs, 60,136 e-books were viewed 45,024 times in 2008. The viewings / e-book ratio was 0.75, considerably lower than that observed for e-reference books. It is also clear from Table 6 that the viewings / e-book ratios for e-reference have been consistently far greater in value than those for e-monographs.


<table>
<thead>
<tr>
<th></th>
<th>Netlibrary</th>
<th>Springer</th>
<th>GVRL</th>
<th>ODRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of e-books in collection</td>
<td>7292</td>
<td>13588</td>
<td>86</td>
<td>29</td>
</tr>
<tr>
<td>Number of viewings</td>
<td>1954</td>
<td>5061</td>
<td>1390</td>
<td>213</td>
</tr>
<tr>
<td>Number of e-books used</td>
<td>812</td>
<td>1301</td>
<td>86</td>
<td>19</td>
</tr>
<tr>
<td>Percent of collection used</td>
<td>11%</td>
<td>10%</td>
<td>100%</td>
<td>66%</td>
</tr>
<tr>
<td>Number of viewings / number of e-books in collection</td>
<td>0.27</td>
<td>0.37</td>
<td>16.16</td>
<td>10.5</td>
</tr>
</tbody>
</table>
Table 7 further illustrates the level of use between two e-reference and two e-monograph collections. In 2008, both Gale Virtual Reference Library (GVRL) and Oxford Digital Reference Shelf (ODRS) had seen 100% and 66%, respectively, of their collection viewed at least once whereas NetLibrary had seen only 11% of its collection of 7,292 books viewed at least once and Springer, 10%. The viewings / e-book ratio for NetLibrary (0.27) and Springer (0.37) are far lower than those of GVRL (16.16) and ODRS (10.5).

Contrary to an e-reference collection to which patrons seem to gravitate automatically, use of an e-monograph collection may be more complex. It may be that appropriateness and awareness of content are not the only factors influencing the level of use. The size of the collection may be just as important. The difficulty will be in determining the correct size, or critical mass, the collection should be before observing optimal use.

**Conclusion**

The size of the e-book collection at the J.N. Desmarais Library has increased greatly over the years. From a single e-book in 2002, it grew to 60,264 e-books by the end of 2008. The pattern of purchase has changed from one of bulk purchasing in 2003 and 2004, to more selective purchasing from 2005 to 2007, and then back to the bulk purchasing of large e-book collections in 2008.

The largest viewings / e-book and searches / e-book ratios were observed in those years when the purchasing of e-books was done more selectively. At this point, however, it should not be concluded that selective purchasing of e-books would lead to better use of an e-book collection. It may simply be that the University community has not yet had the time to fully discover the large collections purchased in 2008. It may be necessary to perform the same evaluation at a later date, perhaps in 2 years. Additionally, the use of a survey would supplement the quantitative data in a more direct and unambiguous manner.

The number of searches also appears to provide a viable means of measuring the use of an e-book collection as opposed to relying solely on the number of viewings. Data presented in this paper shows a strong association between searches and viewings. A correlation of 0.99 is indicative of a very strong relationship between these two variables. Since publishers and aggregators tend to report viewings differently, it may be more accurate and appropriate to measure searches instead of basing usage on the more traditional viewing or download metric.

It is also apparent that the e-reference collection has seen far greater use for its size than has the e-monograph collection. The viewings / e-book ratio for the e-reference collection was consistently larger by several hundred percent, with an average of 669. On the other hand, the highest viewings / e-book ratio for the e-
monograph collection was 1.37, with an average of 0.49. Although a preference for e-reference over their print equivalent exists (Blummer 1-12, Colemean 124-125; Gall 25-31; Lawal 47-62; Roesnita and Zainab 1-23; Safley 445-457), further qualitative analysis would be necessary before making any firm conclusion as to the reasons for the differences in use between the e-reference and e-monograph collections at Laurentian University.

Furthermore, usage for the e-monograph collection appears to be directly proportional to the size of the collection. The more books added to the J.N. Desmarais Library's e-monograph collection, the more the collection seemed to be utilized. Further monitoring would be necessary before confirming or disproving this relationship.

**Acknowledgements**

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**Works Cited**


Dearnley, J., C. McKnight and A. Morris. "Electronic book usage in a public library: a study of user and staff reactions to a PDA-based collection."


Lawal, I.O. "Electronic Reference Works and Library Budgeting Dilemma."


NetLibrary. "Sharing an eBook collection the COOL way: Ontario-area..."
consortium and OCLC Canada develop flexible program so multiple libraries can share collection without large investment." (2005). April 15, 2009


