

What Users Want and What Users Do in E-books: Findings of a study on use of e-books from NTU Library

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Abstract

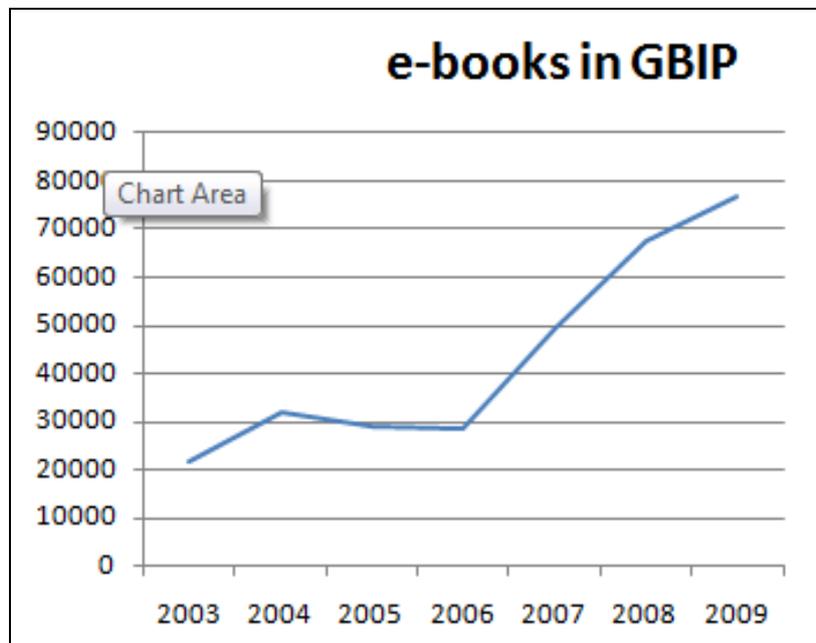
This paper presents the findings of a survey on the use of e-books at the Nanyang Technological University (NTU) during a 6-week period in January/February 2010. The purpose of the survey was to obtain a snapshot of users' behaviour in using e-books so as to assist the Library in providing a more effective service for e-book provision. The survey questions were designed to reveal useful information about users' behavior, from their level of awareness of e-books to their preference for print and electronic formats. Information about how they access the current collection, the features they desired, the frequency and intensity of use, what and how they read and their main purpose for using e-books could also provide useful comparative data for other libraries.

Keywords: E-books, Electronic books, User behavior, Survey, User preferences

Introduction

After many years of simmering activities and uncertainty, interest in e-books began to surge rapidly in recent years. In a report on the Frankfurt Book Fair held in Oct 2008, Kaser (2009) noted that vendors at the Fair felt that e-books are finally coming of age and he opined that “the adoption of EPUB standard seems to have been the magic factor in the delicate e-book deployment and adoption equation”. Libraries have also been steadily increasing their e-book collections and publishers are offering larger number of titles in the market. A search in Global Books in Print (GBIP) in July 2010 showed that there has been a huge jump in e-book titles since 2007 (see Figure 1). The Association of American Publishers (2009) also reported sharp rise in sales correspondingly as seen in a plot of the data gathered from the report (see Figure 2).

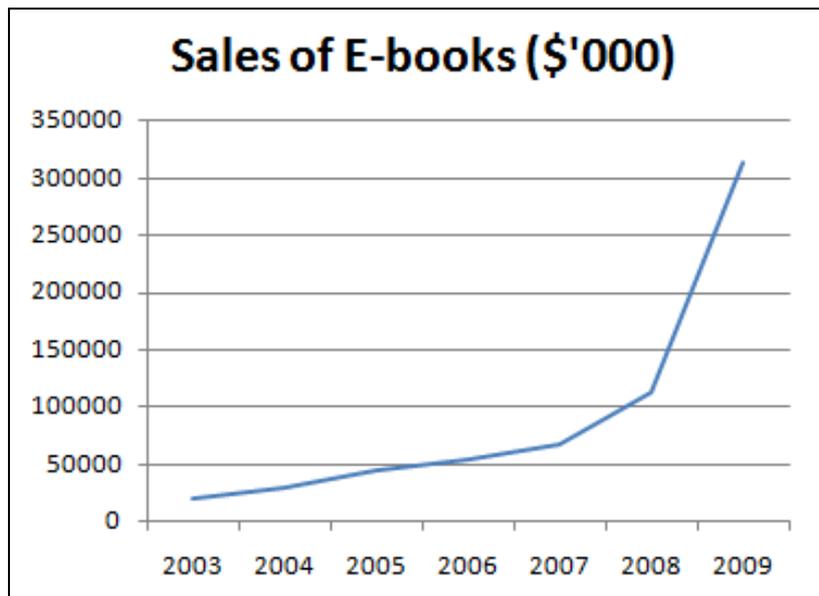
Figure 1: Growth in E-book Titles in Bowker’s GBIP



Interest in e-books has also been fueled by the media frenzy on the appearance of a whole range of e-book readers led by Amazon’s Kindle. Although e-books provided by libraries are mainly for access and use on desktops and laptops while those on e-readers are mainly downloaded (and used offline)

from retail bookstores, the term “e-books” is nevertheless used without differentiation. Certainly, libraries will have to cater to both ways of using e-books as e-book readers and other portable, tablet-form general purpose devices become more ubiquitous.

Figure 2: Growth in Sale of E-books (USD\$) from American Publishers Association report



Implication for Libraries

With stagnant and shrinking library material budgets, any increase in acquisitions of e-books will mean allocating less financial resources to other materials such as journals, databases and printed materials. Therefore it is important for libraries to ensure that their investment in e-books can be justified in terms of high usage and greater utility.

At Nanyang Technological University (NTU) Library, the usage of e-books is growing, but is not very high compared to e-journals and databases at this time. This could be due to a much smaller e-book collection and other access and usage reasons. It was decided that some baseline statistics on e-book usage would be helpful for the Library to plan for an increased role of e-books in the range of materials provided. A simple online survey was carried out among

users between Jan/Feb 2010 to collect information about e-book awareness, access, use, satisfaction and preference. There have been similar studies at other academic libraries which we found useful for comparison purposes.

Other E-book usage studies

In 2008, Ebrary carried out a large scale international survey (Ebrary, 2008) to gather information about students' opinions, perceptions and preferences on the use of e-books. This survey attracted 6,492 students representing about 400 institutions from 75 countries. Another large scale survey was carried by the JISC national e-books observatory project (JISC, 2008), which sought to evaluate the use of course text e-books (licensed for free use by JISC) among students in 127 universities using deep log analysis. There were also a number of studies focusing on particular institutions. Nariani (2009) conducted a study on the findability and accessibility of e-books and their desired features among science graduate students and faculty at York University in Canada. Shelburne (2009) investigated the usage patterns and library patron attitudes toward e-books at the University of Illinois. This study was done in collaboration with Springer. Another user study was done by Briddon et al., at University of the West England (UWE) which aimed to help the Library's collection management and development work by finding out how staff and students are using e-books for learning, teaching and research. These are just a few of the studies to give a flavor of the type of surveys which are similar or which illustrate useful points in our study.

Background on e-book collection and development at NTU Library

NTU is organized into four colleges; Engineering, Science, Business, and Humanities, Art & Social Sciences and has two autonomous institutes. The College of Engineering (CoE) is the largest, with 6 schools and 56% of total student population. The College of Science (CoS) comprising 2 schools and the College of Humanities, Arts & Social Sciences (CoHASS) comprising 3 schools were set up less than 10 years ago. Lastly, Nanyang Business School forms the College of Business. Each of these 3 colleges has between 14% and 16% of total student population in 2009. The Library serves a population of

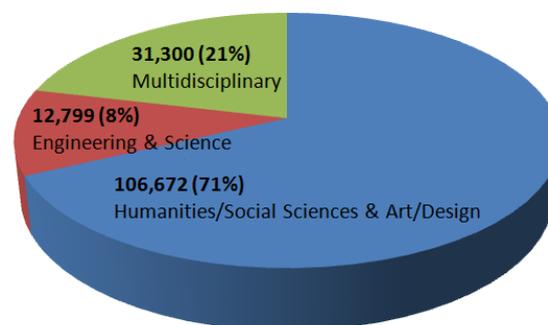
27,353 students up to PhD level and 5,546 staff, of which 3,094 are faculty and research staff (Sep 2009).

The Library first began to acquire e-books in 2004 for the College of Engineering. The initial collection consists mainly of reference titles from Referex, Knovel and CRCnetBASE. During the next two years, the collection expanded to include Elsevier and Wiley's book series on business, management, economics, chemistry and life sciences. In the meantime, student enrollment and researchers for new schools in Humanities and Social Sciences, Art Design and Media and Physical & Mathematical Science was increasing rapidly. New collections from Springer, Oxford University Press and Alexander Street, and titles from NetLibrary, Ebrary and Safari were added. As the Library was starting to build the collection from scratch for the new school of humanities and social sciences, e-books became an important way to quickly provide access to needed materials for the school, particularly for the Chinese studies division where many e-books are available.

A breakdown of the collection by broad discipline is shown in Figure 3 below. It must be noted that the larger proportion of humanities/social sciences and art & design e-book titles (hereafter referred as HSS e-book collection) is due largely to the acquisition of Chinese e-books from Superstar and Apabi. Together these account for 99.5% of the total HSS e-book collection.

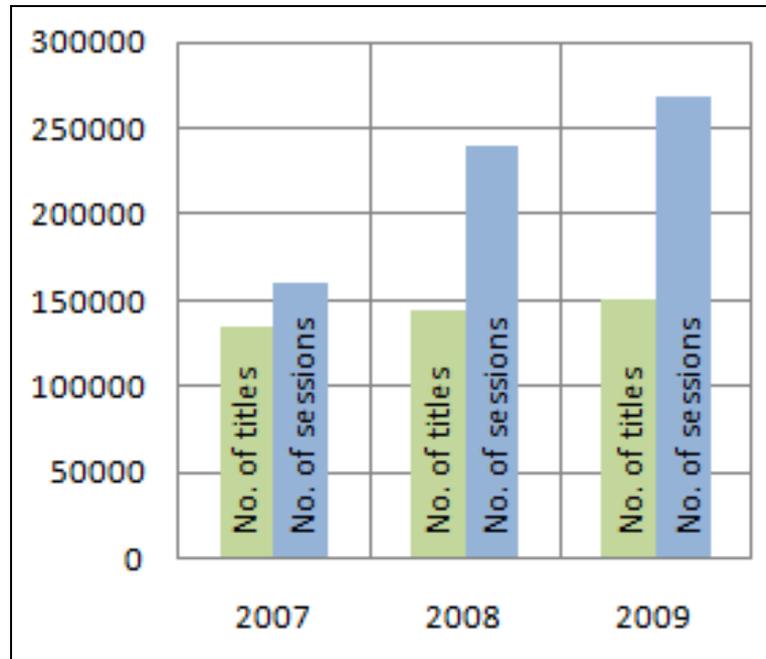
Figure 3: Subject Breakdown of E-books in NTU

Total number of e-books (2009) = 150,861



The use of e-books also increased in the last 3 years. Figure 4 shows the increase in login sessions of e-books since 2007. The rate of use has increased more than the growth rate of e-books.

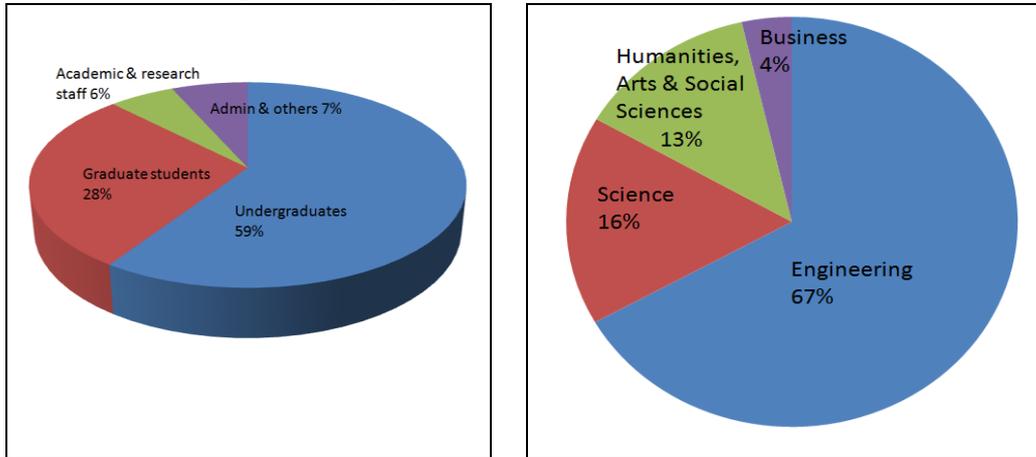
Figure 4: Increase in Usage of E-books in NTU



The Survey

An online survey was posted on the Library's website for 6 weeks from 11 January to 28 February 2010. The survey had 14 questions and was targeted at staff and students. A total of 2,207 replies were received but only 2,119 were used after removing duplicate respondents and respondents with incomplete answers. The response rate was 7.9% of the total staff and student population. More students (8.4% of population) responded compared to staff (4.2%). The composition of respondents is shown in figure 5 and 6. In terms of representation from colleges, engineering students was over-represented (67% against 56%) in the sample size, while business students were under-represented (4% against 14%). The proportion for College of Science and College of Humanities, Arts & Social Sciences reflect closely the proportion of the actual population.

Figure 5: Type of Respondents & Colleges



Findings

1. Awareness of e-books provided by the Library

Of the staff and students, 89.2% reported that are aware that the Library provides e-books as part of its collection. Most staff and students (90.8% and 89.1% respectively), know of the Library's e-book collection (see figure 7 and 8). Among students, undergraduates are more aware than graduate students.

Figure 7: Library E-book Awareness among Staff & Students

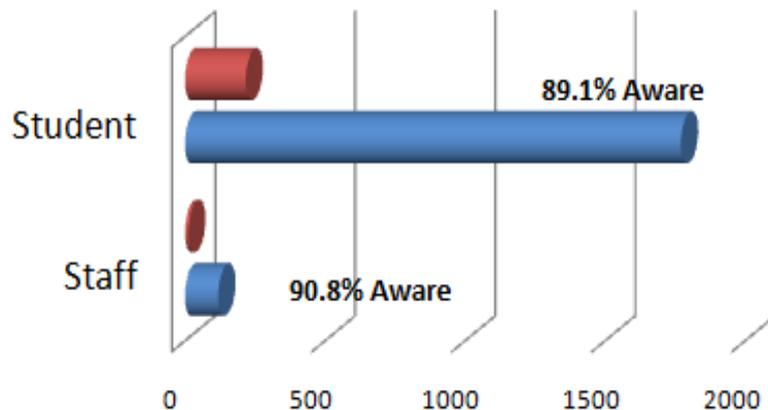
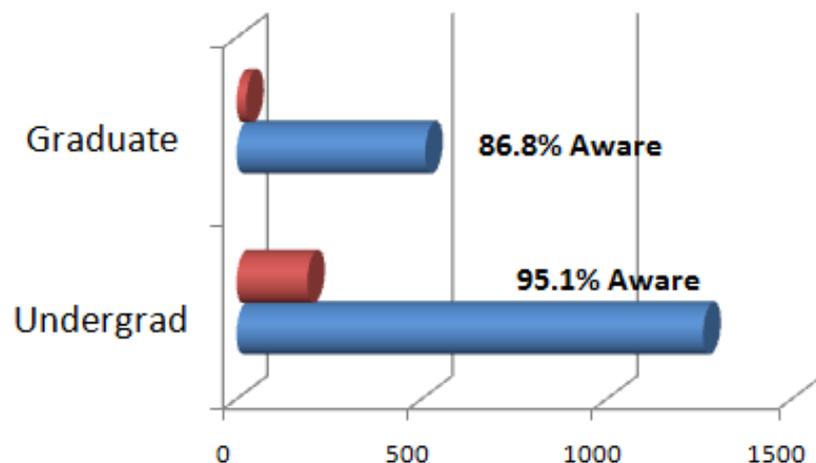


Figure 8: Library E-book Awareness among Graduate Students & Undergraduates



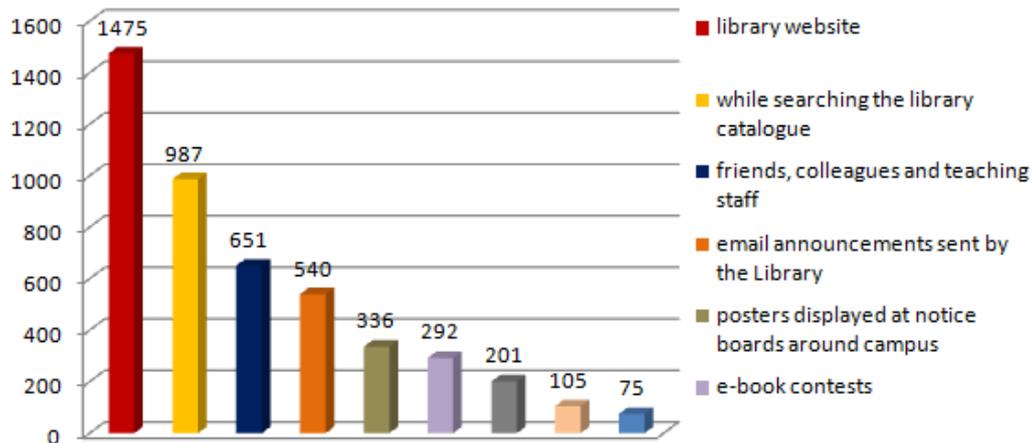
This is a high level of awareness when compared with findings from other studies. For example, the Global Student E-book Survey (Ebrary, 2008) involving 6,492 students from 75 countries noted only 57.2% awareness. The CIBER Superbook survey in 2006 (JISC, 2009) indicated 31%, University of Illinois (Shelbourne, 2009) shows 55% and Canada's York University survey reported awareness by 65.5% of graduate students and 52.8% for faculty (Nariani, 2009).

How do users know about e-books availability in the Library? The majority of users get to know of the Library's e-book collection from the Library's website (31.64%) and the Library Catalogue (21.17%) as seen in Figure 9. This result is consistent with findings from the Global Student E-book Survey (Ebrary, 2008) and CIBER's SuperBook project (JISC, 2009) where these two channels top the charts.

The high awareness of e-books among users could be attributed to the Library's promotion and outreach strategy that encourage regular visits to the Library's website, outreach efforts by subject librarians in subject blogs and other publicity activities. The Library website has attractive flash banners advertising various e-resources which changes on a weekly basis. The Library has also actively promoted e-books via a number of activities. These include pushing emails on new e-book collection or reference works to users, displaying posters on the library's e-book collection for different subjects, and organizing e-book contests to entice users to read or use the collection. These

promotional activities account for 25.1% of users learning of the Library’s e-book collection.

Figure 9: How users know about the Library E-book Collection



2. Actual Use of E-books

Although majority of the users are aware of e-books in the library collection, only 55.9% of the users have actually used them. Further breakdown of usage by type of students revealed the following:

Among graduate students, 75.6% have used e-books. The proportion of undergraduates who have used e-books is 48.1% as seen in Figure 10. Thus proportionately more graduate students use e-books than undergraduates. This could be due to higher degree students needing more literature for their study and research.

Figure 10: Use of e-books by Undergraduates and postgraduates

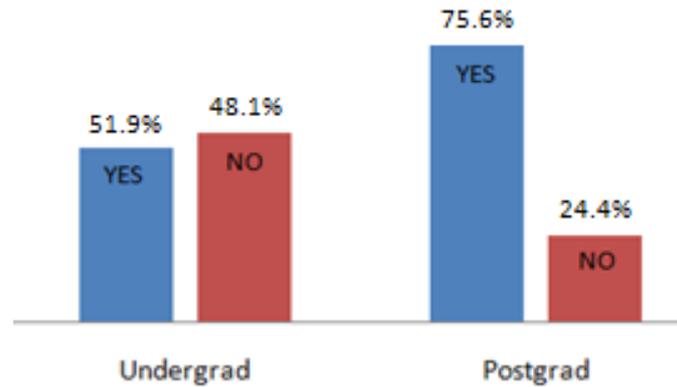
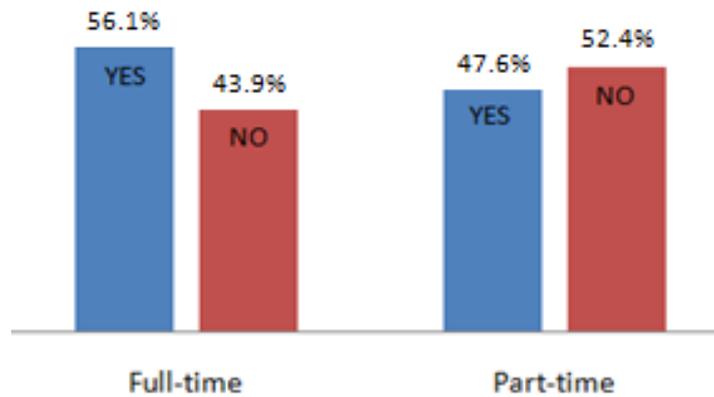
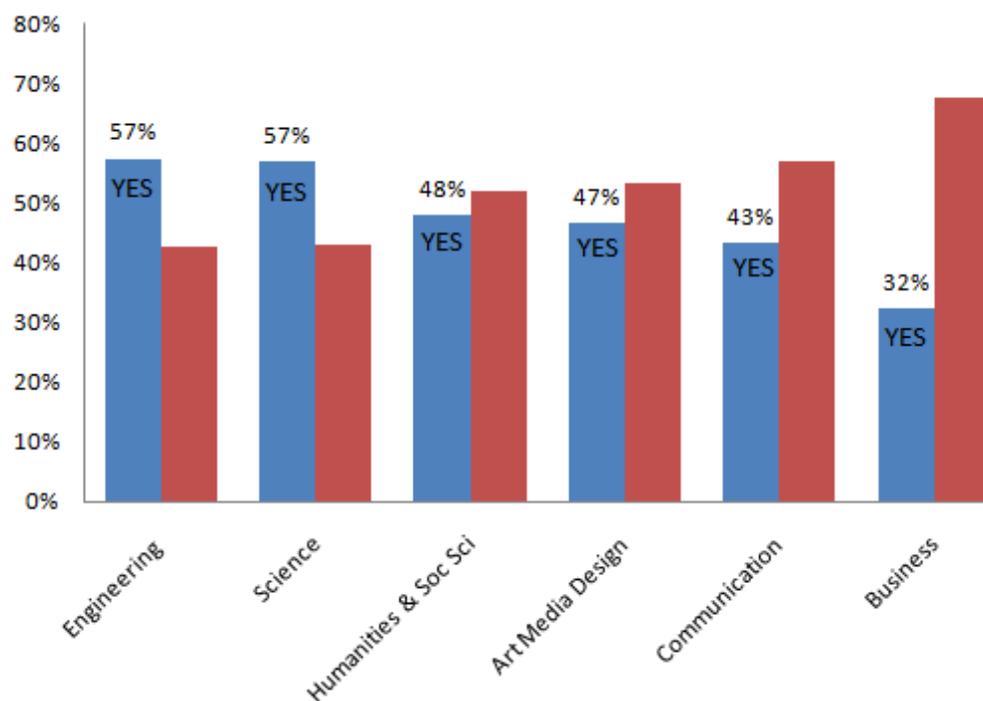


Figure 11: Use of E-books by Full-time & Part-time Students



One would expect a higher usage of e-books by part-time students who spend less time on campus and are more reliant on remote resources such as e-books. However, the survey revealed that more full-time students (56.1%) are using the e-book collection compared with part-time students (47.6%) as seen in Figure 11. Perhaps full-time students have more opportunities to participate in library programmes and are better informed on the resources available. However, in the free form comment session, a number of part-time students did ask for more e-book titles and to include textbooks for their courses.

Figure 12: Use of e-books by users in schools

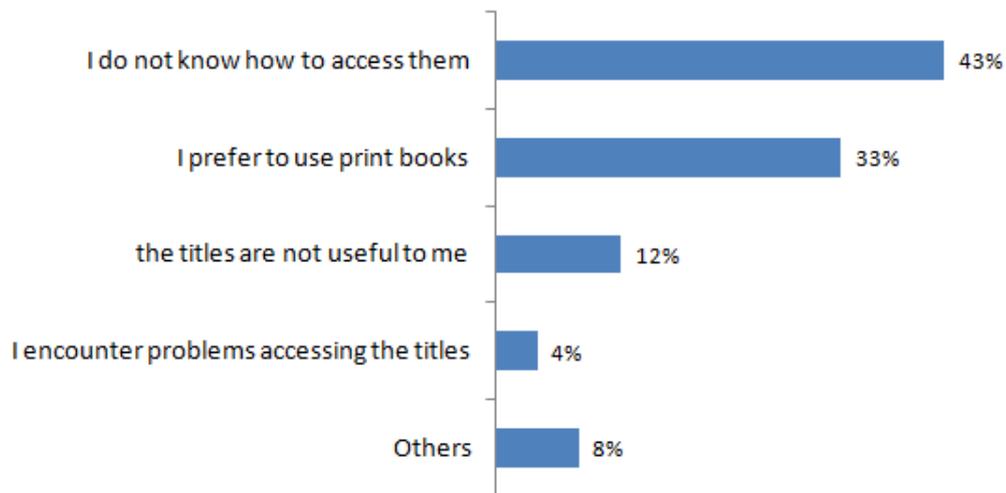


Engineering and Science students use more e-books than students from the Business, Humanities & Social Sciences, Art Design & Media and Communication Studies schools. Figure 12 shows the proportion of users within each disciplinary group who have used the Library e-book collection. 57% of students in both College of Engineering and College of Science have used e-books compared with between 32% to 48% of students in College of Humanities and Social Sciences.

Interestingly, in spite of the high awareness rate on e-books, 44% of users surveyed claimed that they have never used any e-books in the Library collection. Of these non-users, 43% cited the main reason for not using the collection as not knowing how to access e-books. It is reasonable to suggest that this group is likely to be lukewarm towards e-books or else they would have made an effort (by following instruction in the Library website or contacting library staff) to find and use them. 33% of non-users indicated that they prefer print books and 12% explained that the titles are not useful to them. 4% did not use because they encountered problems in accessing the titles.

It would appear that just under half of all users (44%) are not particularly keen on e-books. They either prefer print or do not have sufficient interest to make an effort to access and use them.

Figure 13: Reasons for not using e-books



3. *Satisfaction with the Library e-book collection*

As reported in the survey, 56% of students found the Library e-book collection to be good or excellent, 33% found it adequate while 11% found it poor or uneven (see Figure 14). When the student responses were broken down by colleges, it was found that 12% of all engineering students found the collection to be poor or uneven while only 5% of all business students found it so (see figure 15).

Figure 14: Students' satisfaction with e-book collection

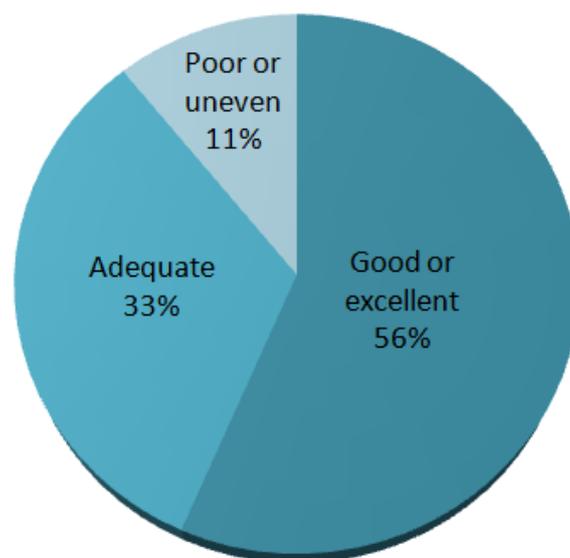
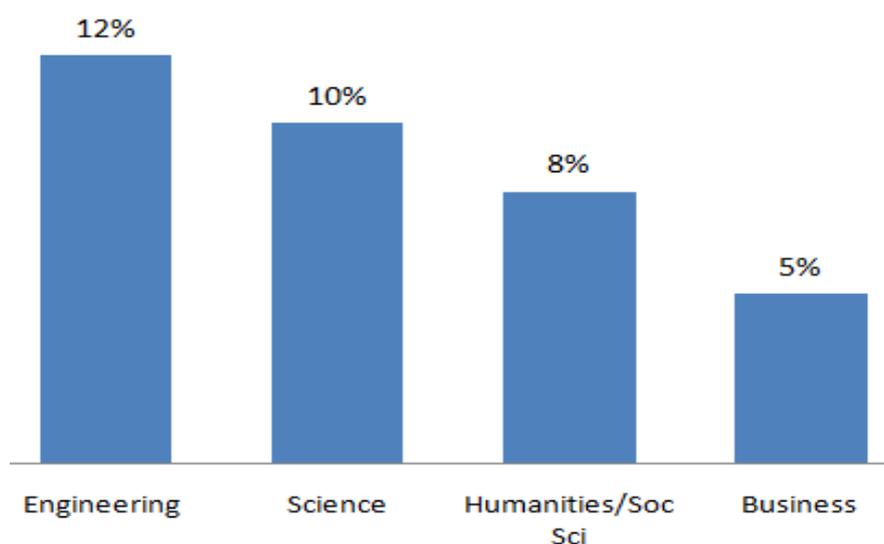


Figure 15: Percentage of students (by college) who rate e-book collection as poor & uneven



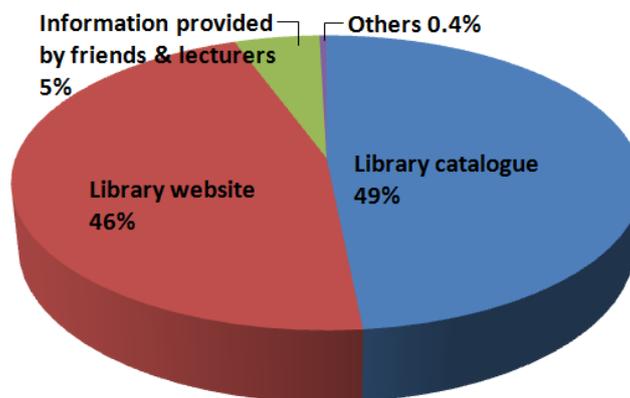
4. Methods of accessing e-books

Not all e-books available to users can be searched and accessed through the Library catalogue at the moment. Retrieval and access to some e-books, such as the huge Chinese collection from Superstar and Apabi (more than 100,000

items) have to be done via their respective hosted platforms provided by the vendors until such time when MARC records can be created or uploaded to the catalogue. Thus unlike the case of printed books where there is only one central retrieval point, e-books retrieval is scattered and users have to go to more than one place to find them.

The findings show that most users access e-books either through the Library Catalogue (48.4%) or the Library Website (47.7%). The e-book search tab in the Website is a static page that guides users in finding e-book titles they need. Users are also tipped off by their friends and lecturers (5.15%) or locate the titles from Google Books (0.42%).

Figure 16: How e-books are located

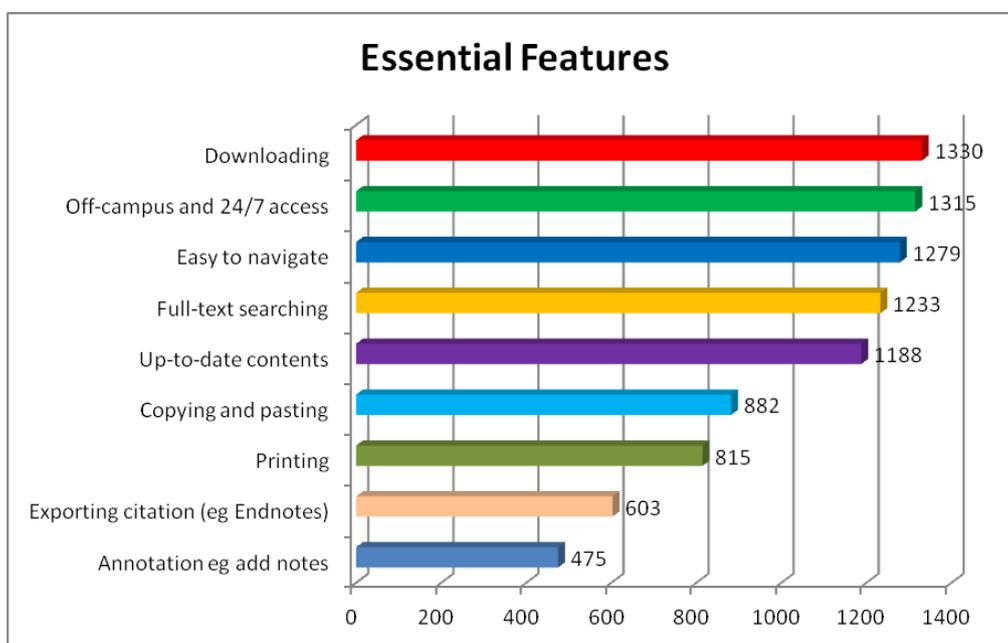


A few students suggested that the library offers more instructions or provide guides on how to use this collection. What is apparent to regular users of the library catalogue are sometimes not obvious to occasional catalogue users.

5. Desirable features of e-books

Respondents were asked to indicate the e-book features that they regard as essential, important, not important or where they have no opinions (i.e. “don’t know”). These features are (a) annotation, (b) copying & pasting, (c) downloading, (d) ease of navigation, (e) exporting citation, (f) off-campus & 24/7 access, (g) printing, (h) full-text search, and (i) up-to-date contents.

Figure 17: Features in e-books that are considered as essential



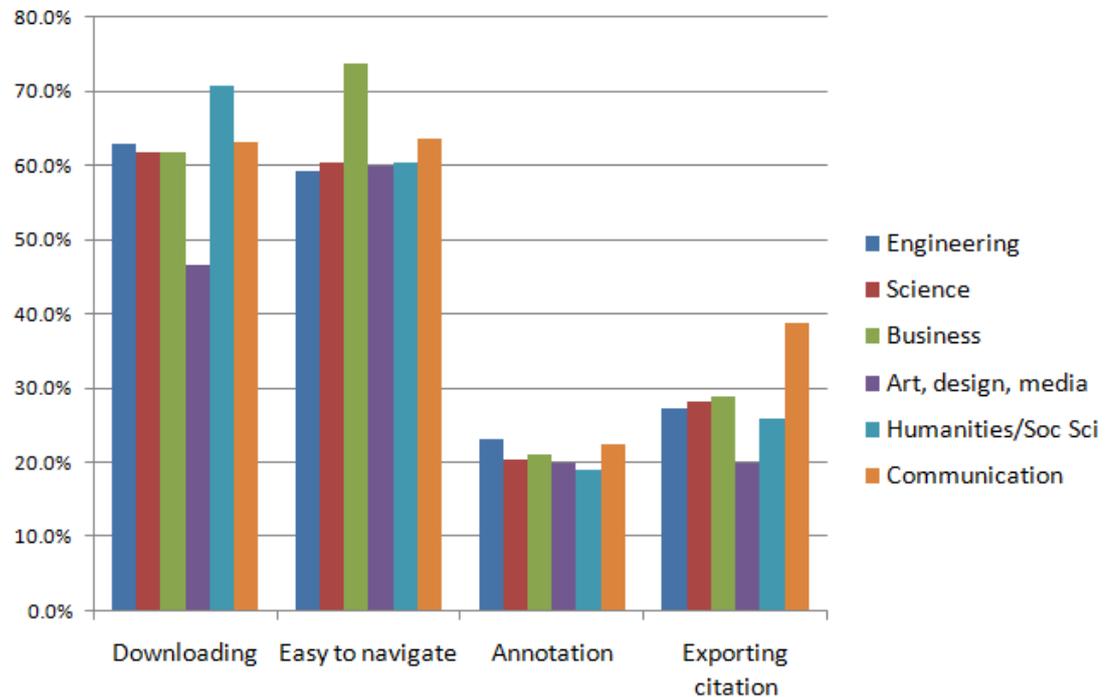
Topping the list as essential features, ranked in order of total number, are

- (1) downloading
- (2) off-campus & 24/7 access
- (3) ease of navigation

More than 60% of the users consider these features as essential. Other features deemed essential by more than 50% of users are full-text searching and up-to-date contents. When both essential and important features are considered together, the ranking barely changes. Easy to navigate and full-text searching move up the ranking, displacing off-campus & 24/7 access. The least important features are annotation and citation export.

There are some differences in the preference among users in the 4 colleges. Figure 18 shows the response of users from College of Engineering, College of Science, College of Business and all the 3 schools (School of Humanities & Social Sciences, School of Art, Design & Media and School of Communication and Information) in College of Humanities and Social Sciences for two features ranked top and bottom.

Figure 18: Percentage of users from individual colleges and schools who rank the 2 top and bottom e-book features as essential



- a. Users from the School of Humanities and Social Sciences seem to have a greater need for downloading as 70.7% consider this feature essential. At the other end, only 46.7% of users from the School of Art, Design & Media find this feature essential. The difference could be due to the fact that most humanities and social science users need the e-books for sustained continuous reading, for which it is more convenient to have it downloaded while art and design students use e-books more for browsing and scanning. Graduate students and undergraduates do not differ much in their choice of downloading and easy to navigate features as essential features (not shown in figures).
- b. More users from the Business school (CoB) rank “Easy to navigate” as essential (73.7%) compared to the rest. Perhaps their need for finding the right chunk of information easily and effectively is of primary concern in reading e-books.

- c. Users from School of Communication & Information value the exporting citation function (38.8%) more than the rest, in particular the School of Art, Design and Media (20%)

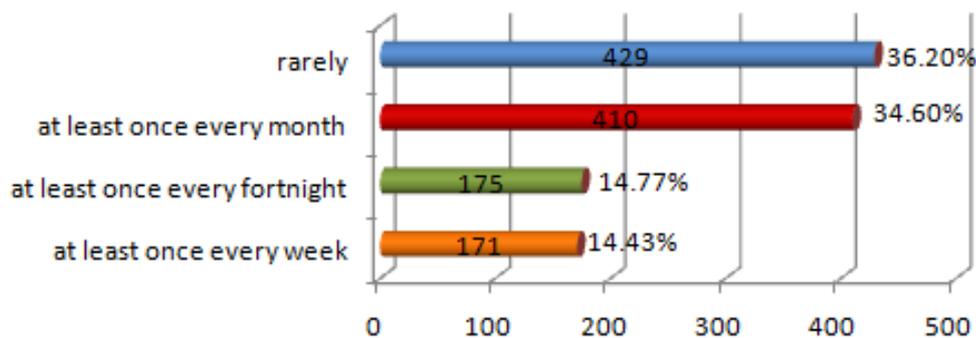
Most users seem to value electronic access to e-books (whether they are downloaded or available online) more than annotation or citation tools in aiding them in using e-books. Online access is crucial enough for many to reiterate this feature in their comments. They also want to retrieve the relevant information needed in the easiest and most convenient manner, as seen from the high ranking of the easy to navigate and full-text searching features. These features need to be considered when new e-book collection or e-book titles are purchased in the future.

6. Usage behavior

a. How often do users access e-book collection

Nearly a third of the users (29.2%) access the e-book collection regularly and half of these regular users refer to the collection on a weekly basis. 34.6% access e-book occasionally and slightly more than a third (36.2%) rarely uses the collection.

Figure 19: Frequency of accessing e-book collection



b. Time spent reading e-books

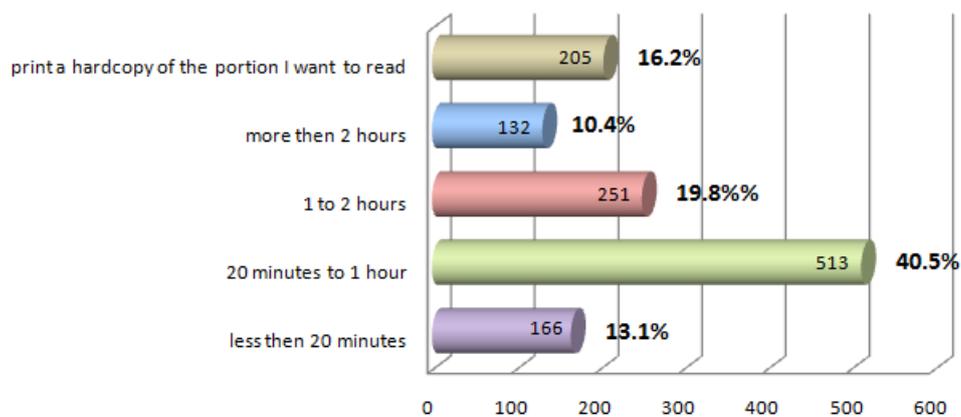
NTU users seem to spend more time reading a e-book online compared to findings from other studies. The results show that 70.7% spend 20 minutes or more and 13.1% spend less than 20 minutes. In contrast, the York University study indicated that only 41.4% graduate students spent 20 minutes and more

and 50% spent 20 minutes or less (Nariani, 2009). NTU staff did not exhibit different reading habits unlike their counterparts at York University. Only 22% of the faculty members at York University spent more than 20 minutes reading on screen.

In 2007, observations made by providers such as OCLC (Wilkie & Harris, 2008) noted an average of 8.5 minutes for each session with an e-book. Staff and students at NTU are spending a great deal more time reading an e-book. For e-books, 19.8% of the users actually spent 1 to 2 hours and another 10.4% devote more than 2 hours reading an e-book.

Time spent by staff and students are comparable except that 5% more staff would print a hardcopy for their reading.

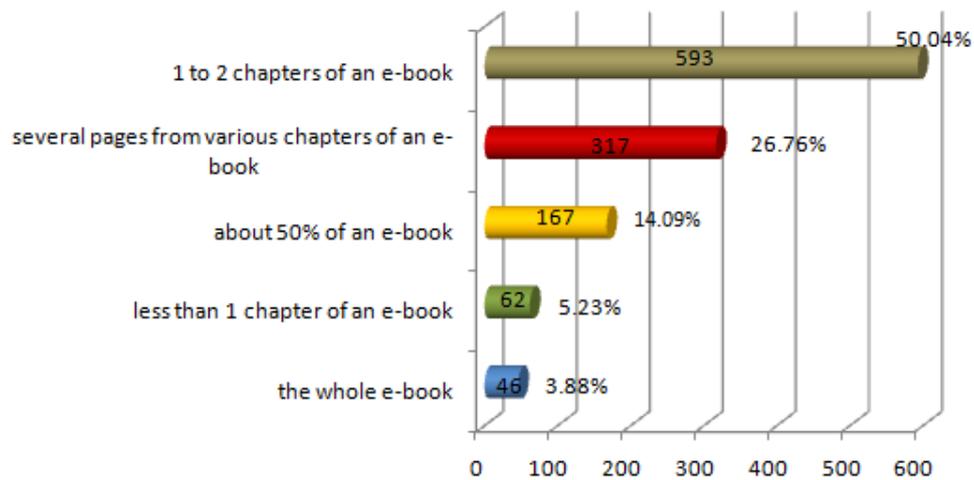
Figure 20: Time spent reading e-books



c. How much of an e-book is read on screen

50% of users read one to two chapters of an e-book. Similar surveys do not yield such high figures. JISC's study, which included 127 universities in the UK had only around 7.8% to 8.6% of users reading one whole chapter online. The study by York University had a higher figure of graduate science students (12.1% to 13.9%) reading one whole chapter in one sitting.

Figure 21: How much of an e-book is read



Many studies conducted on use of e-books have generally found that users tend to dip in and out of an e-book. JISC's study noted that more than 50% of the users display such reading habits and York University noted 29.3% to 36.1%. At NTU, 26.8% will usually read several pages from various chapters of an e-book. Skimming of an e-book by users here is common, though not as high as that reported in the JISC study.

Figures 22-24 compare the amount of materials read by NTU users with the findings of the JISC and the York University studies. 50% of NTU users read 1 to 2 chapters of an e-book compared with only 7.8% staff and 8.6% students in the JISC study and 13.9% staff and 12.10% students at York University, Canada. Most users in the JISC study and York University dip in and out of several chapters or read less than 1 chapter.

Figure 22: How much of an e-book is read – NTU

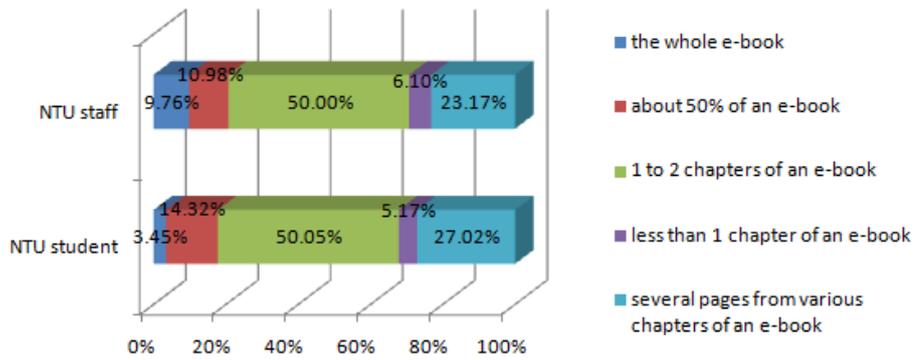


Figure 23: How much of the last e-book did you read online from JISC Study

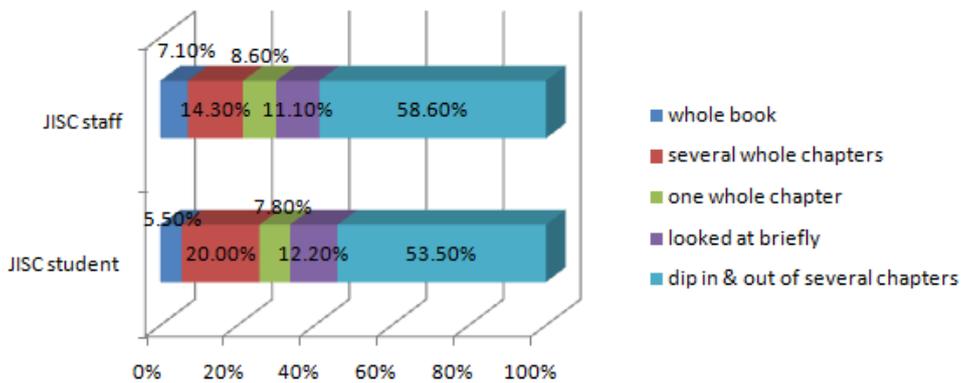
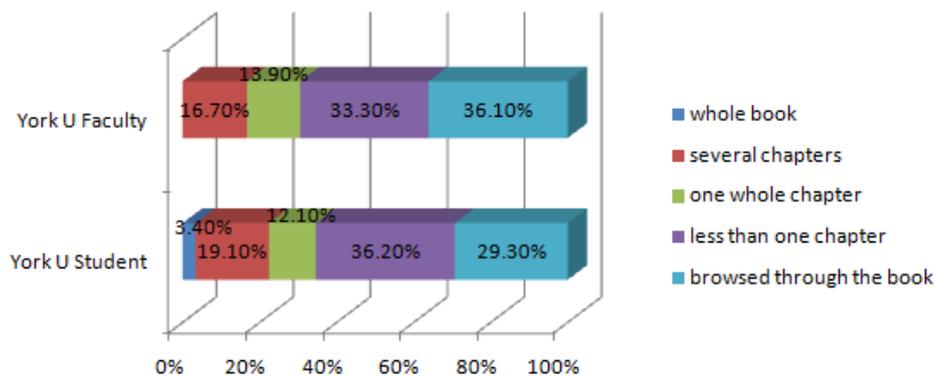


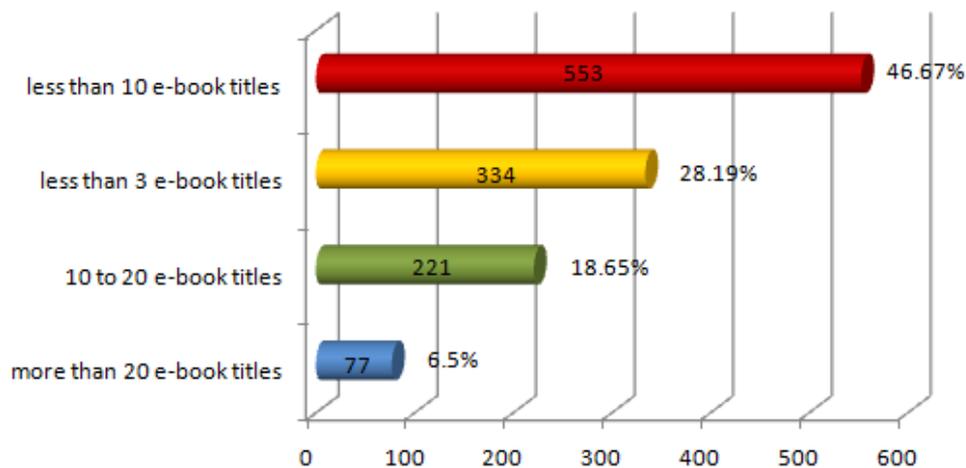
Figure 24 : How much of the e-book you read online in one sitting- York University



d. Number of e-books accessed

The majority of NTU users have read about 3 to 10 e-books. A very small number (6.5%) are heavy users, having read more than 20 titles. It is interesting to note that 267,569 sessions were recorded for e-books use in 2009. In contrast, 1,813,594 physical items were borrowed by users during the same period, i.e. about 6.8 physical items was borrowed for every e-book login session.

Figure 25: Number of e-books accessed



7. Nature of e-books

A set of questions asked users the type of e-books in the Library that they commonly used, the purpose for using them and their experience in using other non-library e-books. We also wanted to find out if there are differences in the types of e-books used by engineering and science students as a group versus business, art, humanities & social sciences and communication students.

a. Types of books used

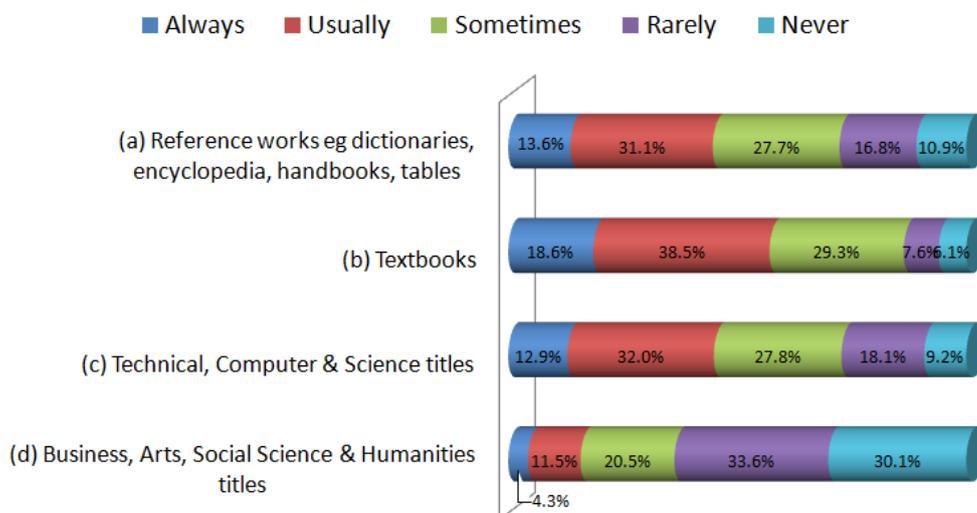
A greater percentage of users indicated that they always or usually use e-books that are text-books (total of 57%). This is followed by technical, computer & science titles (44.9%) and reference works such as dictionaries, encyclopedia and handbooks (44.6%). Regular use of business, arts, social sciences & humanities titles are the lowest at (15.8%) (see figure 26).

Users, like those in other studies, regard textbooks in e-format to be the most useful. This is not unexpected as libraries usually don't provide or provide too few print copies of textbooks that users require for their studies. Traditionally users are expected to buy their own textbooks and text book publishers have been reluctant to provide e-text books unless the business model of providing them ensures that it does not jeopardize their current business.

E-books are often touted to be best for searching and finding quickly snippets of information that are traditionally served by printed reference works such as encyclopedias and handbooks. For users who use this type of e-books, 44.6% indicated that they always or usually do so while 10.9% have never use e-book reference works.

In terms of use of e-books in the 2 broad disciplinary areas (i.e. science/engineering and humanities/social sciences/arts/business), more of the former are used compared to the latter. This could be explained by the larger number of respondents who are from the engineering and science colleges (83%).

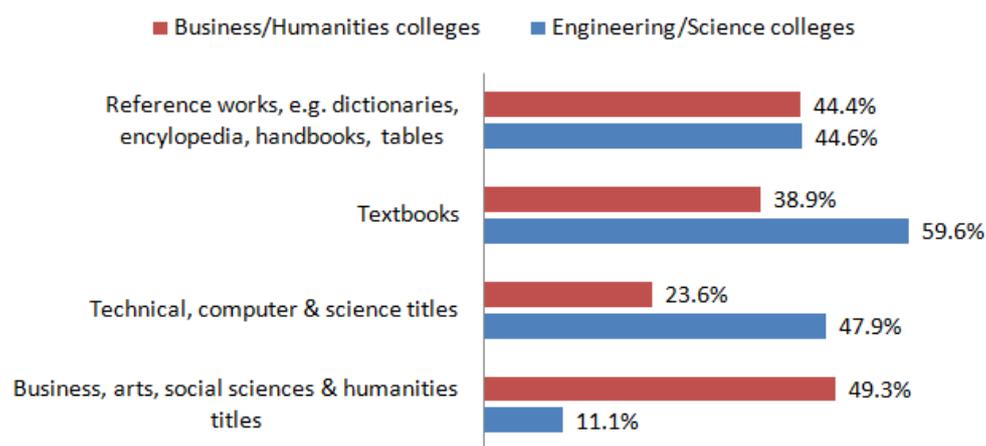
Figure 26: Types of e-book used



To eliminate the impact of the larger proportion of engineering and science users on the result, a further break down of type of e-book used by the two major disciplinary groups; engineering/science and humanities/social sciences; was done and the result displayed in Figure 27.

About the same proportion of users (44%) in each group use reference works frequently. More users within the Engineering and Science colleges (59.6%) use textbooks while only 38.9% of users in Humanities/Social Sciences and Business do so. It is interesting to note that though both groups use e-books in their respective subject areas, they also use e-books from each other 'subject areas significantly – i.e. 11.1% of users from CoE and CoS use e-books in business, art, humanities & social sciences while 23.6 % of users from CoB and CoHASS use the Technical, Computer and Science e-books. Thus the audience for e-books is not restricted to primary users in the related subject areas.

Figure 27: Types of e-books frequently used by Business/Humanities students and Engineering/Science users



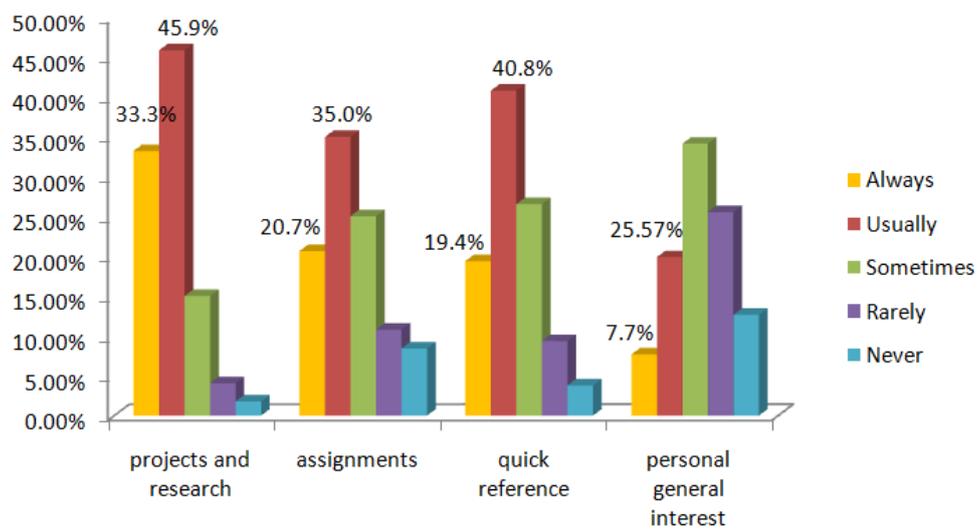
b. Reasons for using e-books

As seen in Figure 28, users indicated that e-books are used more frequently (always, 33.3% and usually, 45.9%) when working on projects and research. The next 2 reasons for frequent use are for quick reference (always 19.4%, usually 40.8%) and doing assignments (always 20.7%, usually 35.0%). The

findings show that users use the library’s e-book collection comparatively less frequently for general reading (always 7.7%, usually 25.6%).

The survey also found that the use of e-books for projects and research, assignments and quick reference by graduate students, undergraduates; full-time and part-time students do not vary widely.

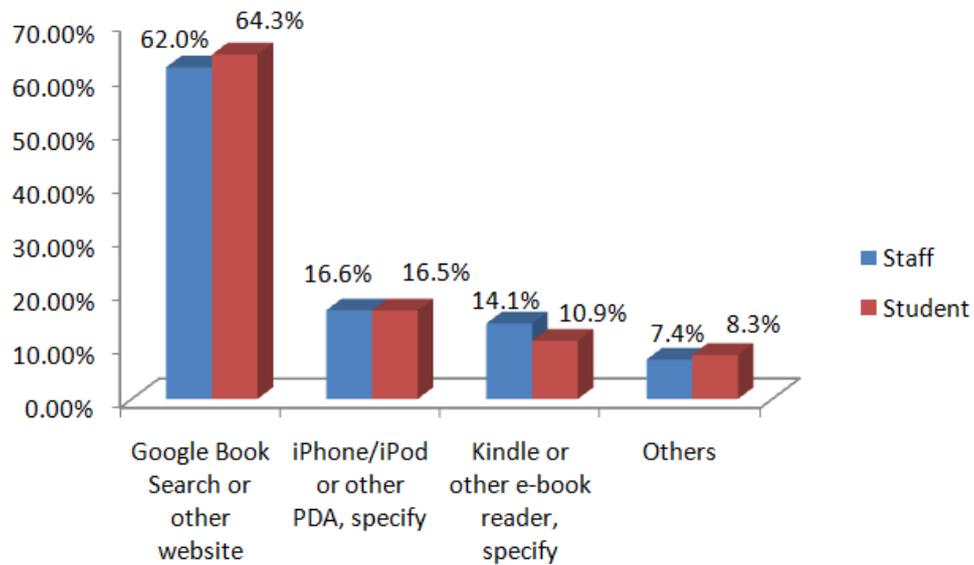
Figure 28 : Reasons for using e-books



c. Use of other e-books

All respondents were asked whether they have accessed or read e-books from other sources apart from the Library. About two thirds (75.4%) of users have used e-books from Google Book Search or other websites such as the Singapore National Library Board, Scribd, Baidu, Gigapedia and Project Gutenberg. Another 19.4% have read e-books from their mobile devices such as smart phones and PDAs. A smaller proportion of users (13.0%) use e-book readers as seen in Figure 29. There is no significant difference among staff or students or within individual colleges on their use of other e-book sources.

Figure 29: Use of other e-books by staff and students

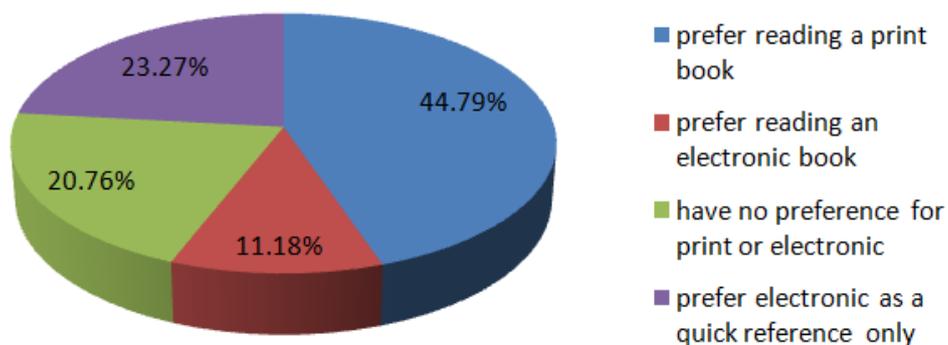


This indicates that most users' experience with other e-books are mostly from reading them on computer screens. Only a small percentage read e-books from portable devices such as smart phones, PDAs or e-book readers.

8. Preference for print and e-books

The survey found that many users still prefer reading a print book (44.8%). Only 11.2% prefer reading e-books. 20.8% have no preference and 23.3% prefer electronic for quick reference only.

Figure 30: Preference for e-books and print book



Many users find reading an e-book strenuous on their eyes as reported in the free-form comment section. A handful of users commented on the unique learning experience that printed book offers. Below is a sampling of users' comments.

“To be honest, comparing with reading e-books, I find myself learn more by reading a print book.”

“I still prefer to tickle my senses of touch, sight and smell through reading a printed book”

“I still love to print it out...need to feel the paper”

“If e-book is as colourful as the printed book, it would be wonderful.”

“the feel that one gets from a print book and e book is still a gap in between”

“Although it is convenient to use an e-book, I feel it will still be easier to read if it is a print book.”

“Books are being obsolete and it is such a pity! I think that price and convenience plays a huge part in fact, but one should not neglect the sense of touch and smell while reading.”

The preference for print is not unique to any specific user group or schools as shown in figure 31 and 32.

Figure 31: Staff vs student preference for print and e-books

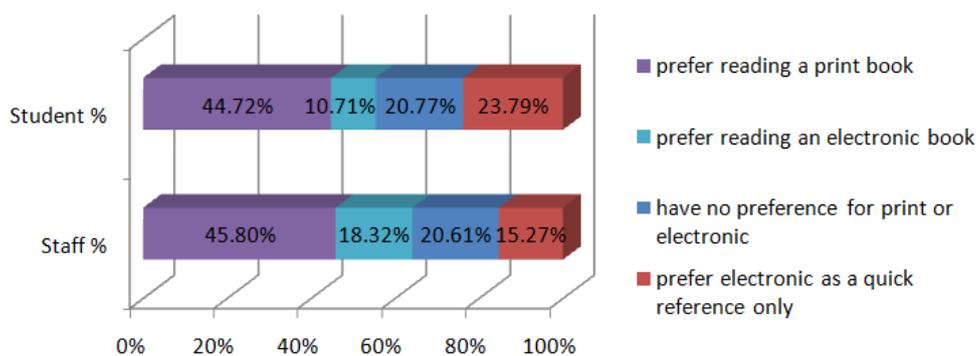
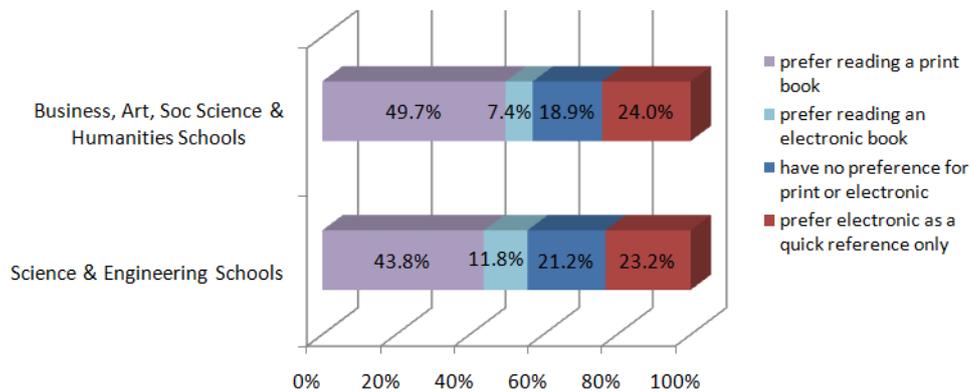
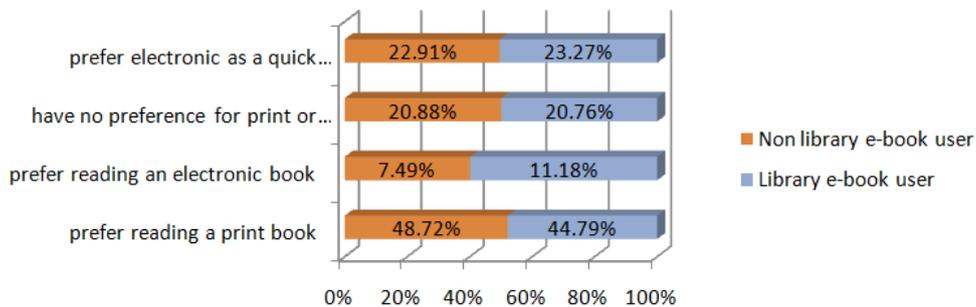


Figure 32 : Preference for print and e-books by colleges and schools



48.7% of respondents who have not used the Library e-book collection before also indicated their preference for print as shown in figure 33 below.

Figure 33: Preference for print and e-books by users of library e-books and non-users

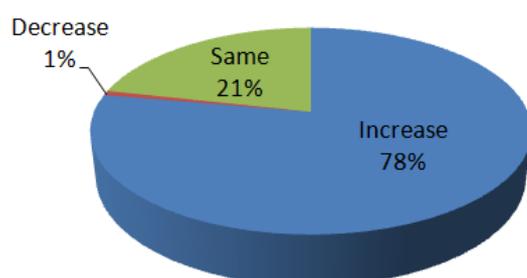


There is therefore a remarkable consistency of between 43.8% and 49.7% of staff, students, users in each major disciplinary group and non-users in terms of their preference for print as contrast to e-book format for reading. However this picture might change when users have more experience with e-book readers, which offer better readability than computer screens in reading text. During the period of the survey, e-book readers have just begun to appear in the market and many top range readers are still not available locally in Singapore. This view is based on the assumption that screen readability is the main grouse among those who prefer print as there are many other factors that influence readers' preference.

9. Future use of e-books

A good 77.8% of users foresee an increase in their use of e-books. Again, the perceived trend in the use of e-books varies only slightly between different user groups and schools. In general, users are receptive to reading more e-books. Many are waiting for software and hardware to become less costly and more comfortable to the eyes. One respondent was resigned to a future where e-books are so readily available that “the need to be up-to-date and current with technological advancements would force me to increase my usage of e-books”.

Figure 34 : Future use of e-books



Discussion

The survey on e-book use at NTU Library provides a useful snapshot of users' awareness, perception, usage, behavior, preferences and attitudes which are useful pointers for the Library to take note in developing e-book collections and services in the immediate future. Though there are similarities in e-book usage compared with other studies, there are also striking differences. The discussion below highlights some of these findings.

Compared with most other institutions, there is a high degree of awareness on availability of e-books in the Library (90.8% and 89.1% of staff and students respectively). This could be due to the general high level of awareness of technological development among our users as well as strong outreach effort from our promotion services division and subject/liaison librarians. Weekly advertisements of various e-resources using attractively designed web banners at the Library Website help to generate interest and repeat visits, while subject blogs and email pushed by our 35 subject librarians probably play important roles in creating awareness.

However, despite the high awareness of library provided e-books, 44% of users have never used them. Though a large percentage of them (43%) responded that the reason for this is because they do not know how to access them, one would expect that this problem could be easily overcome by asking the library staff or finding information and instruction in the Library website. Thus it is likely that their level of interest and need for e-books is not sufficiently high for them to make these efforts.

In fact another 33% of non-users state that they prefer to use print books. This is further reinforced by users' response to a later question that asked them about their preference for print and electronic. 44.8% of users prefer reading print. This is a consistent finding even when we examine preference within all students, staff, business and humanities students, science and engineering students and non-users. It appears that one of the main reasons for print preference is the comparatively poor readability on computer screens and the attractive physicality of printed materials. However this preference might change when better quality e-book readers are more affordable and available. To increase e-book use, the Library may step up its effort in making available e-books for downloading to e-book readers. However this will also depend on the take-up rate of e-book readers among our users as it is not feasible for libraries to provide them on a large scale.

Of those who used the Library's e-books, it was found that science and engineering users tend to use them more than other users from business, humanities and social sciences, art and design schools. There is also evidence of interdisciplinary use, i.e. engineering and science users are using business, humanities and social science e-books and humanities and social science students are using engineering and science titles. It was also found that the proportion of graduate students who use e-books are higher (75.6%) than the proportion of undergraduates (48.1%). This is despite the fact that undergraduates are more aware of the Library e-book collection than graduate students. It is likely that the Library is not meeting the needs of the undergraduates (e.g. provision of textbooks) compared with graduate students in the provision of e-books.

When considering essential features of e-books, most users value convenience of access rather than availability of new tools in using e-books. Thus, more than 60% of users consider downloading, 24/7 access and ease of navigation as essential while non-traditional features such as the ability to make annotation and exporting citation were seen as less essential. It would seem that users still have a very conservative view of using new formats like e-books. They are treated as normal print books with instant and 24/7 convenient access. There are however some differences in preference for

features in e-books among various types of students that are probably related to how they approach study and research in their disciplines. For example, humanities and social science students have greater need for downloading (possibly to store text away for reading later), business students rank navigation high (value quick location of information) and communication students value the feature for exporting citations (value in making references). Of course, these attributions are mere conjectures and need further studies to ascertain their truths.

A striking finding is that NTU users tend to spend more time reading e-books online compared to findings from other studies. 70.7% spend 20 minutes or more reading e-books online compared with 41.4% at York University in Canada. They also read more extensively from an online e-book. 50% of NTU users read 1-2 chapters compared with 8.6% (one whole chapters) among students surveyed in the JISC study. More studies need to be done to explain this finding. Perhaps users here are more tolerant of reading on computer screens. It could also be that the Library here provides more good quality large screen monitors to make working on a computer easier!

Many users (77%) expect to increase their use of e-books in the future. This is in comparison to 55.9% of respondents who actually used the Library e-book collection. Increase in use could come about through an improved e-book collection in the Library, a better match of users' needs and resources, better services to attend to problems that users face in using e-books, improved readability of the reading screen through more options and support in downloading content to e-book readers and portable devices and continuing to keep users aware of new content and capabilities.

Conclusion

In conclusion, the survey shows some interesting findings regarding the use of e-books which we hope would contribute to existing and future studies on the understanding of users' behaviour and needs in this latest media in library collections. In summary, this survey found that even though users are aware of the availability of e-books in the Library, only slightly more than half of them actually used them. The main reasons for non-use are; not knowing how to access them and preference for print. Relating to the last point, it is also interesting that among all users, close to half prefer reading print and only slightly more than a tenth prefer reading electronic format. One-fifth has no preference and close to a quarter prefers e-books for quick reference only. There is also some difference in usage rate among various groups of users; graduates tend to use e-books more than undergraduates and engineering and science users use them more than those in humanities, social sciences, art and

business. In terms of features desired of e-books, most users seem to value easy access to e-books (whether these are downloaded or available online) more than having annotation or citation tools in aiding them in using e-books. As expected, users do not read the whole e-book they accessed. Half of the e-book users read one to two chapters, which seem to be more than what other studies found among their users. NTU users also seem to spend more time reading a e-book online compared with other studies. The majority of users have read about 3 to 10 e-books. A very small number (6.5%) are heavy users, having read more than 20 titles. Users access and use e-books mostly for project or research work and much less for general reading. Looking to the future, the majority of respondents foresees an increase in their use of e-books and is receptive to reading more e-books.

Though the study has been useful in providing some baseline information on how NTU users access and use e-books from the Library, there are limitations on its usefulness. The findings are only indicative of user behavior at this particular snapshot in time and may be different depending on changes in technology, accessibility, awareness and content availability.

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