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Utilization of e-book among University Mathematics Students

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Abstract

This study aims to explore utilization pattern of e-book among mathematics students' of Universiti Putra Malaysia (UPM). This research adopts simple random sampling method to collect data. About 35 undergraduate students participated in this study. Based on the result, only 37.1% of the respondents have used e-book. Among the reasons given for using e-books are "available around the clock", "searchable" and "allow easy navigation". Those who have never used e-books stated that they are not familiar with the technology. The result shows that majority of the respondents like to use e-book for finding materials for their assignments.

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Keywords: E-book; Mathematics; UPM; e-learning; Utilization pattern

1. Introduction

Electronic publications always attract many readers due to its nature of mobility and dynamic features. Electronic book (e-book) as one of the electronic publications on the market has taken its place besides its print counterpart as an accepted method of bringing the published word to readers. Although e-book was introduced four decades ago, but many researchers have claimed that its take up was very slow in many countries (Chu, 2003; Roesnita and Zainab, 2005; Levine-Clark, 2006; Anuradha and Usha, 2006; Noorhidawati and Gibb, 2008).

In Malaysia, local universities such as Universiti Sains Malaysia, Universiti Utara Malaysia, University of Malaya, International Islamic University, Universiti Tun Abdul Razak, Open Universiti Malaysia, Universiti Teknologi Mara and Universiti Kebangsaan Malaysia are among the universities that provide e-book services in their campus libraries (Primalani, 2004). Besides that, Ministry of Higher Education (MOHE), Malaysia is also seriously promoting university libraries to subscribe to e-book providers. Recently, MOHE has helped local universities to subscribe to netLibrary which worth Ringgit Malaysia 1.04 million (Personal Communication, 2010). This initiative has helped the universities to overcome their financial barrier because many universities are facing financial difficulties in subscribing to e-book aggregators.

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University Putra Malaysia (UPM), one of the local public universities in Malaysia has been undergoing massive growth in the last decade in terms of students' enrollment and research activities. The university has been declared as one of the Research University in the nation and receives a large number of research grants from MOHE and other government and private institutions. In order to support the growing need of reference materials for research activities and other academic purposes and also to satisfy the access needs of growing population, the UPM library has subscribed to e-book services in the year 2008.   This academic library offers e-book access to patrons by affording access over the web browsers. Therefore, no special software or hardware is necessary to view e-books.

At first, the library management engaged with Gale Virtual Reference Library and ScienceDirect. In the year 2010, the e-book collection has increased where the library management subscribed to Emerald e-books publisher and IGI Publishing aggregators. Under the IGI Publishing aggregator's umbrella, there are five publishers namely SIAM, Anmol, SciTech, Amsterdam University Press and Columbia University Press. The university library management has quite a large collection of e-books in variety of subject areas such as business, education, environment, history, information and publishing, law, library science, literature, medicine, nation and world and other science social, science and technology subjects.

2.   Literature Review

Researchers have defined e-book in many different perspectives. In general, e-book has been used to refer to hardware, software or document content. Some researchers simply refer to e-book as text that is available in the electronic format (Saurie and Kaushik, 2001). Others have indicated that e-book as the combination of electronic text and electronic reading device (the medium used to read the document content) (Lynch, 2001; Goh, 2003). Chen (2003) defines e-book in terms of four perspectives; the media used to preserve the books; the content; the device used to read the content; and the delivery channel. According to Armstrong, Edwards and Lonsdale (2002, p.217) e-book can be defined as "any piece of electronic text regardless of size or composition (a digital object), but excluding journal publication, made available electronically (or optically) for any device (handheld or desk-bound) that includes a screen". The definition given by Armstrong, Edwards and Lonsdale (2002) is widely accepted by many scholars.

Past researches are claiming that the acceptance rate of e-book is not as high as expected. For instance, in Malaysia a study conducted by Roesnita and Zainab (2005) among 250 undergraduate students of Faculty of Computer Science and Information Technology, University of Malaya revealed that only 39% of the respondents have used e-book prior to their study. The survey result is quite surprising because it is assumed that the selected respondents have basic information literacy skills and will face little difficulties in handling digital library environment. Another survey conducted by Chong, Lim and Ling (2008) in Multimedia University indicates that the acceptance rate of e-book has increased slightly to 52.3%. According to the researchers, although there is 13.0% increment in e-book usage among university students in Malaysia, as compared to the earlier study conducted by Roesnita and Zainab (2005), but it is not at encouraging level because most of their respondents have high exposure to computers and technology. Noorhidawati and Gibb (2008) in their research among students in Scottish Higher Education Institute pointed out about 60% of their respondents are not using e-book. They identified reasons such as "lack of awareness on e-book availability" and "no wide publicity on e-book availability in their libraries" were contribute to the low utilization rate of e-book. In addition, Levine-Clark (2006) through his study about e-book utilization in University of Denver reported that although half of his respondents are using e-book but they only use it occasionally.

Researchers have listed out many advantages and disadvantages of using e-book. On the positive side, many researchers have pointed out that around the clock availability and searchability are the main two reasons that motivate users to use e-book (Noorhidawati and Gibb, 2008; Roesnita and Zainab, 2005; Chu, 2003; Anuradha and Usha, 2005; Jamali, Nicholas and Rowlands, 2008). In addition, factors such as online availability, faster and easy access to new titles and unavailability of print version are also encouraged users to use e-book (Levine-Clark, 2006; Noorhidawati and Gibb, 2008). Moreover, multimedia features and other criteria such as glossary lookup, book marking, highlight, annotate and navigate facilities further motivate users to use e-books as their main reading material (Anuradha and Usha, 2005).

On the negative side, "hard to read and browse" become the main reason that hinder the users from using the e-book. Similarly, introduction of new technology such as e-book invites many different perceptions from users. In the

case of e-book many respondents stated that they are not familiar with the technology, lack of confidence on using e-book, has little knowledge on how to use or access to e-book and not aware of the availability of e-book in their university libraries (Roesnita and Zainab, 2005; Anuradha and Usha, 2005; Noorhidawati and Gibb, 2008). To increase the confidence level and familiarity of e-book technology, the relevant parties such as libraries should promote activities to market e-book use. Besides that, hardware and software compatibility issue and limited number of titles also become another major barrier to e-book adoption (Chong, Lim and Ling, 2008; Anuradha and Usha, 2005).

McCarty (2001) revealed that students at the University of Colorado Boulder Libraries used e-books for research and found it convenient, when searching for information. It is in line with Noorhidawati and Gibb (2008) who stated that students use e-books mainly to find material for a project or essay. Healy (2002) who interviewed 3200 faculty members, undergraduates and graduate students revealed that his respondents use e-books mainly for research, teaching and learning. Many authors have stated that e-books are mostly used for reference purpose or for finding relevant content (Gunther, 2005; Long, 2003).

According to Haslina Abu Seman, Librarian of Sultan Abdul Samad, UPM, no research has been conducted regarding utilization of e-book services in UPM academic library (Personal communication, 2010). Hence, the librarian intends to know the utilization rate of e-book among her campus students. As the initial stage, a research was carried out among mathematics students of UPM. These students were selected as the respondents because the library management has planned to increase the collection of mathematics e-books and in need of knowing the mathematics students perception on e-books. Moreover, the statistics provided by the publisher shows that the acceptance rate of e-book among mathematics students is very low compared to students from other disciplines such as engineering. For instance, in the year 2009, the access rate of mathematics students to mathematics e-books published by Springer is 50 (There are total of 390 mathematics e-books in the library supplied by Springer). On the other hand, the access rate of engineering students to engineering e-books published by Springer is 129 (There are total of 36 engineering e-books in the library supplied by Springer). Currently, the library has 1622 mathematics titles from Springer, Gale Virtual Reference Library and Science Direct.

This paper is part of an ongoing research process that aims to explore the mathematics students' usage of e-books. The focus of this study is to gauge the perception particularly on the utilization rate of e-books and the factors that motivate and hinder adoption of e-book among students from the Mathematical Departments, UPM. By having an overall picture and better understanding of their exposure and experience in using e-books, the researcher hopes to collect some information on how to foster idea and information for the management to improve e-book usage among the target group.

3.   Methodology

A structured questionnaire was used to collect information on e-book utilization pattern among mathematics students. The questionnaire consisted of 3 portions. In the first portion, respondents were required to indicate their personal particulars. The second portion of the questionnaire was formulated within the framework of assessing respondents' perception on e-books, their usage levels and reasons for using e-book. The third portion consisted questions, which require the respondents to express their reasons for not using e-book. The study was carried out from October - November 2009. The questionnaires were distributed by the lecturer who taught that particular class. The completion of the questionnaire took about 20-25 minutes and all the students complete their questionnaire during their lesson period.

4.   Findings

Socio-Demographic Profile of the Respondents

Female respondents formed the majority (77.1%) of the study sample and over three quarter (94.3%) were from third year of their bachelor degree. The average age of the respondents who participated in the study was 21 years old. Most of the respondents were from sub-urban, which contributed about 45.7% of the total number. Out of 35

respondents, 57.2% were Malay students, 25.7% were Chinese, 11.4% were Indians and 5.7% were from other races. A more detailed description of the respondents is given in Table I.

Table I. Socio-demographic profile of the respondents

Demographic Information	Category	Frequency	Percentage (%)
Gender	Male	8	**22.9**
	Female	27	**77.1**
Race	Malay	20	**57.2**
	Chinese	9	**25.7**
	Indian	4	**11.4**
	Others	2	**5.7**
Year of Study	Third	33	**94.3**
	Fourth	2	**5.7**
Residential Area	Urban	12	**34.3**
	Sub-Urban	16	**45.7**
	Rural	5	**14.3**
	Missing	**2**	**5.7**

Computer Skills and Utilization of E-book

Majority (82.9%) of the respondents graded themselves as average computer users whereas only 2.9% admitted themselves as expert user (Table II). From the result it can be concluded that only 37.1% have used e-book before the survey. This corresponds with Zainab's and Roesnita's (2005) findings who reported that only a minority (39%) of their respondents have used e-books in the past in Malaysia. However, the utilization rate dropped compared to the figures (52.3%) reported by Chong, Lim and Ling (2008) who conducted the survey in Multimedia University. The result is also in line with the findings of Chu (2003) identified that 67% of his respondents had not used e-books and Anuradha and Usha (2006) who revealed that 66% of their respondents had not used e-books. The finding from current study shows that many respondents were still not familiar with the product and hesitates to use e-book even though they have basic computer knowledge.

Table II. Computer skill

Computer Skill	Frequency	Percentage (%)
Beginner	5	14.3
Intermediate	29	82.9
Expert	1	2.9
Total	**35**	**100**

Definition of E-book

When the respondents were asked to select the appropriate definitions of e-book from the given list, majority of the respondents (54.3%) define e-book as an e-text but require e-book devices and software to read it (Table III). It supports the definition given by Goh (2002) and Grant (2002) who defined e-book as a combine package of e-text, e-book reading device and e-book software.

Table III. Definition of e-book

Definition	Percentage (%)
Electronic Text (e-text)	8.6
E-text + e-book devices + e-book software	54.3
E-book software	8.6
E-book reader	22.8

Don't know	5.7
Total	**100**

Awareness on the E-book Services at UPM Library

When the respondents were asked whether they are aware of the e-book services offered by their university library (UPM), about 66.7% of the total respondents stated that they are not aware of the service. This contrast with Levine-Clark (2006) who reported only 41% of his respondents who are humanities from University of Denver University were not aware of the e-book holding in their academic library and findings of Noorhidawati and Gibb (2008) who stated that 57% of their respondents were not aware of the availability of e-books at their library.

Purpose of Reading E-book

Respondents were asked to select the purpose of reading e-book. In this case 84.6% of all respondents indicated that they use e-books to find materials for their assignment and 61.5% have admitted that they use it to do their research. As was predicted, only 23.1% of the respondents are using e-book as their textbook and recommended course book. It again supports the finding of Noorhidawati and Gibb (2008) who claimed "find material for a project or essay" is the most favourable purpose of using e-book. Table IV indicates the purpose of using e-book. A survey conducted by Nicholas, Rowlands, Jamali and Huntington (2007) among 1818 University College London, London, UK staff and students revealed that 71% of their respondents mostly associated e-book with work and study. Anuradha and Usha (2006) who conducted a survey in Indian Insitute of Science also stated that 58.33% of their respondents using e-book for academic purpose. However, their (Anuradha and Usha , 2006 and Nicholas, Rowlands, Jamali and Huntington , 2007) result not revealed the specific purpose of using e-book at work and study.

Table IV. Purpose of using e-book

Purpose of using e-book	**Percentage (%)**
Finding material	84.6
Research	61.5
Look up answer	46.2
Textbook	23.1
Course book	23.1
Leisure	23.1

Mode of Reading E-book

A high percentage of the respondents indicated that they prefer to read e-book on screen (53.8%) compared to print the whole book (30.8%) and print a part of the book (15.4%). The survey conducted by Nicholas, Rowlands, Jamali and Huntington (2007) also supports this finding where they indicated that 48% of their respondents like to read e-book through screen relatively independent of their age. However, 46.2% of the respondents of this current study reported that they prefer to use printed books compared to e-book. Similarly, Levine-Clark (2007) survey also revealed that his respondents prefer printed book to electronic version. Additionally, Carlock and Perry (2008) who conducted a research among a focus group who consist of six faculty members in Arizona State University, USA revealed that, the respondents prefer printed books as compared to e-books.

Factors of Using E-book

According to Table V, high percentage of respondents reported that they use e-book because they are searchable (53.8%), available around the clock (53.8%), allow easy navigation (53.8%), portable (38.5%), offer timely access (30.8%), have helpful feature (30.8%) and no relevant paper book (30.8%). This is in agreement with the findings reported by Chu (2003) where his respondents from Library and Information Science School in USA indicated that factors such as "searchable" and "available around the clock" that motivate them to use e-book. In addition to that, research result by Jamali, Nicholas and Rowland (2008) who have conducted a nationwide benchmarking survey

among university students and staffs revealed that factors such as "online access", "searchability" and "cost" are the three major reasons that encourage their respondents to use e-book. However, Levine-Clark (2007) reported that "print version is not available" is the major factor that motivates his respondents (humanists) to use e-book.

Table V. Factors of using e-book

Factors of using e-book	Percentage (%)
Available around the clock	53.8
Searchable	53.8
Allow easy navigation	53.8
Portable	38.5
No relevant paper book	30.8
Offer timely access	30.8
Helpful features	30.8
Save space	15.4
Allow e-archive	7.7
Save trees	7.7
Versatile	7.7

Factors that Hinder Utilization of E-book

Table VI shows that factors such as not familiar with product (50%), cost (40.9%), difficult in accessing computers/internet (36.4%), not confident with the technology (27.3%) and hard to read and browse (22.7%) as the major factors that hinder the respondents from using e-book. This is because, those who indicated that they are not familiar with the product are mainly from rural and sub-urban area and they do not have the confident to try the new technology such as e-book. This is inline with Roesnita and Zainab's (2005) findings where they reported that little knowledge on how to use or access e-books (35.2%), does not have Internet connection (24.8%) and difficult to browse and read (22.4%) as the major reasons that hinder their respondents from using e-book. Similarly, Chu's (2003) findings also revealed that majority of his respondents stated that hard to read and browse (48.1%), need additional cost on the user's side (33.3%) and not enough exposure (18.5%) as the major factors that hinder them from using e-book.

Table VI. Factors of not using e-book

Factors of not using e-book	Percentage (%)
Not familiar with product	50
Difficult in accessing computer/internet	36.4
Not compatible	22.7
Hard to read and browse	22.7
Not confident with the technology	22.7
Do not want to change	22.7
Enough printed books	9.1
Cost	4.9
Limited number of titles	4.5

5.   Conclusion

The survey revealed that majority of the mathematics students is not using e-book. Factors such as "not familiar with the product", "cost", "difficult in accessing computers/internet", "not confident with the e-book technology" and "hard to read and browse" were given as the main reasons for not using e-book. However, more than half of the respondents are able to define e-book appropriately. It shows that the mathematics students knew what is an e-book is.

The survey found that, most of the respondents are using e-book to find materials for their assignments and to do their research work. On the other hand, only a few of the respondents are using e-book as their textbook and recommended course book. Although the finding of this survey shows that majority of the respondents claimed that they like to read e-book through screen but quite a large portion of the respondents indicated that they prefer to use printed book as compared to the e-book.

About 66.7% of the respondents revealed that they are not aware of the availability of the e-book at their academic library and 61.5% of the respondents prefer to read e-book at home. The survey also shows to us that majority of the respondents like to use e-book because it is "searchable", "available online" and "allows easy navigation".

Only 35 respondents participated in this preliminary study. Hence, the small size of the population surveyed placed certain limitations on the level of detail in which the data collected could be analysed and summarised. For example, it would be unwise to present results broken down by subject of study, as some subjects were represented by very few respondents or single respondent. However, the results of the study help the researcher to convey some important information to the UPM library management about the e-book utilization scenario among UPM mathematics students.

Since the UPM academic library would like to increase the collection of e-books specially mathematics e-books, it is vital for the library management to understand how e-books are perceived and used by the students from Mathematics Department. The library should increase the promotion on the availability of e-book at their academic library since many respondents still did not aware of the e-book collection at the library. Furthermore, since many respondents prefer to print the e-book, the library management should allow the students to print the e-book. According to the librarian, currently the patrons are allowed to print up to 16 pages per access. In order to print more pages, the patron need to login again to the system. It burdens many patrons and discourage them from using e-book. It is suggested that library management should discuss with the publisher and aggregator to permit patrons print more pages per access.

Moreover, the library also should take further action to improve the facilities and infrastructure to help the respondents' access to e-books facilities. Currently, the library has only 153 computers to allow the student from the whole campus to access to internet and e-books from the library. Hence, it hinders many students from accessing e-book from the library. Furthermore, the students also face difficulties in accessing e-book from their home since the proxy server works intermittently. It bores many students and limits their access to e-books.

Other than the library management, the academicians can also play important role in encouraging the students to use e-book. From the survey, it can be concluded that very few respondents using e-book as their course book and text book. The major reason that causes this situation is, none of the academicians have listed e-book as reference book in their syllabus. Furthermore, many academicians hardly update their knowledge on the collection of e-book at the academic library. These reasons lead to the lower utilization rate of e-book among students. Therefore, it is suggested that academicians should encourage students to use e-book as their course material.

To summarise, e-book can promise better knowledge delivery/accessibility and long lasting knowledge repository. Hence, students should make use of this facility to keep abreast with the e-book technology.

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