CY-ICER 2012

E-Books as textbooks in the classroom

Abd Mutalib Embong [a]*, Azelin M Noor [b], Hezlina M Hashim [c], Razol Mahari Ali [d], Zullina H Shaari [e]

[a]Abd Mutalib Embong,Universiti Teknologi PETRONAS, Bandar Seri Iskandar, 31750 Tronoh, Perak, Malaysia
[b]Azelin M Noor, Universiti Teknologi PETRONAS, Bandar Seri Iskandar, 31750 Tronoh, Perak, Malaysia
[c]Hezlina M Hashim,Universiti Teknologi PETRONAS, Bandar Seri Iskandar, 31750 Tronoh, Perak, Malaysia
[d]Razol Mahari Ali, Universiti Teknologi PETRONAS, Bandar Seri Iskandar, 31750 Tronoh, Perak, Malaysia
[e]Zullina H Shaari, Universiti Teknologi PETRONAS, Bandar Seri Iskandar, 31750 Tronoh, Perak, Malaysia

Abstract

The electronic books, or e-Books, offer students, teachers and schools an additional medium or tool of instructions that can support or enhance the learning process. All this while, the use of e-Books is limited to college students. Using e-Books as text books in the classroom at schools is a new paradigm especially in developing countries. As with all books, there are various types of e-Books available to suit students' knowledge, characteristics, abilities, and interests. The paper provides some insight on what an e-Books is, and its advantages, limitations, strategies and framework of using it as a text book in classrooms.
© 2012 Published by Elsevier Ltd. Selection and/or peer review under responsibility of Prof. Dr. Hüseyin Uzunboylu
Open access under CC BY-NC-ND license.
Keywords: E-Books, Textbooks, Classrooms;

1. Introduction

It all began in 1971, when Project Gutenberg was started by Michael Hart who used computer to store, retrieve, and search information. It was named as e-Books or electronic versions of print books. Since that, this Project Gutenberg creates thousands of free texts and copies of books which can be downloaded or accessed online.

The key definition of e-Book varies due to its nature and extent. The Oxford Advanced Learner's dictionary (2011) defines an e-Book as "a book that is displayed on a computer screen or on an electronic device that is held in the hand, instead of being printed on paper. It is in multiple electronic formats". Lynch (2001), Arthur (2001), Dennis (2001), and Harold (2002) are among researchers who incorporate the conceptual definitions of e-Books. Somehow, Armstrong et al. (2002, p. 217) comes up with the definition used by many scholars:

[. . .] any piece of electronic text regardless of size or composition (a digital object), but excluding journal publications, made available electronically (or optically) for any device (handheld or desk-bound) that includes a screen.

---

* Abdul Mutalib Embong Tel.: +605-3687735
E-mail address: mutalib_embong@petronas.com.my

Vassiliou (2008) claims most early definitions of e-Books are obsolete due to too heavy reference to specific readers or access technologies. She defines e-Books in two parts. The first part of e-Books summarizes the essential and reasonably stable nature of e-Books referring to digital object with textual and/or other contents. It is the result of integrating the common concept of a book with features that can be provided in an electronic environment. The second part refers to in use features such as search and cross reference functions, reference materials, monographs, hypertext links, bookmarks, interactive dictionaries, highlights, multimedia objects and note taking. These features will become less significant due to the vast advancement in technology. Thus, ongoing revision is required.

There are three basic components of e-Books: hardware or reader, software and the e-Book files. Hardware-based e-Book readers are portable electronic devices designed mainly for the mean of reading e-Books or any forms of publications. The price range depends on the quality portrayed by the e-Book readers. In terms of capacity, e-Book readers can store certain number of books worth of content, which can be accessed virtually from any location (Wilson, 2001). Good e-Book readers will be able to perform tasks like printing, audio-visual, interactive touch, and even wireless communications. Software-based e-Book readers are programs that display data of an e-Book on the device (Pereus, 2000). Software book readers allow the access on personal computers or any latest computer technologies. Microsoft Reader, Adobe Acrobat Reader, and Adobe Acrobat e-Book Reader are three examples of such software. One advantage of software-based readers is that besides offering the functions of dedicated readers, they offer extra facilities through a keyboard and wider screen sizes (Lynch, 2001). This could offer better access to the information because with the keyboard utilities, users can manipulate the display through changing the settings. A file type is a file which contains an embedded signature. It notifies the operating system how to manage that file. A user can tell what type of file an e-Book s/he has by referring to the file extension located at the end of the file name. The most common file types used for e-Book are exemplified in Table 1.

Table 1: e-book files and examples

e-Book Files	Examples
Plain ASCII text files have the extension .txt	e-Books and their functions.txt
Microsoft Word files have the extension .doc	academic_calendar_and_dates.doc
Adobe acrobat files have the extension .pdf	e-Books at University Technology PETRONAS.pdf
Html files have the extension .html or .htm	21st-Century-Classroom_e-Books.aspx.htm
Adobe eBook files have the extension .pdf	malaysia 1.pdf

With the above definition of e-Books, this paper highlights advantages and limitations, and proposes a framework and strategies of using them as text books in the classroom.

2. E-Books in Education

There are several studies involving the use of e-Books in the classroom as a medium of teaching (Tan, 2009; Christine, 2007; Carty, 2000; Springer, 2007). Most of the studies discuss the effectiveness of e-books in enhancing the learning process. As technology is expanding fast, the use of e-Books in classroom has become rampant too especially in the last ten years.

One of the successful stories of e-Books refers to the e-Book project of Clearwater High School (2010) which replaces print textbooks with e-Books. It is collaboration between the school and Amazon Kindle. In this project, e-Books are fully loaded with the contents of subjects taught and become the main textbooks Amazon Kindle also equips all 2,100 students and 100 teachers at that school with e-Book readers in electronic formats to access books, newspapers and magazines. The Kindle allows students and teachers of the school to search for word definitions, bookmark pages, highlight text, and type notes. Prior to this project, they needed to scribble on pages of a hard-bound print book to do the same tasks.

This Kindle project is a fine example of how most developed countries are well versed with the use of e-Books in classroom. Somehow, some developing countries like Indonesia, Turkey and Singapore are still grappling to use them. In Malaysia, the Electronic Book Project (2001) was initiated by the Ministry of Education involving the use of the electronic books or e-Books in 35 schools over a period of five months. The project was meant to gauge how this technology, which stores textbooks, assists teachers to improve the quality of students' performances in classrooms. A similar project was then started by the Terengganu State Government, Malaysia which allocated USD15mil to purchase 50,000 e-Book readers to year Four and Five pupils in 2010. The readers enable the pupils to enjoy a learning environment which was conducive for them not to carry a bag load of books to schools anymore. It was also vital to prepare students to excel academically and face global challenges (Said, 2009). The State Government has decided to continue the e-book project for the upcoming years. Such a move actually has prompted other states in Malaysia to introduce e-Books into classrooms.

The paramount of e-Books as textbooks leads more and more countries to formulate special projects in enhancing the use of e-Books in classrooms. Technology specialists are developing software to ease the production of e-Books and convert periodicals into e-Book formats. Their goal is promote literacy across the nations. A country like Portugal has implemented such projects, while a few other European countries are considering similar programmes. So far, Portugal has distributed 500,000 files of e-Books to students, while Venezuela has deployed a million files of e-Books to certain schools in the country (Lebert, 2009).

3. The Advantages of Using e-Book in the Classroom

Over many years, technology has become a pertinent point among the educators as a good and effective tool to teaching children. Somehow, research on the use of e-book as learning materials in the classrooms and particularly at schools is still in its infancy. E-Books are still considered as a novelty in classrooms since they have just found their way in teaching and learning environment in some countries. Undeniably, e-Books have special features and criteria, which give a lot of inputs to the learning process (Sasson, n.d.). Nonetheless, their usage offers some advantages which represent the benefits for students, school administrators and parents.

For students, a part from reducing the burden of carrying heavy conventional textbooks, the use of e-Books brings a lot of impacts. E-Books benefit them physically, academically and psychologically. An e-Book reader can compress the contents of a conventional textbook. Since students in Malaysia are typically required to bring a number of textbooks to schools daily, compressed versions of textbooks lighten the burden. Physically, the reduce weight enables the students to grow healthily without any damaging effects such as lower back pain, poor posture, spinal deformity over time and back problems in adulthood (Anderson, 2007). In terms of learning, students who are engaging e-Books may find the process is fun due to e-Book attractive features (i.e. user friendly functions; attractive graphics; enlarged text size; plug-in speakers). These features would encourage students' creativity and learning autonomy.

For education administrators, e-Books ease the management process. E-Books allow them to monitor classroom activities done by each student concurrently. Students' development can be closely and conveniently monitored, documented, categorized and accessed (David, 2011). Through integrating technology into the classroom, curriculum designers and teachers can enhance teaching methods to improve students' learning process in classrooms.

From the perspective of parents or guardians, the use of e-Books in classrooms will be economical. Most e-Book readers are subsidized by the schools, loaned to students, and maintained by technologists. The subsidies will minimize education expenditure for parents with school going children (Hellman, 2010). The loaned e-Books will eliminate the need to buy textbooks which are subject to lower shelf life compared to e-Books. Students often pay little attention in taking care of the traditional books to allow them to hand down the books to the younger students.

As such, the battered or damaged traditional books need to be replaced with new copies. Since e-Books require regular maintenance of e-Books, their shelf life of the contents could be optimised.

4. Limitations of using e-Books in the Classroom

Together with the change of times and the evolution of technology, there has been a rampant outbreak of e-Book readers in the market. However, what has truly awed the market is the invention of the e-Book readers which enable readers to read books on small mobile devices. Anyhow, these awesome devices still have flaws and limitations (see Donadi and Bloom; 2011; Rosso, 2009; Sasson, n.d). Some of the limitations are specified below:

- There is a limited storage capacity on the hardware itself.
- There are limited power outlets in a classroom to ensure uninterrupted use of e-Books in the classroom.
- Teachers and educators may not be adequately trained to conduct lessons with an e-Book.
- Insufficient supply of e-Books at schools could not be overcome through sharing as conveniently practiced with textbooks.
- Some students may find e-Books do not offer the same pleasure of reading compared to reading a traditional book.
- Some e-Book readers discourage text annotation. Students cannot write in texts, underline, circle, or even comment in the margins to help them understand and analyse the text.
- Stringent DRM (Digital Rights Management) often prevents e-Books from being shifted from one device to another.

5. Strategies of Using e-Books in Classrooms

Drawing from the advantages and limitations of using e-Books as textbooks, the following guidelines may give a rudiment concept for the teachers or school administrators upon implementing the use of this portable electronic device:-.

1. The use of e-Books in the classroom involved few parties: teachers, school administrators, and technology specialists. Is there any collaboration among them to jive the content presentations of the syllabi with the e-Book readers?
2. The prerequisite of introducing e-Books in class is the technology. Schools must equip the technology of e-Books (i.e. software and hardware) if they would like to use them as learning materials. So, are these technologies readily available? Do teachers have knowledge and skills about e-Books?
3. How do schools provide instructions and manuals to students who are not IT savvy, are ESL students, or are with special needs? How can e-Books support teachers in helping these groups of students?
4. Parents must adapt themselves to e-Book technology when e-Books replace the traditional textbooks. How can they help their children to learn using e-Books both at school and at home?
5. E-Books may not have a long shelf life if not regularly and properly maintained. Is the maintenance of e-Books properly planned and implemented? If there is, who is responsible for it? Will the service be readily available?

6. A Framework for Using e-Book as Textbooks

E-books have the potential to provide teachers with a teaching tool that can help them to effectively deliver their lessons to their students. Nevertheless, this paper acknowledges that e-Books can never replace teachers. The task of elementary-age students is very complicated complex as it needs the teacher to possess deep knowledge of the children's mental capacities as well as their emotional requirements. Furthermore, how effective the child's education also depends on the types of feedback, direction and encouragement that can only be provided by human

teachers who have the knowledge as well as the passion. Yet, the use of e-Books as text books is definitely best suited in today's learning environment. The education system has entered a new paradigm to keep pace with the emerging green environment trend. This paper outlines a framework on how e-Book can support students in the learning process. The framework is adopted from a framework of Using Technology within K-6 Programme (National Reading Panel Report-NRP 2000). It is then used in this paper to suit the context of e-Books as Textbooks. The framework consists of five general capabilities. E-books should offer various presentations of information and activities, ease teachers to evaluate their students' work, automate some feedbacks for students, provide scaffolds or flexible supports suitable for students' learning process, and ensure sustainable resources of knowledge.

6.1. Offering various presentations of information and activities

E-Books can present any type of auditory or visual materials – including speech, text, music, animations, photographs, or videos – alone or in different combinations. E-Books can link different types of representations such as pictures with sounds, oral readings with written text, videos with subtitles, or any other combinations that could reinforce teaching and learning (Casey, 1994). They can also provide enormous flexibility, allowing students to set the rate of speech, decide whether written text should also be read aloud, choose the language presented in text and speech, or decide whether to repeat the presentation.

6.2. Facilitating the evaluations of students' work

The capability of presenting information and activities in various formats also means that e-Books can accept a variety of inputs from students, ranging from mouse clicks to written text to spoken words. It can be programmed to check a student's work. A good e-Book is highly capable of recording and organizing information, as well as reporting that information in multiple formats. The e-Book can, for example, record the responses of all students in a class and then immediately report to the teacher the errors made by each individual student as well as the common errors made by the entire class. In more complex tasks, e-Books can serve as convenient recording and reporting devices for teachers, helping them track students' progress far more conveniently than other means of data collection (Casey, 1994). This capability can be used to inform teachers' instructional decisions and to make documenting students' progress much more efficient.

6.3. Automating some feedbacks for students

While e-Books ease evaluation, they should also be interactive to ensure effective instruction. For example, when students respond to questions or read aloud, they need: feedback to know whether they are correct, instruction to help them learn more, and opportunities to engage in additional work at appropriate levels to further their learning. When tasks require simple inputs, such as selecting from presented options or typing a word, the e-Book can be programmed to immediately evaluate each response and provide appropriate feedback. This feedback can be in the form of positive messages when the child is correct, and hints, additional chances, or corrected answers when the child is incorrect. Most importantly, the e-Book can be programmed to adjust the tasks presented based on feedbacks from previous performances.

6.4. Providing scaffolds for learning process

Besides interactive instructions, e-Books should also provide flexible supports for students' learning process. Most e-Book programs provide the ability to highlight text sections, and take notes. Some even add the ability to create drawings within the book. All of these features can increase a student's comprehension of and attention to a given work. Some e-Book programs have interactive dictionaries, providing just-in-time learning, that allow users to

select any word within the e-Book and get a definition instantly, have the definition read aloud, or request an instant translation to another language.

Furthermore, the display offered through e-Book programs and devices can provide reading scaffolds for many students through their ability to change the displayed text size. Students who struggle with reading, regardless of the reason, can benefit from changing to larger font sizes. The reason for using large print is not necessarily because these children have visual difficulties. Larger font sizes and spacing actually cause the eyes to move more slowly while reading, allowing students to track their reading more easily (Grabe & Grabe 1996) and giving them more processing time. All students, especially those susceptible to visual stress, were found to make more errors when using smaller text sizes than with larger text (Cavanaugh, 2006). For most e-Book programs, creating a large text format is just a matter of sliding a text size bar to a larger setting.

6.5. Ensuring sustainable resources of knowledge

Providing scaffolds for the learning process should also be supported by fostering sustained development of knowledge and learnt society. E-Books can contribute to this continuos effort through maximizing the availability of knowledge while reducing the numbers of trees cut down to produce printed books. Green Press Initiative (2007) reports that every year about 200,000 tons of paper are produced from 4 million trees for the publication of textbooks. This accounts for approximately 20 per cent of the total paper used in the book publishing sector. According to the latest figures from the Ministry of Education, Malaysia, the current number of enrolment in Malaysian public schools is approximately 5.2 million (Ministry of Education, 2011). This number accounts for 2.9 million primary school students and 2.3 million secondary school students. Each primary school student generally has about 10 textbooks per year and each textbook has about 50 to 80 pages. The shift to using e-Books as textbooks would not only reduce the usage of approximately 1 billion sheets of paper which translates into 120000 trees being saved every year but also ensure sustainable resources of knowledge (Conservatree, 2011).

7. Conclusions

The emergence of e-Books as textbooks among the school children requires all parties (i.e. teachers, technologist, parents and even policy makers) to think how to adapt themselves in using e-Book. While e-Book will not replace print books in the near future, it will definitely be used to complement print books. In classrooms, teachers and students will start to value the convenience and accessibility of e-Book. Technologists can expand e-Book usage among a large number of school children through creating awareness of e-Book usability. Parents will be exposed to the latest development in education technology. Indeed, the introduction of e-book in education could be a jump-start in promoting highly literate society. The suggested framework above may also need to suit a country's policy. The development and publishing process of text books into e-Book may be different from one country to another. In Malaysia, this process is subject to the control of the Ministry of Education which has full copyright of the publication.

References

Anderson, J. Heavy School Bags Linked to Back Problems: Three Students Lobbying for Relief. *Ergonomics Today* April 9, 2007. Available at http://www.ergoweb.com/news/detail.cfm?id=1716. Retrieved on 20 December 2011.

Appleton, L. (2004) *The Use of e-books in Midwifery Education: The Student Perspective*. Retrieved on 1 November 2011.

Arthur, A. (2001) *Electronic Books: Internet Research*. Available at http://www.e-bookscenter.dk/nyt/electronic_books.pdf. Retrieved on 1 November 2011.

Borgman, Christine L. (2007) Scholarship in the Digital Age: Information, Infrastructure, and the Internet. *Cambridge: MIT Press*. Available at http://snipurl.com/BorgmanDigitalAge. Retrieved on 5 November 2011.

Carty, K. (2000) The Digital Textbook is Coming! *Information Searcher* : 3-7.

Casey, J. (1994) Integrating Computers in the Primary Classroom. *The Computing Teacher*, 21, 33-36.

Catalanello, R. Textbooks Ditched at Clearwater High as Students Log on to Kindles. *St. Petersburg Times* June 2, 2010.

Cavanaugh, T. W. (2006). *The Digital Reader: Using E-books in K-12 Education.* Washington, D. C.: International Society for Technology in Education.

Conservatree. (2011). *Trees Into Paper*. Available at Conservatree.org: http.://conservatree.org/learn/EnviroIssues/TreeStats.shtml. Retrieved on 14 December 2011

David, R. (2011) *What Are The Advantages Of e-Book Readers Over Print Books?* Available at http://www.itrainharder.com/what-are-the-disadvantages-of-ebook-over-print-books. Retrieved on 2 September 2011.

Dennis, D. (2001) *e-Books: the University of Texas Experience, Part 1*. Library Hi Tech., Vol.19.

Donadi, V and Bloom, D (2011) *Automated Conversion to eBook – Problems and Limitations.* Available at http://www.dclab.com/blog/2011/04/automated-conversion-to-ebook-problems-and-limitations. Retrieved on 2 September 2011.

E-Book-Costs and Benefits to Academic and Research Libraries. *Springer Report* (2007).

Grabe, M., & Grabe, C. (1996). *Integrating Technology for Meaningful Learning*. Boston, MA: Houghton Mifflin Co.

Green Press Initiative Newsletter. *The Environmental Defense Fund (EDF) Paper Calculator* January, 2011

Harold,H. (2002) Survey on Electronic Book Features. *Open e-Book Forum*. Available at http://www.openebook.org . Retrieved on 21 November 2011.

Health Information and Libraries Journal, Vol. 21 No. 4, pp. 245-52.

Hellman, E (2010) e-Book Summit Preview: Should Kids Get e-Books in School? *Library Journal*

Lebert, M (2009) *A Short History of e-Books*, NEF, University Toronto.

Lynch, C. (2001) *The Battle to Define the Future of the Book in the Digital World*. Available at http://www.firstmonday.org/issues/issues/issue6_6/lynch/index.html no.2:113-125. Retrieved on 4 November 2011.

Ministry of Education Malaysia. (2011). *Official Site: Ministry of Education Malaysia.* from Official Site: Ministry of Education Malaysia. Availabe at http://www.moe.gov.my/?lang=en.Retrieved on 14 December 2011

National Reading Panel Report Interventions on Early (K-3) Reading Available at http://www.w-w-c.org/topic1.html. Retrieved on 15 November 2011.

Oxford Advanced Learner's Dictionary (2011)

Pereus, S.C. (2000). *Selecting Software: A Comprehensive Selection and Evaluation Process Can help you Avoid Costly Mistakes*. Available at http://content.arma.org/./featurewebexclusiveavoidingsixfiguresoftware. Retrieved on 21 November 2011.

Rosso, S. (2009) *What are ebooks? Advantages and Disadvantages of Electronic Books* Available at http://whenihavetime.com/2009/03/09/what-are-ebooks-advantages-and-disadvantages-of-electronic-books. Retrieved on 2 September 2011.

Said, A e-Books for Pupils in Terengganu The Star, May 29, 2009.

Sasson, R (n.d.). *The Benefits and Advantages of e-Books*. Available at http://www.successconsciousness.com/index.htm. Retrieved on 2 November 2011

Tan, O. Protection in Malaysia and the End Users Perspective in E-Book. *International Journal of e-Education, e-Business, e-Management and e-Learning*, Vol. 1, No. 2, June, 2011

The Second Gutenberg. Available at http://promo.net/pg/upi_interview_05_05.html. Retrieved on 2 September 2011.

Vassiliou, M. (2008) Progressing the definition of "e-Book"", Library Hi Tech, Vol. 26 Iss: 3, 355-368

What is Project Gutenberg? Available at http://promo.net/pg/history.html. Retrieved on 2 September 2011.

Wilson, R.(2001) *Evolution of Portable Electronic Books Ariadne*, issue 29 Available at http://www.ariadne.ac.uk/issue29/wilson. Retrieved on 21 November 2011.