DESIDOC Journal of Library & Information Technology, Vol. 32, No. 2, March 2012, pp. 109-115

From Plato to Michael Hart: The Long Journey of E-books

P. Divakar

Centre for Cellular and Molecular Biology, Council of Scientific and Industrial Research
Uppal Road, Hyderabad-500 007
E-mail: divakar@ccmb.res.in

ABSTRACT

Genesis of e-books and the connected social implications have a long bearing on the dissemination of knowledge. The strides in information technology have ushered in new content formats and reading devices. An e-book is superior to a c-book in terms of storage, delivery and accessibility. E-books have tremendous implications on libraries, library users and publishers. Around the world, there have been initiatives towards the ultimate goal of enhancing public access to all recorded knowledge. Internet apart from facilitating self publication of e-books, democratising access to knowledge and doing social good especially for developing countries by improving literacy, and education.

Keywords: E-books, library management, self publishing, reading devices, content delivery

1. INTRODUCTION

In Plato's *Phaedrus*, the dialogue between Socrates and Phaedrus closes by questioning the value of the written word. Writing things down "will atrophy people's memories", and since it would make people rely on the thoughts of others, "writing will make the things they have learnt disappear from their minds." Though Plato died in 347 B.C. at the age of 80, his philosophical wisdom survives to this day. Plato's prognostications[1], and the wider ramifications of the arrival of e-books and other forms of digital communication, would be debated for generations, including at the arrival of Gutenberg's hand-operated printing press in the 15th century and its subsequent replacement by powered rotary presses.

Coming to the 21st century, for Michael Hart, the joy of e-books, which he invented, was that "anyone could read those books anywhere, free, on any device, and every text could be replicated millions of times over". He dreamed that by 2021 he would have provided a million e-books each, a petabyte of information that could probably be held in one hand, to a billion people all over the globe—a quadrillion books, just given away. As powerful as the bomb, but beneficial. Sadly, before realising his dream Michael, the founder of Project Gutenberg, the first ever e-book delivery platform, passed away on September 6, 2011. The mission statements for his project were:

- Encourage the creation and distribution of e-books
- Help break down the bars of ignorance and illiteracy
- Give as many ebooks to as many people as possible

From Plato to Michel Hart, the world has witnessed a plethora of path breaking inventions in communication—from verbal to print and then to digital; and now the internet, resulting in the e-revolution in every sphere of human activity. Books and libraries are no exception.

2. DEFINITIONS

In common parlance, the book is used as a very generic term, and its content may range from creative literary material (an engaging novel or poetry) to reading material for a school going child. At the high end, we have Research Monographs, which from a librarian's point of view, are a kind of 'information analysis and consolidation product'. Books are valuable to a wide audience in the sense that they provide information that people 'can't easily gather at one place'.

According to the Oxford English Dictionary, 'book' is a written or printed work consisting of pages glued or sewn together on one edge and bound in covers. It is a literary composition that is published or intended for publication as such a work.

The result of integrating classical book structure with features that can be provided within an electronic environment is generally referred to as an e-book. In that

Received 01 February 2012, accepted 14 February 2012, online published 17 February 2012

sense, the e-book is an information technology product that facilitates reading and acquisition of information. It is a written work readable on the screen of a personal computer, or any other device specifically designed or made compatible for the purpose. It provides the same meaning as a conventional paper book (c-book) which stores and communicates knowledge through reading. On the positive side, an e-book is superior to a c-book from diverse perspectives such as storage, transfer, delivery, and accessibility[2].

E-book is a new platform for accessing digital information that preserves the benefits of having electronic reading while providing many of the advantages of paper books. Cox[3] indicates that an e-book can support the academic mission effectively, saving time and adding value as a collective online reference, and for dynamic and cost-effective collection management. On the negative side, Doctorow[4] indicates the resolution of an e-book is too low to effectively replace paper and that we cannot read an e-book without power and a reading device. Subba Rao[5] and Vassiliou[6] provided a more comprehensive set of definitions and explanations for the contemporary e-book.

2.1 Features of Electronic Books

Developments in information technology enabled us overcome the limitations of paper books by adding a series of useful features. E-books are dynamic, reactive, and can be made available in different formats and/or editions in a short time. With laptops and e-book reading devices getting increasingly lighter and more powerful; and internet connectivity becoming popular and reliable, e-books are easy to access from anywhere.

From the technological point of view e-books demand powerful processors, large storage, and the capability to manage combinations of different types of data. The motivations for producing e-books are more complex and deal with economic factors as well. Cognitive issues related to the ability of readers to use, appreciate, and prefer books in electronic format to paper ones are also equally important. The quality aspect also becomes crucial, and for this reason the design process for producing e-books has to provide additional value added features that paper counterparts cannot provide.

Crestani[7] attempted a conceptual classification of e-books based on their features:

- Page-turner books (imitate or maintain the features of a classical print book)
- Scrolling books (text scrolls almost without any physical limitation. The page no longer exists as a logical and physical unit, nor does any reference to page numbers or to the page sequence).
- Portable books (a bound set of pages using digital ink that replicates the visual clarity of permanent black ink on white paper. Content dispensed on portable e-book readers. e.g. Kindle, Nook)
- Multimedia books (provide a mixture of different media such as video, sound, animation, text, and pictures, but lesser integration with text. Children like them)
- Hypermedia books (present textual material and integrate it with other related sources, such as video, sounds, and pictures, and provide the reader with alternative reading/ browsing paths)
- Cyberbooks (completely free from any physical/ conceptual dependence on the paper book. They are in a sense, active books with which readers can interact)

Out of the above, portable books are becoming more and more popular as appropriate technology has developed. They imitate the conventional book as a portable tool for providing information. However, they have to deal with limitations in screen size, resolution, and efficiency, but these are all technological rather than conceptual aspects.

3. CONTENT FORMATS FOR E-BOOKS

There are three basic types of e-book formats: HTML, document, and hand-held. Each type supports a different presentation medium for the content and each has its own benefits and pitfalls.

3.1 HTML

An HTML e-book is created using the hypertext markup language—the same language used to create a web page. The core content consists of standard web pages containing text, graphics, Java applets, and hyperlinks. Essentially, each page is a single web page that one would otherwise see on a website. Once the content is organised, they are compiled into a compressed executable file. The file runs like any other application and a suitable web browser needs to be in place since many of the e-book compilers use the features of the browser for display and navigation.

3.2 Document

The document e-book is compiled from a standard document generated in a word-processor. To create such an e-book, we simply add and format content and images into a word-processor. Once the core document is complete, the content is output through a driver that produces a file with a .pdf extension. These types of documents, in the portable document format (PDF), require that the Adobe Acrobat Reader package (freely downloadable from the internet) be installed on the machine.

3.3 Hand-held

The hand-held e-book is generated to run on one of the many hand-held e-book readers available on the market today. Creating a hand-held e-book is quite similar to creating a document, or PDF. The difference is that the final version is created using a compiler unique to the target hand-held device.

3.4 Suitability

- PDF and hand-held style e-books are suitable for extensive, professional documents, and tend to be less dynamic than an HTML e-book. These types of e-books can also be printed into a format that can be bound if the reader so desires.
- Interactive e-books display animations or contain components that change with user access. These types of e-books are better handled in an HTML e-book. HTML compiled e-books are also better for how-to-do, instructional, or informational e-books. E-books (like Gray's Anatomy) can be interactive over the internet and can contain live links, graphics, forms, shopping carts, JavaScript, embedded video, have search capabilities, and can be password protected.

4. E-BOOK READING DEVICES

"The art of reading, I'm pleased to realize, is still far ahead of the art of making e-readers"[8].

Libraries have experimented with e-book readers over a decade, but it was not until the introduction of the Kindle that they got accepted for lending books. Librarians tested many of the early e-book readers, to discover their limitations and scope of possibilities[9].

'E Ink', which gives the paper like displays used in the majority of today's e-book readers, was established on the basis of Jacobson's work at MIT in 1997. This brought about a remarkable change in reading comfort[10].

According to Forrester Research just seven percent of all adults are presently buying e-books, and those seven percent are already buying 41 per cent of their books digitally and that these 'Kindle-connoisseurs' represent the biggest demographic segment of consumer book buyers. In addition to branded reading devices from Sony, the major booksellers offer their own private label Kindle-like e-readers (such as Barnes & Noble's Nook and Borders' Kobo). Simultaneously, all big retailers also offer cross-platform reading apps such as 'Kindle for iPhone' or 'BN for Android'. The bookstores are trying to keep up with Apple and Amazon as long as possible on hardware.

5. USERS PREFERENCES

Carlson[11] in his survey of users indicates that navigating through digital text is one of the biggest complaints for e-book users. They found moving from page to page was tedious, and it was difficult to find specific chapters in the text or to locate particular words.

Mayes[12], *et al*. show that subjects take longer to read text on a screen than on paper. As for accuracy, students using digital hypertext on a screen to find out specific information in the text had higher accuracy than students using the paper text. For reading comprehension, Dillon[13] concludes that comprehension when reading from a screen is better than reading from paper when performing substantial searching or manipulation and comparison of visual details among objects. However other studies have indicated that visual fatigue is significantly higher with when reading black objects on a white screen background than reading paper. In addition, Martin and Platt[14] also found that the medical school students still prefer to read from paper rather than from a screen.

Usage studies by Kang[15] indicate that reading an e-book caused significantly higher eye fatigue than reading a conventional book (c-book). This is mainly due to the low contrast and resolution of the display for an e-book. In addition, the reading efficiency for an e-book was lower than that of a c-book. Since the reading habit for c-books was established in childhood, people are more used to reading c-books than e-books.

5.1 Implications for Individual Readers

Books purchased on Amazon.com that are readable only on an Amazon Kindle e-reader, books purchased at Barnes & Noble require a Nook e-reader, and some other books purchased through Apple are viewable only on the Apple iBooks app, and so on. The issue of incompatible formats and the difficulty of organising books bought from different e-book sellers are two things that one should consider before committing to a specific e-book platform. Ultimately, what consumers need is e-books that they can buy and read anywhere, using any software they choose on any device they have at hand, whether it be a phone, a tablet, a laptop, or a PC. This issue is also critical to library management and to the future success of e-books.

6 PUBLISHERS PERSPECTIVE

The web offers an additional advantage for publishers in that it provides not just a means to reach customers with product information, but with the product itself. Paul Coates, publisher of Black Classic Press, asserts e-books bring a tremendous good for minority authors and publishers—global markets, diverse content, titles remain in print forever. He sees the new medium as a way to cut out the middle man, thereby increasing profits for producers and lowering costs for readers.

E-books are likely to lead to a restructuring of the publishing industry by enabling cross-border commerce.

Apart from mergers and acquisitions among the existing publishing houses, new kinds of business models are developing to deliver the content over the internet.

- Delivering forms that are born digital, with no precise counterpart in print.
- Moving out of established genres and formats: no book-length novels or biographies, no full-length cookbooks.

Publishers are also finding it difficult to forecast how all these developments will turn out. According to Esposito[16], the disruption brought about by online distribution of digital books is not a one-time thing. The disruption is a process, with one disruption leading inexorably to another.

6.1 Multime dia e-books

Though books about technology abound, books themselves haven't gone through the same degree of technological change, as have other forms of entertainment. In the 133 years since Thomas Edison invented the phonograph, there have been more than a dozen commercially available formats for playing back recorded sound. In the 556 years since Johannes Gutenberg's Bible, the paperback and the audio book are the only other major advanced book publishing formats besides the e-book[17].

6.2 Social Media for Marketing E-books

Content engagement tools such as comment and rate applications that are widely used to enable 'sticky' websites can be deployed for e-books. Social media is also bringing together readers of a particular title. Upon opening the e-book file, the readers will have option to record if they are in a book club or whether they wish to join one. Real-time commenting or chat could also allow readers to see what fellow book club members have to say about the noted passages.

6.3 Cloud Computing for E-books

Software used by book publishers to manage contracts, royalties, production workflow, sales, and marketing have begun to migrate from relatively closed systems that are internally maintained, to cloud-based platforms on the web. Business drivers behind this migration include a highly dynamic market for e-books and other digital products. While questions remain as to how quickly the transition will take, the possibility of cloud-based book publishing promises to change the nature of publishing infrastructure and with it the role of the IT professionals in publishing[18].

7. MAJOR E-BOOK INITIATIVES

Ever since the scanning and digital conversion technologies became available, libraries around the world started looking at the option of converting their print books into digital formats with the goal of long-term preservation and enhancing accessibility. Apart from libraries, few voluntary organisations also took up the conversion. Even corporate major, Google got into the business in collaboration with libraries.

7.1 Project Gutenberg

Project Gutenberg is the first and largest single collection of free eBooks. The premise on which Michael Hart based Project Gutenberg was: anything that can be entered into a computer can be reproduced indefinitely—what Michael termed 'Replicator Technology'. The concept is simple; once a book or any other item (including pictures, sounds, and even 3-D items) can be stored in a computer, then any number of copies can and will be available. Everyone in the world, or even not in this world (given satellite transmission) can have a copy of a book that has been entered into a computer. Project Gutenberg e-texts are presented in 'Plain Vanilla ASCII' which is considered to be easy on both the eyes and the computer.

The project currently offers free download of 38,000 e-books in the public domain, all digitised by volunteers. In the years to come, it aims to make available 10 million books in 100 languages.

Project Gutenberg hosts lot of books, in the areas of Indian history, philosophy, literature, and even on flora and fauna of India. One can find the works of Rabindranath Tagore, Sarojini Naidu, Valmiki to name a few.

7.2 Google Books

Google e-books project is as old as Google itself. In 1996, Google co-founders Sergey Brin and Larry Page were graduate computer science students working on a research project supported by the Stanford Digital Library. Their goal was to make digital libraries work, and their big idea was to index the books' content and analyse the connections between them, determining any given book's relevance and usefulness by tracking the number and quality of citations from other books.

The crawler they wound up building was called BackRub, and it was this modern twist on traditional citation analysis that inspired Google's PageRank algorithms—the core search technology that makes Google what Google is of today.

In December 2004, Google announced the beginning of the "Google Print" Library Project, made possible by partnerships with Harvard, the University of Michigan, the New York Public Library, Oxford and Stanford. The combined collections at these libraries were estimated to exceed 15 million volumes. Subsequently, many more university libraries joined the project. The project went

through several litigations and currently hosts huge number of digitised books in all subjects, some of which are freely readable.

7.3 Digital Public Library of America Project

The proposed Digital Public Library of America (DPLA) is expected to serve as an open online collection of digitised books and texts that project leaders hope could one day incorporate every volume ever published. DPLA might index and provide access to a wide range of broadly distributed content. Guided by a Steering Committee at the Harvard Law School's Berkman Center for Internet and Society, the project remains in its initial planning phase.

The DPLA will be the product of collaboration between the largest library systems including Harvard, the Library of Congress, the National Archives, and the Smithsonian Institution. It intends to make use of existing free and open source code; all new code funded by the DPLA will be free and open source. To facilitate and maximise interoperability, the DPLA platform will support open standards. It will be freely accessible for others to fork, host, and replicate with no discrimination based on use or field of endeavor.

8. SELF PUBLISHING OF E-BOOKS

The internet has not only democratised access to recorded human knowledge, but even helping potential writers with creation and distribution of self published e-content. To self publish an e-book one doesn't need any special technological expertise. Self publishing is possible using completely free software called e-book compilers and one can use the Internet to either sell the e-book or give it away completely free to millions of people[19].

Self publishing is done without the involvement or vetting of an established publisher and uses a publishing system such as Lulu, Smashwords, Amazon's Kindle Direct Publishing or Barnes & Noble's PubIt. Preparing the book is easy using common tools like Microsoft Word or Google Docs. There are several free e-book compilers on the net.

Where does this leave authors in the developing world who feel their works are currently underrepresented? They can wait like everyone else for this concept to mature. When it does, they can hope that reduced publishing and distribution costs enable authors to reach readers in distant lands. In the meantime, the global monopoly of book publishers persists.

Specifically, e-books present three potential benefits to third-world authors[20].

(a) Reduction in publishing costs—These costs are not reduced to zero, since any electronic publishing effort should include both page design and copy editing costs. But the actual cost of printing a book is eliminated, these represent significant costs in countries that need to import paper and use older, smaller presses.

(b) Distribution—With web distribution, all publishers and self-publishing authors can now ship their products for the cost of a web connection. Web costs are relatively higher in the developing world, but costs are coming down, and in any case, much lower than the cost of actually shipping a box of books.

(c) Improvements in book promotion—Where writers previously had to absorb costs for mailings and brochures, they now can use individual websites, directed e-mail, and cross-postings as a low cost means of reaching potential readers.

While these are real advantages that open the world to the books of authors and publishers who might otherwise be invisible, the e-book effort is not without its own problems. What may be most daunting to authors is the confusion within the industry itself.

9. LIBRARY MANAGEMENT IMPLICATIONS

The increasing popularity of e-books has serious implications for library management. The library, as a content manager and provider, is rebalancing various aspects relating to the development and design of services for incorporating this new format. The transformation of the format has serious implications on the relationship between users and libraries, as well as between publishers and libraries[21].

9.1 Should Every Printed Page be Converted in Electronic Form ?

The translation from paper to electronic environment may not be appropriate for every type of publication and for every type of reader tempting to accomplish have a central role in judging the suitability of this transition. The fact that technology is able to represent documents on the screen may not be a sufficient reason for putting every piece of paper into electronic format. It is necessary to consider the subject matter and usage need of the specific document before deciding if conversion to an electronic version would be useful or not. But, however, many conservationists and library activists believe the other way. They argue that since books in print may not withstand usability beyond 75 years, e-conversion of all content is a must for carrying the content to future generations.

9.2 Changing Reading Habits of Users

The emergence of the internet has introduced new ways for users to access library resources and has

shaped user behaviour and expectations. Users now insist on instant and constant access to information, often from distant locations, and as a result, remote access to online library resources has become an increasingly significant part of library service. People spend time in finding micro information rather than reading from cover to cover.

Users also require a federated search tool to simultaneously search the library catalogues (for print books) as well as the e-books accessible to them[22]. The speed and ease of federated search tools make them appealing, particularly the novice searchers. They do not need to learn how to formulate searches in each of the databases, nor must they learn how to interpret the different results sets; federated search tools typically display results in a common format. An efficient federated search engine allows searching to be done in a timely manner and eliminates the need for a user to learn multiple search interfaces. Many federated search interfaces also provide facility for deduplication.

9.3 Coping Up with E-books Quantity in Future

Recently librarians have conceived[23] a Global Library Consortium (GLC) at the Radcliffe Institute, Harvard. It is the brainchild of Frances Pinter, former publisher of Bloomsbury Academic in the UK, and founder of EIFL (http://www.eifl.net/), an international library consortium of consortia supporting greater access to information.

The GLC proposal would operate with libraries pooling together into a membership coalition that purchases the rights to titles offered by participating publishers. Those books would then be made available on an open access basis, perhaps with Creative Commons license terms. Libraries would place bids for each offered title into a pool, and if there was sufficient interest to hit the price trigger point, the publisher would release the title into the open access pool with costs apportioned among participating institutions. Once made open access, titles would be publicly readable through a web browser interface, but downloadable PDFs or EPUBs would only be freely available to GLC members.

According to one estimate, by 2020 university libraries may no longer need circulation desks (National Center for Education Statistics data)[24]. This claim appears reasonable, considering the increasing flood of e-books and e-journals into libraries, and decreasing dependence on print resources.

10. CONCLUSIONS

Today, determining the library shelf space is a far more philosophical undertaking, as questions regarding the future of the book invoke strong and often opposing views. Depending on the vision one supports, conventional books will either become largely obsolete as iPads, iPhones, Kindles, Nooks, tablets and dozens of other yet-to-be-imagined e-book readers grow to dominate the market; or publisher-produced print-on-paper will remain the primary means of interacting with lengthy textual material. But librarians are generally unconvinced that any existing e-book reader allows for a more productive means of scholarly engagement than the physical book.

At this point of time, while it is difficult to predict whether e-books would totally substitute paper books, they would certainly play a crucial role in education and research. For a developing country like India, e-books make more sense to leapfrog and achieve 100 percent literacy.

REFERENCES

1. Plato & Waterfield, Robin. Phaedrus. Oxford University Press, Oxford, 2002.
2. Press, L. From p-books to e-book. *Communication of the ACM*, 2000, **43**(5), 170-21.
3. Cox, J. E-book: Challenges and opportunities. *D-Lib Magazine*, 2004, **10**(10), 1082–093.
4. Doctorow, C. Ebooks: Neither E, nor books. *In* O'Reilly Emerging Technologies Conference, San Diego, CA, 2004. http://craphound.com/ebooksneitherenorbooks.txt (accessed on 1 February 2012).
5. Rao, S.S. Familiarisation of electronic books. *Electronic Library*, 2001, **19**(1), 247-56.
6. Vassiliou, M. & Rowley, J. Progressing the definition of e-book. *Library Hi Tech,* 2008, **26**(3), 355-68.
7. Crestani, F.; Landoni, M. & Melucci, M. Appearance and functionality of electronic books: lessons from the visual book and hyper-textbook projects. *Inter. J. Digital Libr.,* 2006, **6**(2), 192-09.
8. O'Donnell, J.J. An idea whose time has almost come. *Chronicle of Higher Education*, 2010, **56**(38), B10.
9. Clark, D.T. Lending Kindle e-book readers: First results from the Texas A&M University project. *Collection Building*, 2009, **28**(4), 146-49.
10. Harris, S. Emergence of the e-book. *Nature Photonics*, 2010, **4**, 748-49.
11. Carlson, S. Students complain about devices for reading e-book, study finds. *Chronicle Higher Edu.*, 2002.
12. Mayes, D.K.; Sims, V.K. & Koonce, J.M. Comprehension and workload differences for VDT and

paper-based reading. *Inter. J. Indust. Ergon.,* 2001, **28** (6), 367-78.

13. Dillon, A. Designing usable electronic text. Ed. 2. Taylor and Francis, London, 2004.

14. Martin, L.A. & Platt, M.W. Printing and screen reading in the medical school curriculum: Guttenberg vs. the cathode ray tube. *Behav. Inf. Technol.,* 2001, **20**, 143-48.

15. Kang, Y.Y.; Wang, M.J.J. & Lin, R. Usability evaluation of e-books. *Displays,* 2009, **30**(1), 49-52.

16. Esposito, J.J. One world publishing, brought to you by the internet. *Publish. Res. Quart.,* 2011, **27**, 13-18.

17. Hollander, S. Listen to the music: Lessons for publishers from record labels' digital debut decade. *Publish. Res. Quart.,* 2011, **27,** 26-35.

18. Hill, T. The inevitable shift to cloud-based book publishing: The next step in the digital transformation of book publishing may be closer than you think. *Publish. Res. Quart.,* 2012, (in press) published online 19 January 2012. DOI: 10.1007/s12109-011-9249-9

19. Oghojafor, K. E-book publishing success: How anyone can write, compile and sell e-books on the internet. Chandos Publishing, Oxford, 2005.

20. Wresch, W. Perspectives on the right to publish: Global inequalities, digital publications, and the legacy of revolutionary France. *Ethics Inf. Technol.*, 2003, **5,** 117-27.

21. Romero, N.L. The management of e-book collections and their implication on the economic management of the library. *The Bottom Line: Manag. Lib. Finan.*, 2011, **24**(3), 173-79.

22. Foust, J.E.; Bergen, P.; Maxeiner, G.L. & Pawlowski, P.N. Improving e-book access via a library-developed full-text search tool. *J. Med. Lib. Asso.,* 2007, **95**(1), 40-45.

23. Brantley, Peter. Academic e-books: Innovation and transition. *Publishers Weekly*, 3 February 2012 http://www.publishersweekly.com/pw/by-topic/digital/content-and-e-books/article/50486-academic-e-books-innovation-and-transition.html (accessed on 5 February 2012)

24. Kurt, Will. The end of academic library circulation? *ACRL Tech Connect,* 1 February 2012. http://acrl.ala.org/techconnect/?p=233 (accessed on 10 February 2012)

About the Author

Shri Potluri Divakar has been handling scientific information for the past 35 years. After graduating in Biology at Loyola College, Vijayawada he obtained his masters degree in Zoology with specialisation in Parasitology from Andhra University, Visakhapatnam. He obtained Associateship in Documentation and Information Science from Indian Statistical Institute. He joined ICRISAT, Hyderabad in the Sorghum and Millets Information Centre in 1977. Currently, he is managing the Knowledge Resource Centre at CCMB Hyderabad. He is a Guest Faculty for various library science programmes at IGNOU, BRAOU, University of Hyderabad, and Osmania University. He has also been associated with UGC Academic Staff Colleges, DRDO and CSIR-HRDC as resource person for in-service training programmes. His areas of interest include library management, scientific information searching, and scientometrics.