



E-Books, an introduction

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Abstract:

- eBooks are predicted by Forrester Research to occupy 17.5% of the publishing industry by the year 2005.
- Factors influencing mass-adoption are: readability, portability, content, and cost.
- This presentation examines today, and looks ahead to possible solutions in the near future.
- Based on my presentation for Master of IT at Monash University





Overview: What is an eBook?

- Not before time, 'e-Book' has now made [Concise Oxford Dictionary](#). The dictionary defines it as follows:
 - e-book n. an electronic version of a printed book which can be read on a personal computer or handheld device designed specifically for this purpose.



First: Some administration

- Acrobat Discussion Forum
Server-side PDF, PDF Forms, XML and PDF, PDF and hand held devices, cross-platform PDF, Digital Signatures, and interactive PDF
10:45 Wednesday in the PDF Stream
Submit questions to Registration Desk



Overview: Quick Survey

- How many have read an “eBook” before?
- How many have seen an eBook?
- Was it on a personal computer? Or handheld device?
- Did you enjoy it reading it?
- Was it an immersive experience?



Overview: Beating the ‘book’

- Microsoft’s Bill Hill (1998) says,
 - “The computer can go beyond the book—but only if we first really understand it then move forward with respect and without breaking what already works so well.”



Overview: Introduction

- Problem: How does one build a cost-effective, replacement eBook reading system that is a suitable replacement for paper-based book technology? (Today and tomorrow.)
- Limiting factors identified are as follows:
 1. Readability
 2. Portability
 3. Content
 4. Low-cost



Problem: 1 - Readability

- The single biggest challenge for eBooks to succeed is to provide readability on mobile computing systems:
 - Hill says reading on the screen needs to be an unconscious and as immersive as it is on paper today.
- Displays in use today have resolutions of around 72-96 dots per inch and cost around \$150-250 US.
- A piece of paper has an effective resolution of 1200 dpi and costs less than a few cents.
- Matching these characteristics will be difficult indeed.



Problem: 2 - Portability

- Simpson (2001) reports that Robert Hertzberg, an analyst with Jupiter Research, said:
 - "Reading an e-book is just like reading a book ... but it's just less fun, more expensive and heavier." And as he said, that's not much of a marketing motto.
- eBooks need to be as portable and durable as existing paper-based books. This is referred to as the test of the 4B's being Bed, Bath, Bus and Beach.
- eBooks can probably be deemed to pass the Bed and Bus test, but only the most courageous of eBook Reading Device owners would be willing to risk their prized possessions in the Bath or at the Beach.



Problem: 3 - Content

- A low-cost device that exhibits all the beneficial characteristics of paper is worthless without a suitable content repository to view with it. Like a computer without software.
- Developments must be made to allow existing content to be put into a form that is viewable on eBook devices. It must also be simple to convert new content to this format.



Problem: 4 - Low-cost

- Paperbacks, hardbacks, and magazines are currently accessible from a cost perspective to the average consumer.
 - Example: a paperback book has a retail price of \$5-10 US and yet is more readable than the equivalent eBook version displayed on a device that costs more than \$500 US.
- eBooks and eBook Reading Devices must also be low-cost if they are to be a viable alternative.



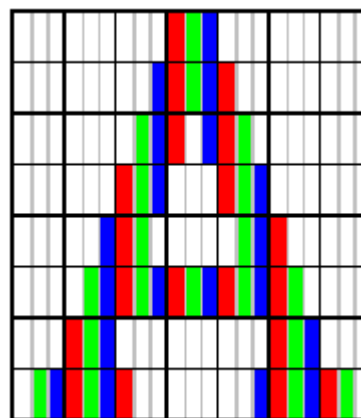
Readability: Overview

- Without a high resolution screen typography becomes irrelevant.
- Two approaches are:
 - Sub-pixel rendering (now)
 - Alternative display technologies (later)
 - Sony announced entirely new technology “organic electroluminescent display” in February 2001
 - Electrostatically orientated so-called Paper 2.0 from E Ink, or SmartPaper™ from Gyricon Media.



Readability: Sub-pixel rendering

- The majority of mobile computers involved in the eBook space are based around LCDs.
- Sub-pixel addressing can be exploited to allow an effective 3-times increase in the horizontal resolution.





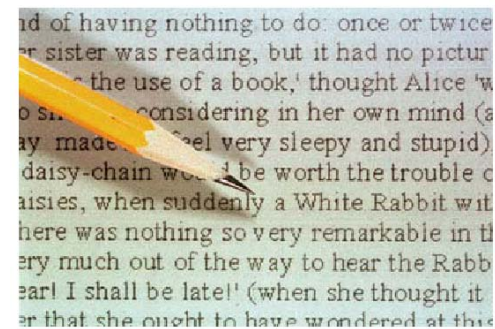
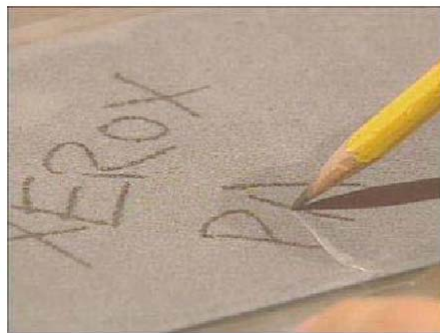
Readability: Sub-pixel rendering cont...

- Microsoft Reader has ClearType.
- Adobe eBook Reader has CoolType
- MobiPocket has announced it will provide support for subpixel rendering? CrispType (?)
- I have read over ten books in recent months on a handheld device using sub-pixel font rendering technology and was able to enter an immersive reading state
- Only works on LCD, not CRT



Readability: Alternative display technologies

- Future is being addressed by alternative display technologies.
 - Gyricon Media's Paper 2.0
 - E Ink Smart Paper





Readability: Paper 2.0

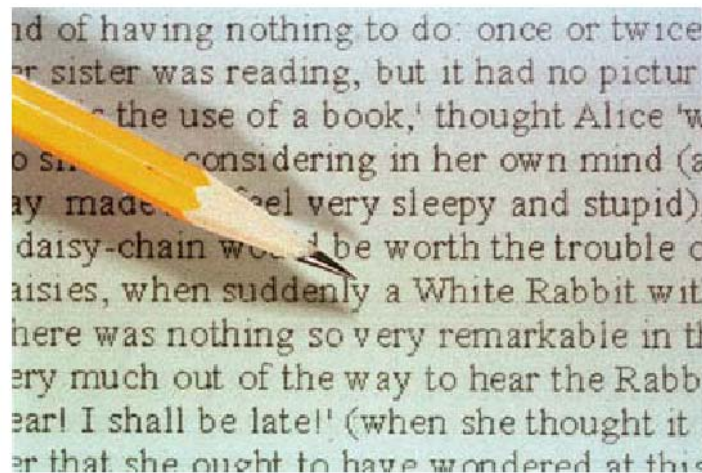
- A display technology, invented at the Xerox PARC, called "Gyricon". Gyricon is actually an array of tiny (100 micron diameter or smaller) solid beads embedded in a thin layer of flexible transparent plastic. Each beads has two hemispheres of contrasting color ("bichromal") and is free to rotate being housed in an oil-filled cavity.





Readability: E Ink

- E Ink (2001) announced an active matrix electronic ink display capable of producing high-resolution illustrations and text.
- A new generation of highly mobile devices that will have "...screens as easy to read as ink on paper".





Readability: E Ink cont...

- E Ink's product has the following characteristics:
 - Three to six times increase in brightness than traditional
 - Reflective LCD
 - Exceeds newspapers in contrast ratio
 - Easily read in dim and full sunlight
 - A clear image regardless of viewing angle
 - Only requires power whilst the image is changing
 - Backlight not required in most cases
 - Draws less than 1/1000th of the power normally required for LCD



Portability



- Dedicated reading device or a reading application for a multifunction device?
 - Dedicated eBook Reading Devices are usually lower-cost and have a larger screen than their multifunction counterparts.
 - Multifunction devices pack much more utility into their smaller package, at the expense of a higher price tag.





Content

- A low-cost device eBook device would be worthless without eBooks to view on it.
- Currently two formats in use for eBook content, Open eBook Format (OEB) and Adobe's Portable Document Format (PDF).
- OEB is used primarily for simple text documents with limited table and image support (Microsoft Reader, MobiPocket Reader, and Ansys's Mobile Office.) Can be viewed on the handheld.
- Science Technical Medical type (STM) are more suitable for conversion to PDF. Desktop preferred.



Low-cost

- As manufacturers attempt to build a device that best passes the test of the 4Bs, they've also introduced another element that I call the 5th B that of, "B"eing affordable. There is little point having the most robust, portable, high-resolution eBook Reading Device if no one can afford to buy it.
- Not only are the devices expensive, but also publishers have been selling the content at almost the paper-back retail price. Not incorporating any saving to the consumer that they realize in the publishing process.



Conclusion

- The four factors holding back the adoption of eBooks are readability, portability, content and low-cost.
- Increased readability depends significantly on the production of higher resolution screens.
- Assisted by sub-pixel tech. (CoolType, ClearType)
- Later developments from E Ink, Gyricon Media, Sony and perhaps IBM will assist.
- Portability will be addressed by next generation devices with low-power screen technology and greater battery life. Sony Sports eBook, anyone?
- Existing content will be released in a desktop format (PDF). New content will become available in a variety of formats including the device-friendly OEB. Should be priced at discount to paper back.



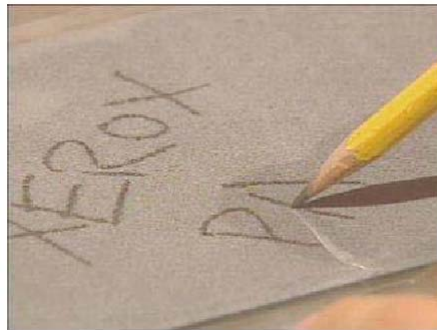
Conclusion cont...

Last Word

- Knowing this, some eBook advocates (me) would say that – like the trees they are printed on – traditional books are dead.
- Not everyone agrees... Gorman (1995) suggests,
 - “One of the sillier forecasts of an all-electronic future is the idea that everyone will read from computer devices.”
- Time will tell



Questions?



...ad of having nothing to do: once or twice
...er sister was reading, but it had no pictur
...e the use of a book,' thought Alice 'w
...o she was considering in her own mind (s
...ay made her feel very sleepy and stupid)
...daisy-chain would be worth the trouble c
...aisies, when suddenly a White Rabbit wit
...here was nothing so very remarkable in th
...ery much out of the way to hear the Rabb
...ear! I shall be late!' (when she thought it
...er that she ought to have wondered at thi