

Beyond the page: A comparison of reading in different media

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Motivation & background

- In the present era, new technologies emerge; enabling the transition from printed books to the electronic ones through e-readers.
- Electronic reading devices, including e-readers and tablet computers, are increasing in popularity at such a rapid rate so it is critical to understand how the user's perceived the usability of such devices compares with traditional print books.

Motivation & background

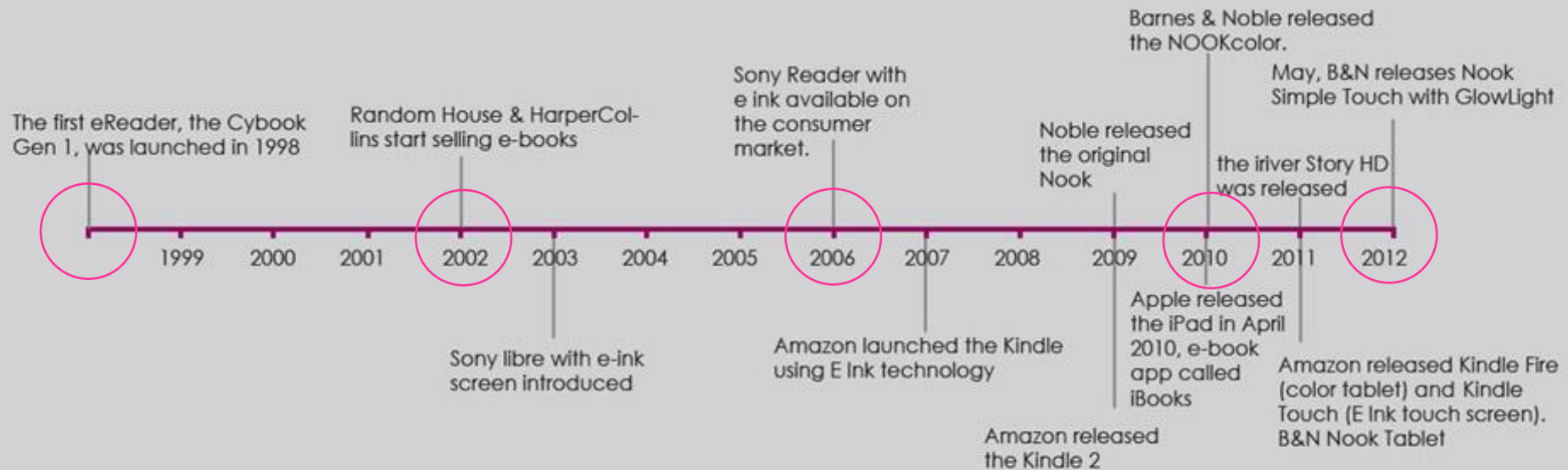
- A critical question is why a user use an electronic reader when he can use a net book, tablet or a smart phone?
- The fundamental difference lies in the display, which is made of such materials so as not to strain user's eyes to the face as if it were a **passive material such as paper**.

Motivation & background

- The initial attempt to produce a worldwide library of e-books was called Project Gutenberg and it's still running today.
- Founder of the project, Michael Heart, wished to bring all famous and important print collections open to the general public in electronic form.
- Although investigation began in earnest within the mid-80s, several ideas grew to become implemented **only about the last ten years**, as the price of the analysis was huge.

Motivation & background

The Figure illustrates the evolution of e-readers.



Difficulties

- One difficulty potential users face is a range of products each using their own proprietary content formats.
- Different e-readers use different formats
- Publishing industries are extremely dissimilar to the change in practices.

eReaders

- What is an eBook without an eReader?
- e Reader promises a comfortable, computer-free experience for reading.
- e Ink displays do not require any background lighting and are easy to read, even in direct sunlight.

E-Readers and usability

- Previous studies found that users encounters problems when they trying to complete specific tasks while using an e-reader.
- Clark et al., reported that 36 Kindle readers at Texas university found its use limited due to content availability and **licensing issues**, **graphic display capabilities**, organizational issues, and its **prohibitive cost** .

Aim of the study

- The goal of this study is to explore the usability of two electronic reading devices.
- One dedicated reader and one multifunctional device.

Usability

- The term “*usability*” is frequently employed in the field of human-computer interaction (HCI).
- Nielsen describes usability as an issue related to the broader issue of acceptability.

Usability testing

- **Usability testing** is a method employed in user-centered design to evaluate product design by testing it on **representative users**.
- Our session was designed specifically **to include a representative pool** of the **potential users** of e-readers that was being tested.

research methodology

■ Participants

- Twelve participants (N=12) aged between 18 -65 (mean age = 36.08, SD = 14.47 years), seven males and five females.

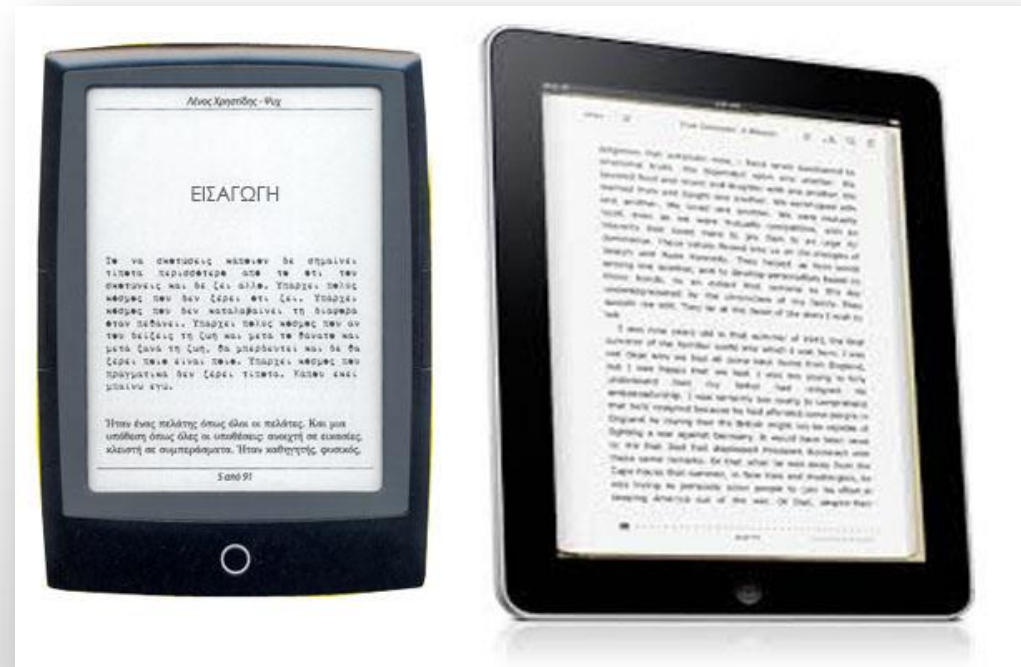
ID	P1	P2	P3	P4	P5	P6
Age	26	38	23	27	47	36
Gender	M	F	M	F	M	M
ID	P7	P8	P9	P10	P11	P12
Age	22	31	18	45	55	65
gender	M	M	F	F	F	M

Age, gender and number of participants

research methodology

Material

- Two e-readers devices
- One **dedicated reader** (Cybook Odyssey)
- One multifunctional device (The Apple iPad)
- A Panasonic HDCSD40 digital camera was used to create a complete record of all user interactions with the interface.



Research methodology

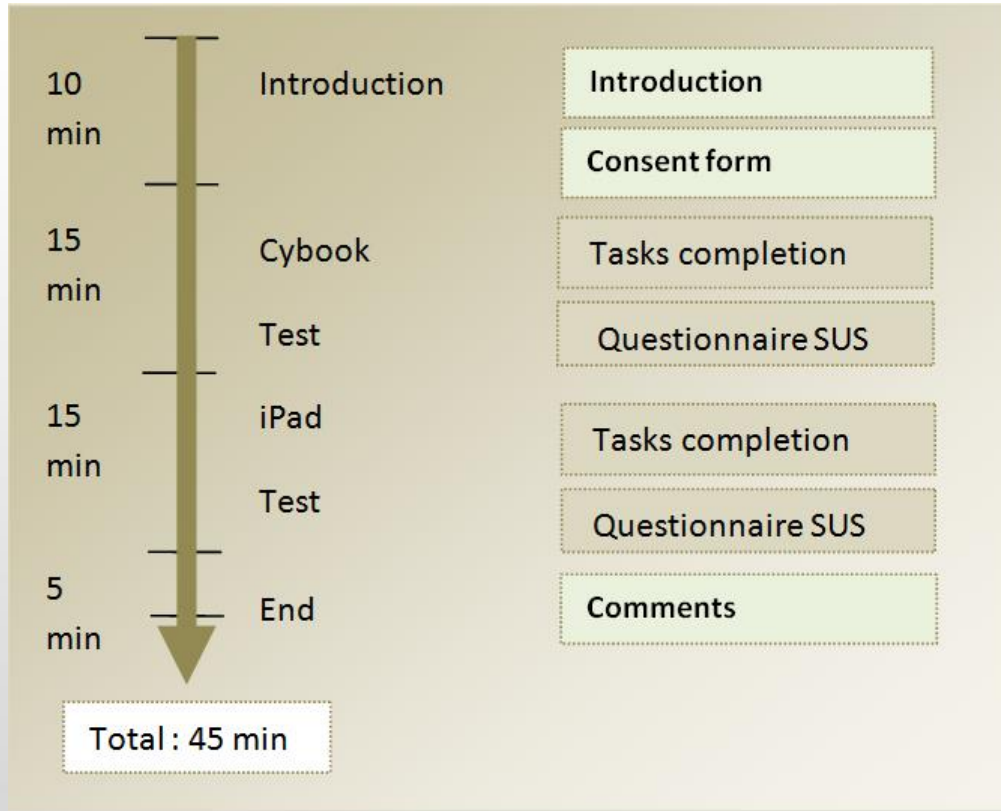
User Tasks

- For the usability test, the participants were required to complete the eight tasks given in table. The tasks were chosen as **being representative** and covered as many as possible of the features of the e-readers.

Tasks	Task Description
Task 1	Open the book "Mythology"
Task 2	Go to page 26
Task 3	Change the page to landscape format
Task 4	Highlight the first two sentences of the page
Task 5	Delete the highlighted sentences
Task 6	Make a note of the first paragraph of the page
Task 7	Increase the font size
Task 8	Add bookmark

research methodology

Test protocol



User test process



Participant during the usability testing.

research methodology

- The main factors to be examined when testing usability are effectiveness, efficiency and user satisfaction.
- In order to evaluate effectiveness, we measured the percentage of steps successfully solved within the time limit (7min). Efficiency refers to how quickly a system supports the user in what he wants to do. To evaluate efficiency, we recorded the time needed to process the task.
- For user satisfaction a SUS (system usability scale) questionnaire completed by the users, after the test .

Results

- **Effectiveness** (percentage of steps successfully solved within the time limit -7min).

	Task1	Task2	Task3	Task4	Task5	Task6	Task7	Task8
Cybook odysse	11/12	9/12	8/12	7/12	7/12	2/12	9/12	10/12
	91%	75%	66%	58%	58%	16.7% *	75%	83.3%
Apple iPad (3 rd generation)	12/12	11/12	9/12	8/12	11/12	7/12	10/12	11/12
	100%	91%	75%	66%	91%	58%	83.3%	91%

Results

▪ Efficiency

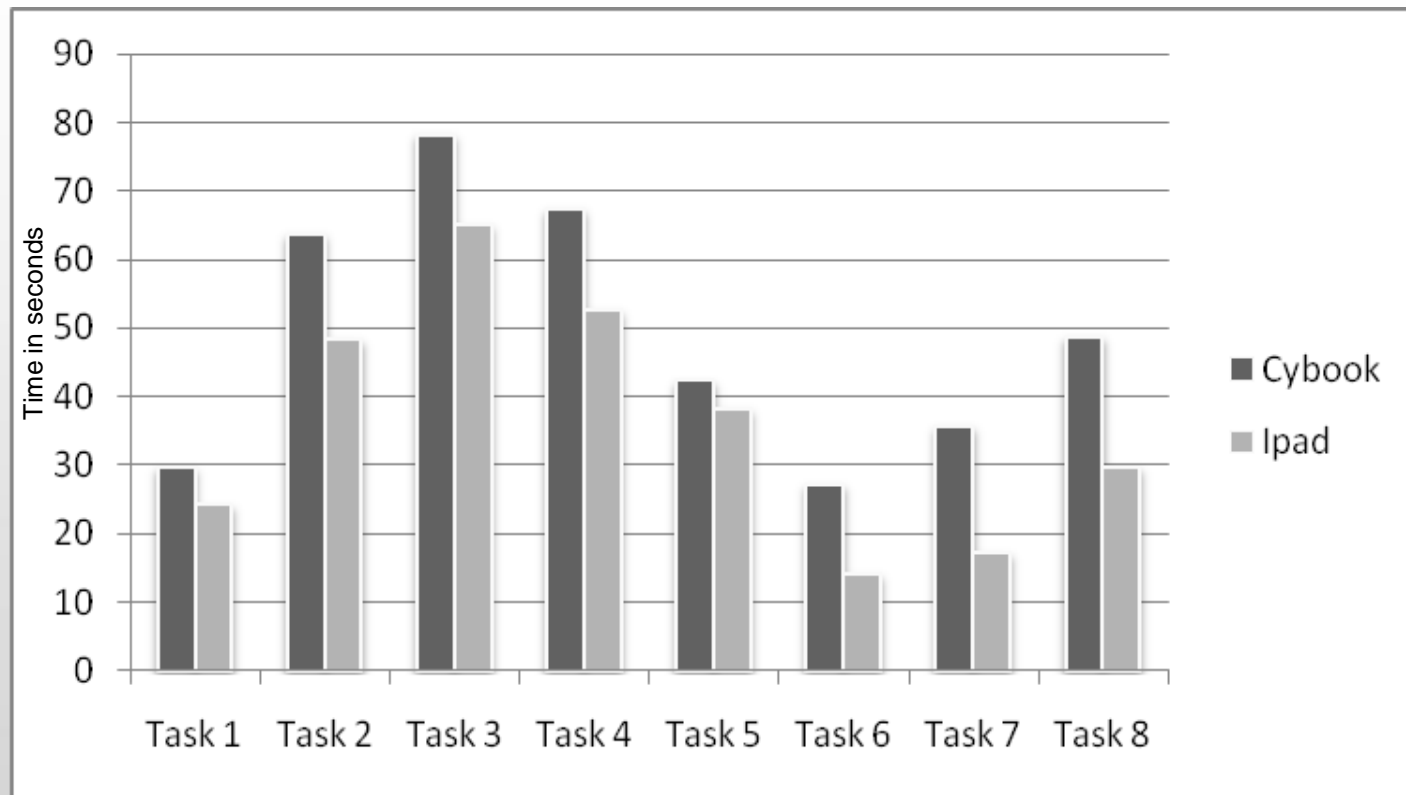
Tasks	Task Description	Cybook	iPad
Task 1	Open the book "Mythology"	29,7	24,2
Task 2	Go to page 26	63,7	48,3
Task 3	Change the page to landscape format	27,2	14,1
Task 4	Highlight the first two sentences of the page	67,3	52,6
Task 5	Delete the highlighted sentences	42,3	38,2
Task 6	Make a note of the first paragraph of the page	78,2	65,1
Task 7	Increase the font size	35,6	17,2
Task 8	Add bookmark	48,7	29,7
	Average Time	49,1	36,2
	Standard Deviation	18,8	18,1

The task completion mean time (seconds)

Results

▪ Efficiency

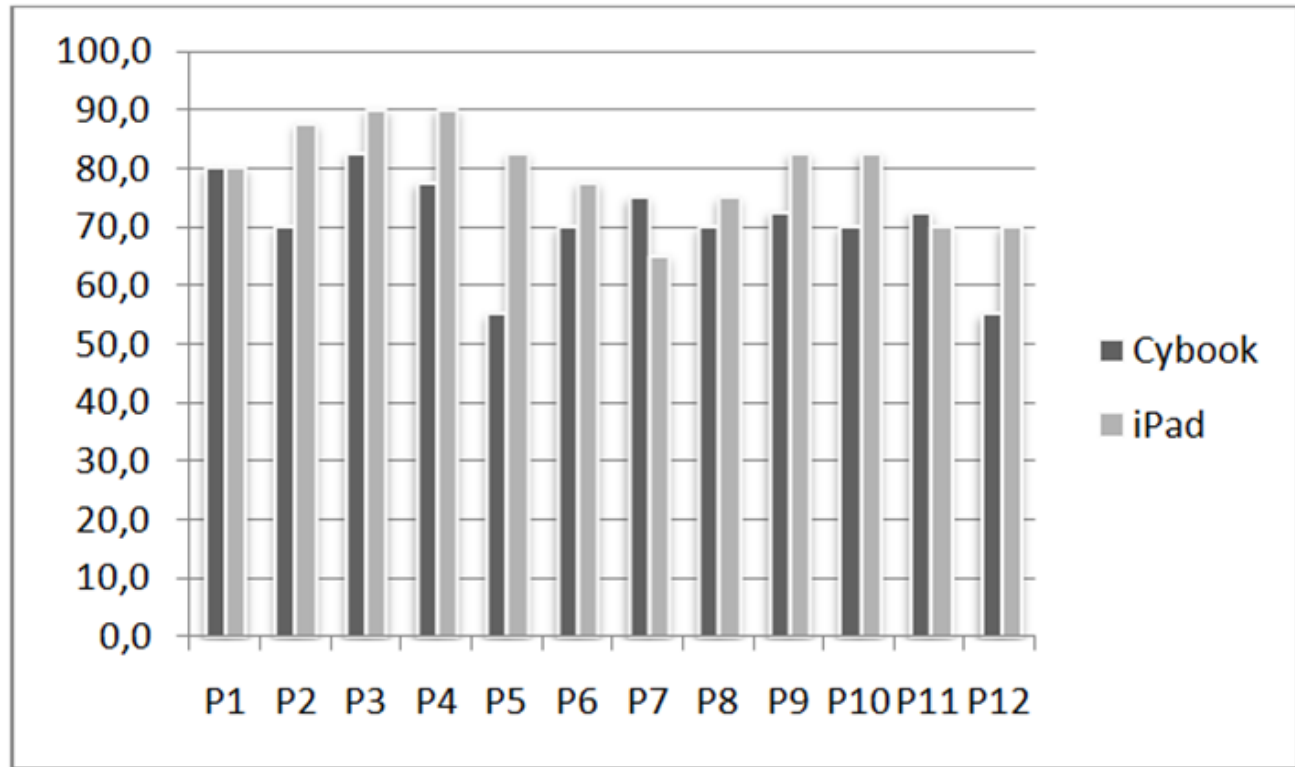
Task completion time



Results

- User satisfaction SUS (system usability scale)

Participants	Cybook	iPad
P1	80,0	80,0
P2	70,0	87,5
P3	82,5	90,0
P4	77,5	90,0
P5	55,0	82,5
P6	70,0	77,5
P7	75,0	65,0
P8	70,0	75,0
P9	72,5	82,5
P10	70,0	82,5
P11	72,5	70,0
P12	55,0	70,0
Average	70,8	79,3



Results

■ User satisfaction

The survey results showed the overall satisfaction.

Sauro reports that a mean value over 74 is level B, value above 80.3 is level A. An average value of below 51 is level F (fail).

- The iPad with an average value of 79.3 are to be placed on level B, and Cybook, with an average value of 70.8, belong also to level B.
- It can be remarkable to notice that none of the e-Readers had an extremely high satisfaction score, meaning that users preferences were ambiguous.

Participants	Cybook	iPad
P1	80,0	80,0
P2	70,0	87,5
P3	82,5	90,0
P4	77,5	90,0
P5	55,0	82,5
P6	70,0	77,5
P7	75,0	65,0
P8	70,0	75,0
P9	72,5	82,5
P10	70,0	82,5
P11	72,5	70,0
P12	55,0	70,0
Average	70,8	79,3

Conclusions

- Participants reported that *the make a note* task was difficult to be performed with Cybook as the keypad was complicated to be used compared to iPad.
- Overall, participants had a preference to highlight and make notes on the iPad.
- The effectiveness and efficiency of the multifunctional device is evident in the fact that users took less time to complete their tasks.

Conclusions

Participants **complained about** :

- Poor page navigation
- Difficulty to turn the page
- Slow to use in non-linear reading
- Environment

From the other hand participants **reported that** :

- For the dedicated device was easy to found some functions via the menu.
- Participants (elders) found **desirable** the possibility to adjust text's font size.
- Portability and Lightness
- For their leisure time usage, when reading a novel sequentially from the beginning to the end, the e-ink technology is more user friendly.

Conclusions

- The results of the study show that both in terms of usability and overall impression, the iPad was the preferred device. This was surprising in part as the lightness, long battery life and portability of Cybook was strongly liked by respondents.
- In addition the study has shown that even though manufacturers have addressed a few of the perceived limitations of e-books, there are more conditions that remain unresolved or tend not to match user expectations.

THANK YOU!

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