



Introduction

- Many schools and universities are implementing e-Textbooks into the classrooms (Swanson, 2011; Colgrass 2011)
- Reed College Study: Kindle DX & iPads for whole classroom (2009 & 2011)
 - Multifunctional device, like certain tablets, would be better for the academic environment.
 - Studies with iPads have received positive feedback.
- Other studies have used smaller devices: iPod touch & cell phones (Chao & Chen, 2009; Johnson, Levine, Smith & Stone, 2010).
- Growing number of mobile apps to read e-Textbooks



- Some e-Textbook apps have different features:
 - Hand written notes
 - Different colors for highlighting
 - Sharing notes and marks through social networks
- Problem:** Studies do not examine e-Textbook:
 - Usability
 - Engagement
 - Use in real-world studying

Method

Participants

- $N = 40$ (25 females and 15 males)
- Age: 18 to 50 ($M = 21.2$; $SD = 6.1$)

Materials

- iPad 3 with Kindle and Inking app installed
- Web camera and Morae 3.2 were used to record interactions

Procedure

- Pre-Test
- Completed 10 tasks on Kindle and 12 tasks on Inking
- Recorded: (1) Time to complete each task, (2) number of taps, and (3) task success (completed a task successfully or not)
- Rated task difficulty on a 5-point Likert scale (1 = very easy, 5 = very difficult)
- Study time
- Post- Test
- Subjective data:
 - Subjective workload assessment (NASA-TLX)
 - Satisfaction survey (adapted SUS from Brooke, 1996)
 - Engagement (O'Brien, 2010)
 - e-Textbook experience
- Verbal comments

Usability Test Tasks	
Use Table of Contents	
Find Table of Contents	
Turn Pages	
Change Text	
Highlight	
Make a Note	
Search Text	
Make a Bookmark	
Find Highlight/Note	
Delete Highlight/Note	

Results

Completion Time

- Locating TOC, searching, and locating a highlight was faster on Inking.
- Page turning and bookmarking was faster on Kindle.

Key: **Inking** **Kindle**

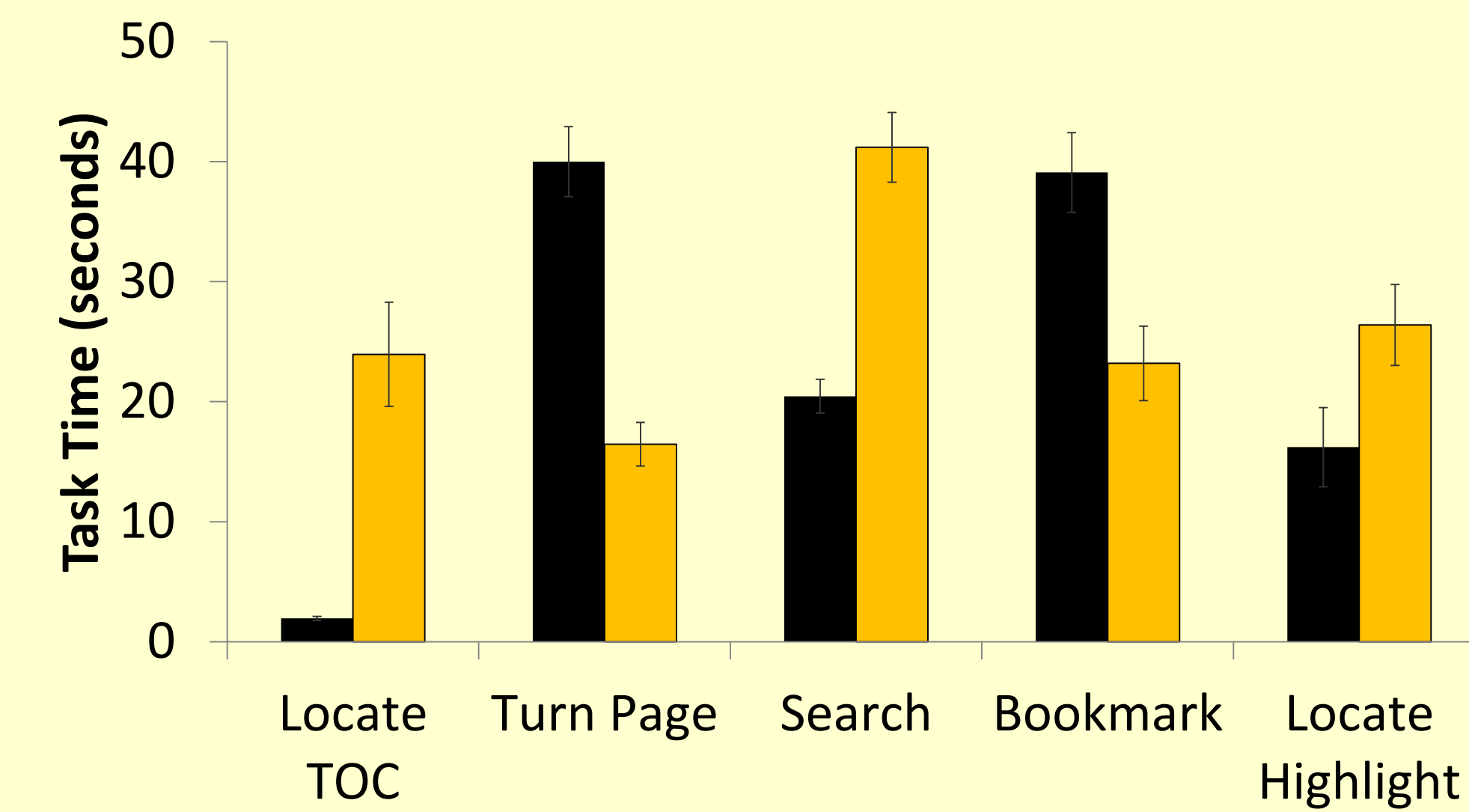


Figure 1. Average completion time per task per app.

Task Difficulty

- Locating TOC, locating a highlight, and deleting a note was easier on Inking.
- Page turning was easier on Kindle.

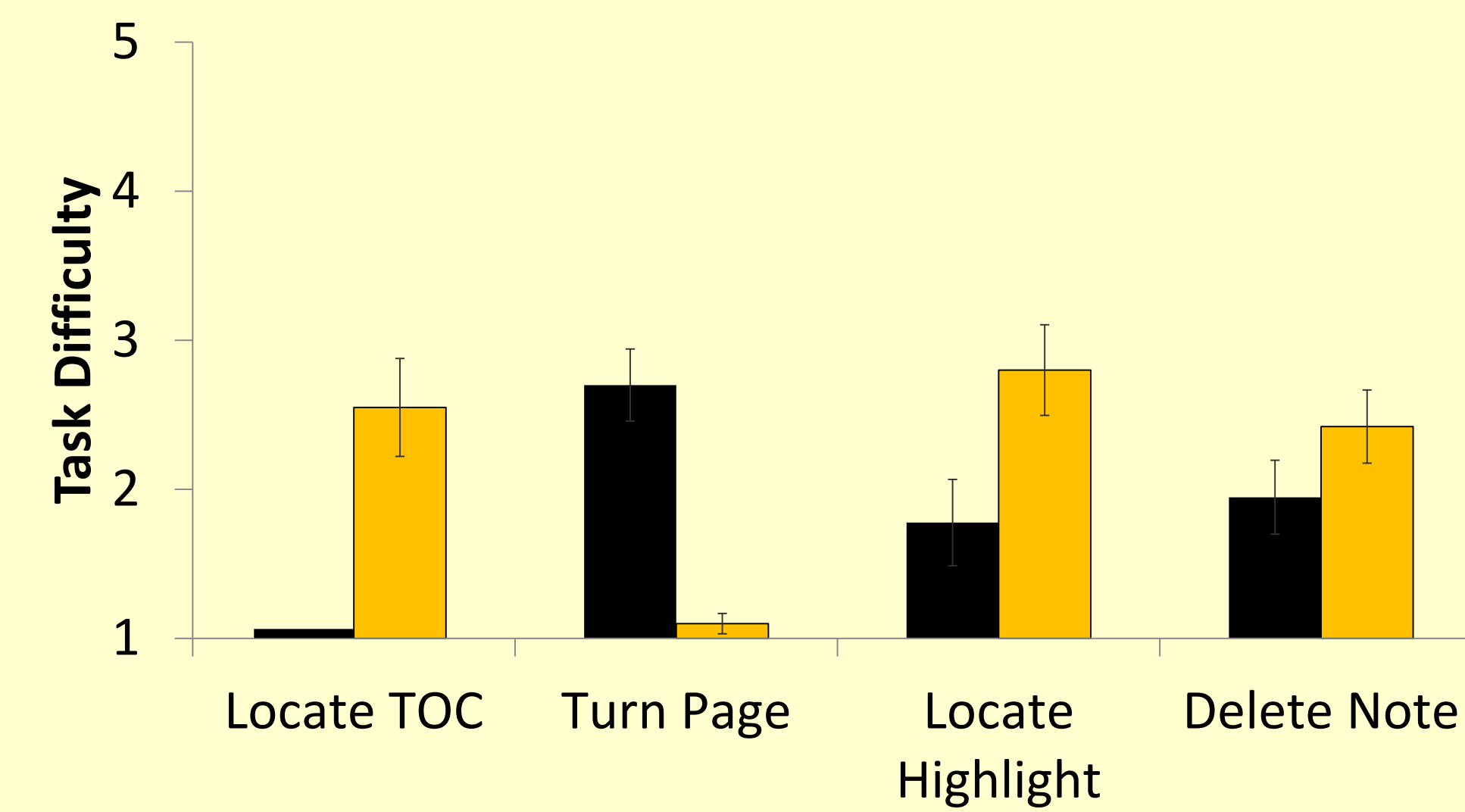


Figure 2. Average difficulty rating per task per app.

Engagement

Participants rated Inking higher on endurance and novelty.

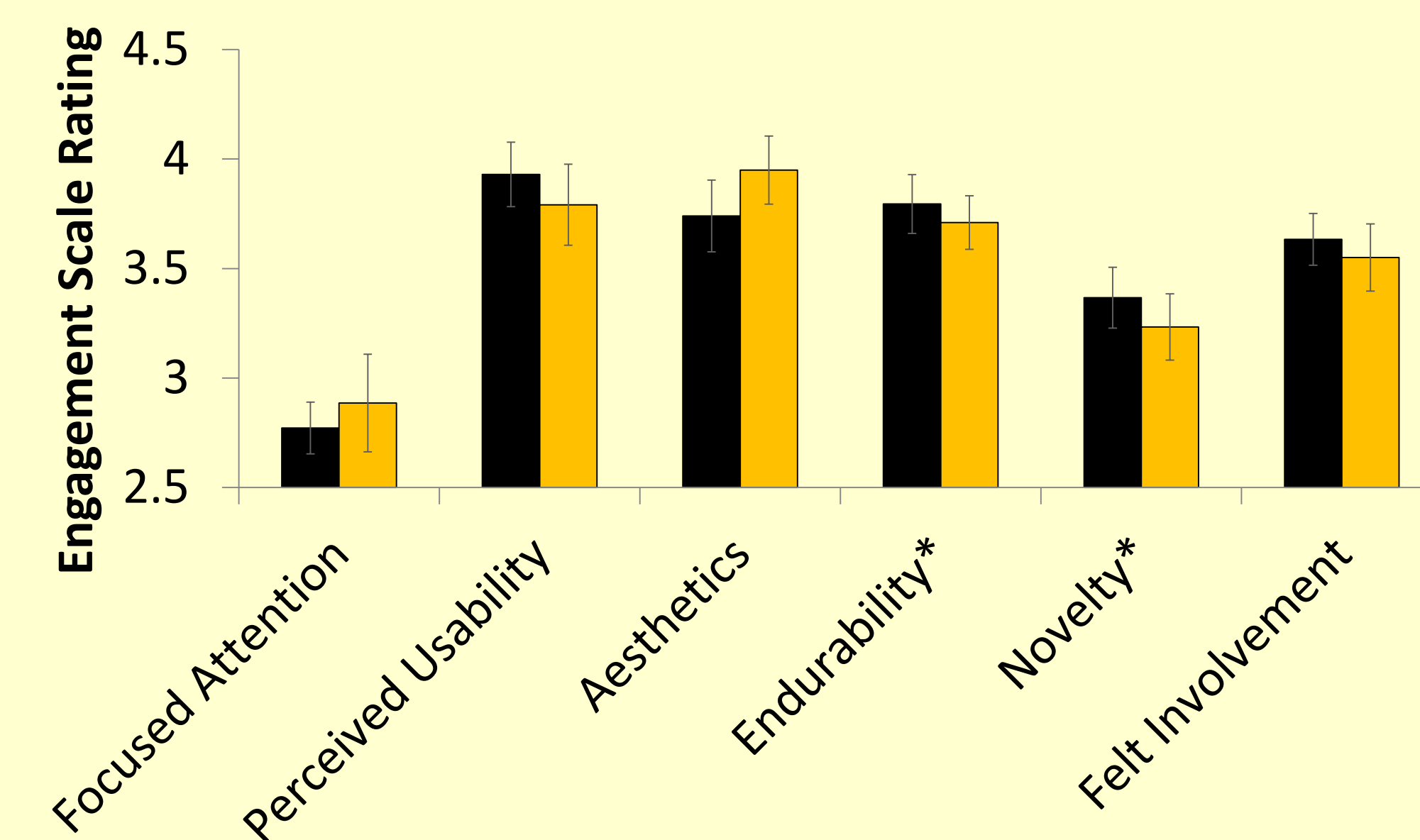


Figure 3. Average engagement scale rating per app.

Workload

Participants reported the Inking to require less mental effort and resulted in better performance.

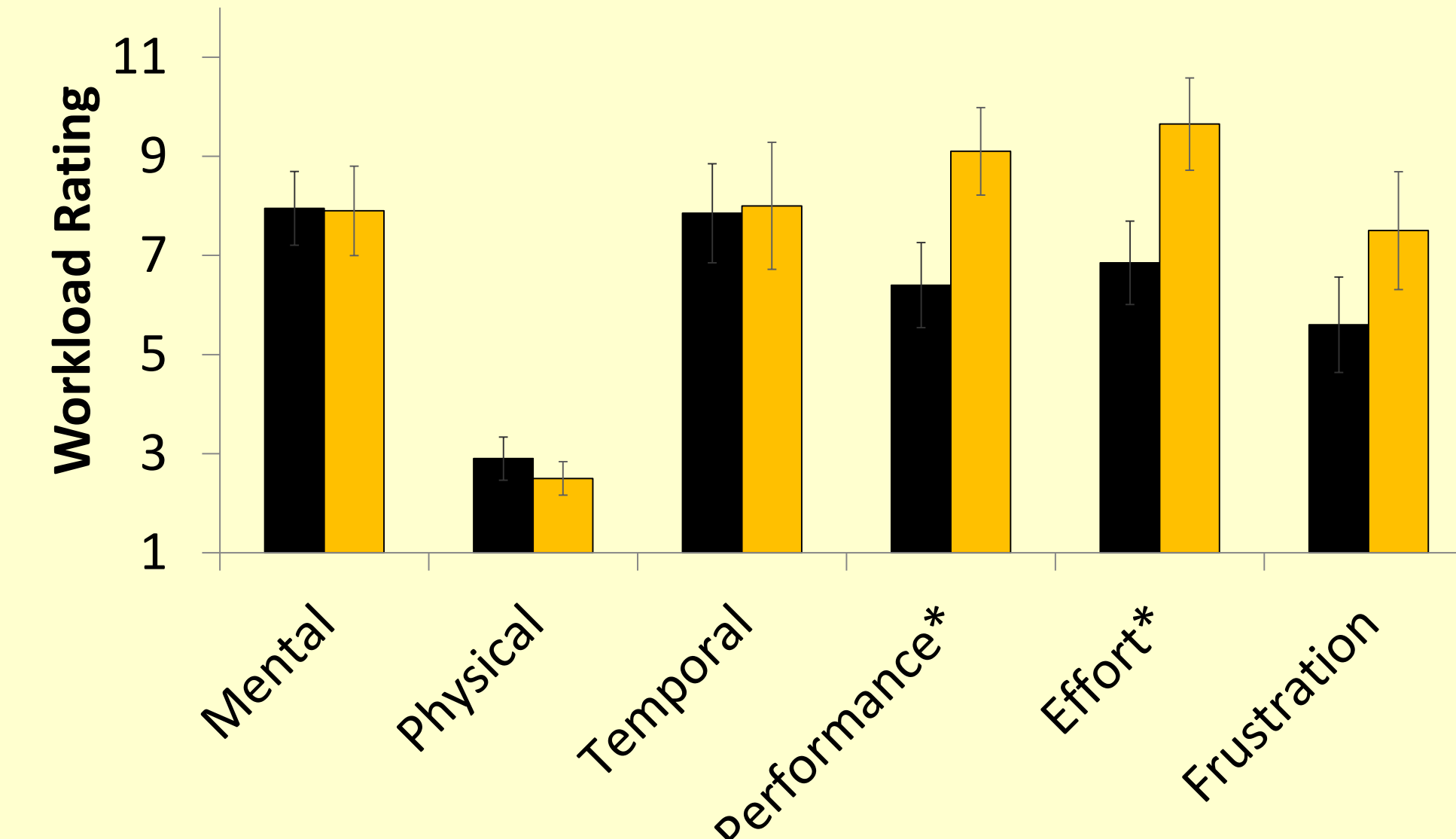


Figure 4. Average workload rating per app.

Task Success

- Inking: More success locating a section and TOC, changing the text size, and searching.
- Kindle: More success turning pages and bookmarking.

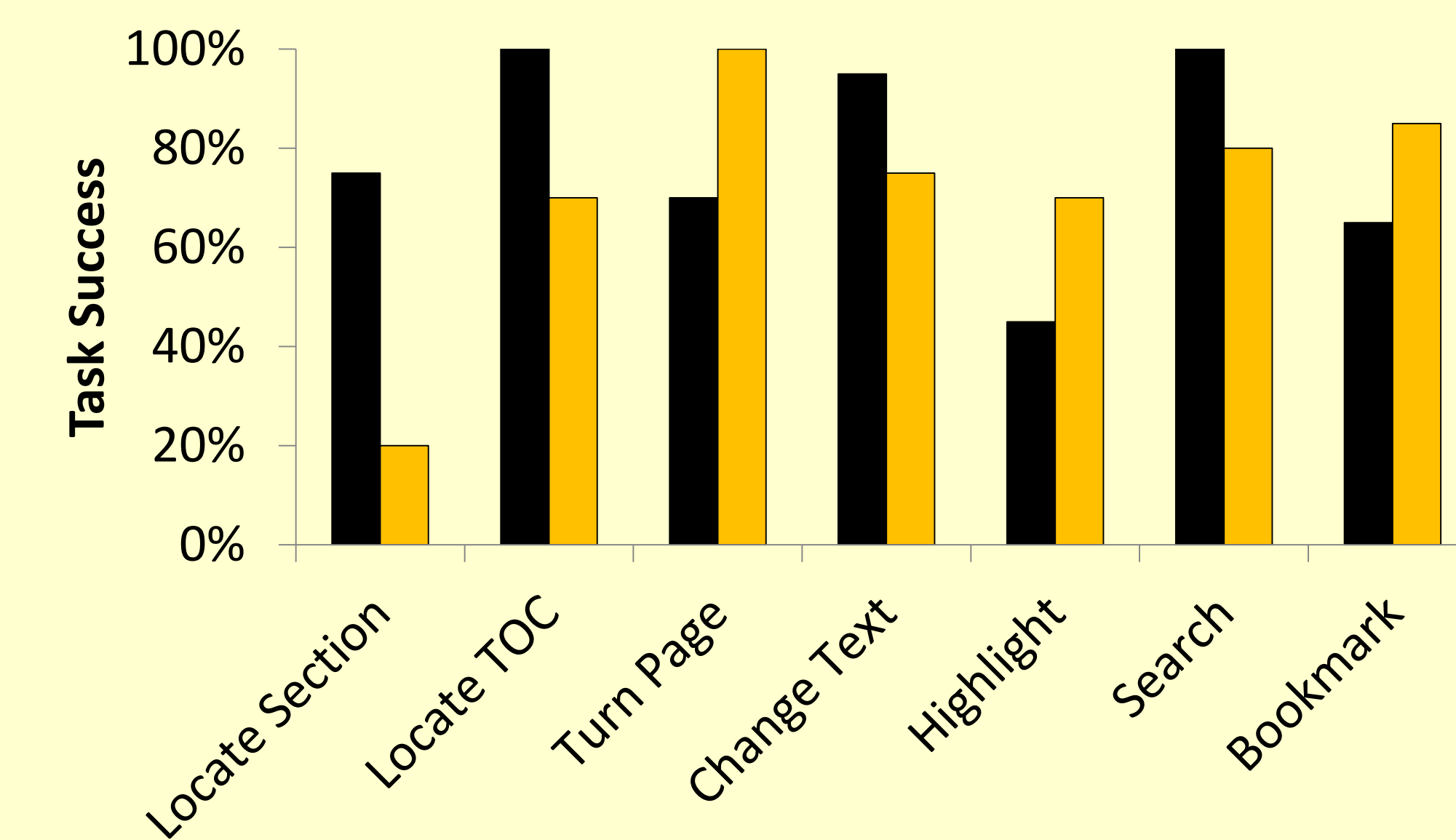


Figure 5. Percentage of successful task completion.

E-Textbook Features

- Highlight was the most used feature
 - Participants made more highlights on the Kindle ($M = 22$) than the Inking ($M = 6$)
- Search and notes were used frequently on both apps.
- Quiz and enlarging the vocabulary were more likely to be used on Inking

Satisfaction

- No significant difference between the apps.
 - Out of a total score of 100
 - Inking = 73.9 ($SD = 13.9$)
 - Kindle = 67.0 ($SD = 12.3$)

Post Comprehension Test Scores

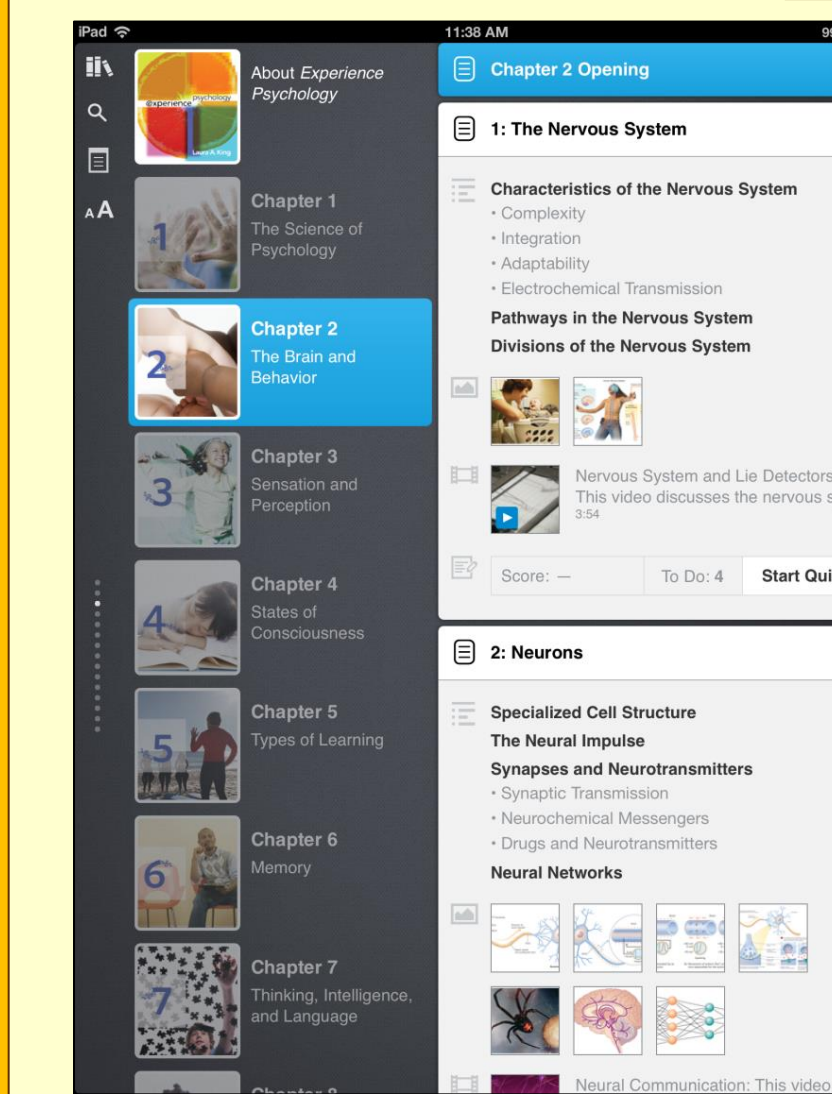
- No significant difference between the apps
 - Most participants improved from pre to post test regardless of the app used.

User-Friendliness

- Most participants rated the user-friendliness of the app as "Excellent" or "Good".

Discussion

Inking



Clearly defined sections made navigation easier on Inking.

Kindle

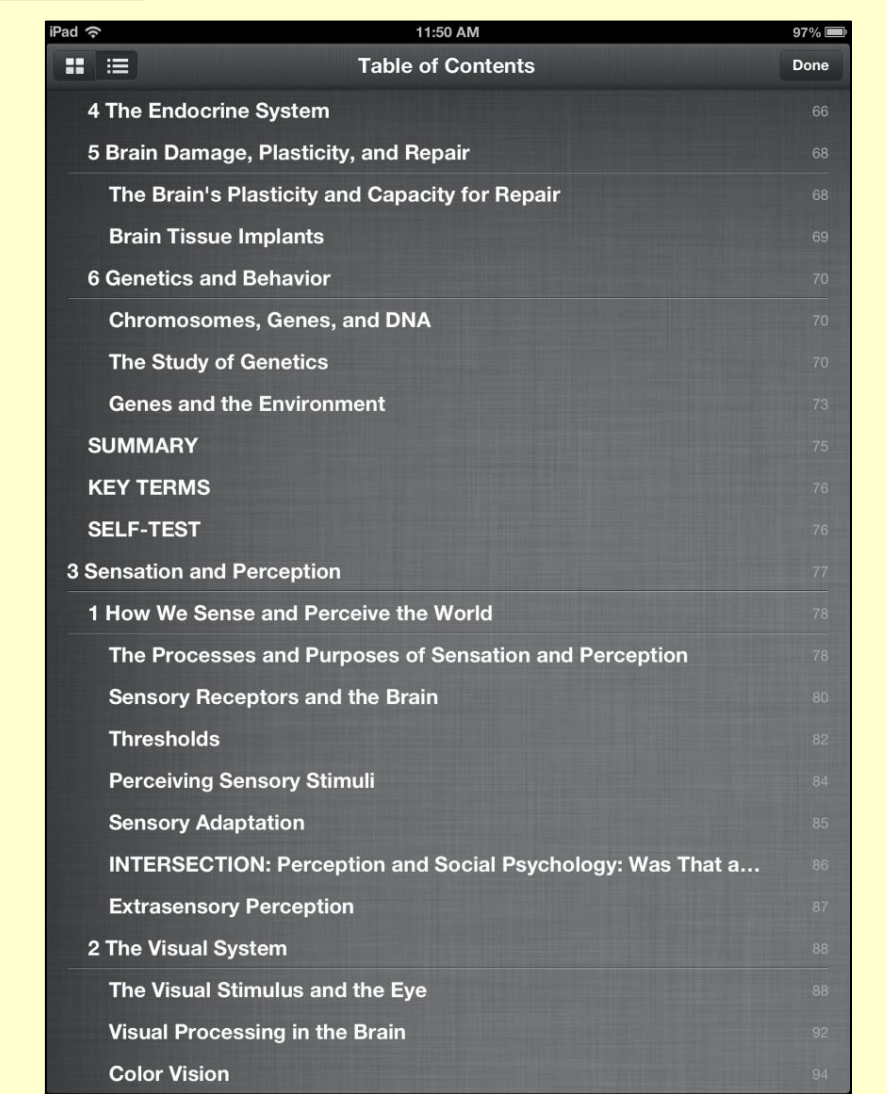
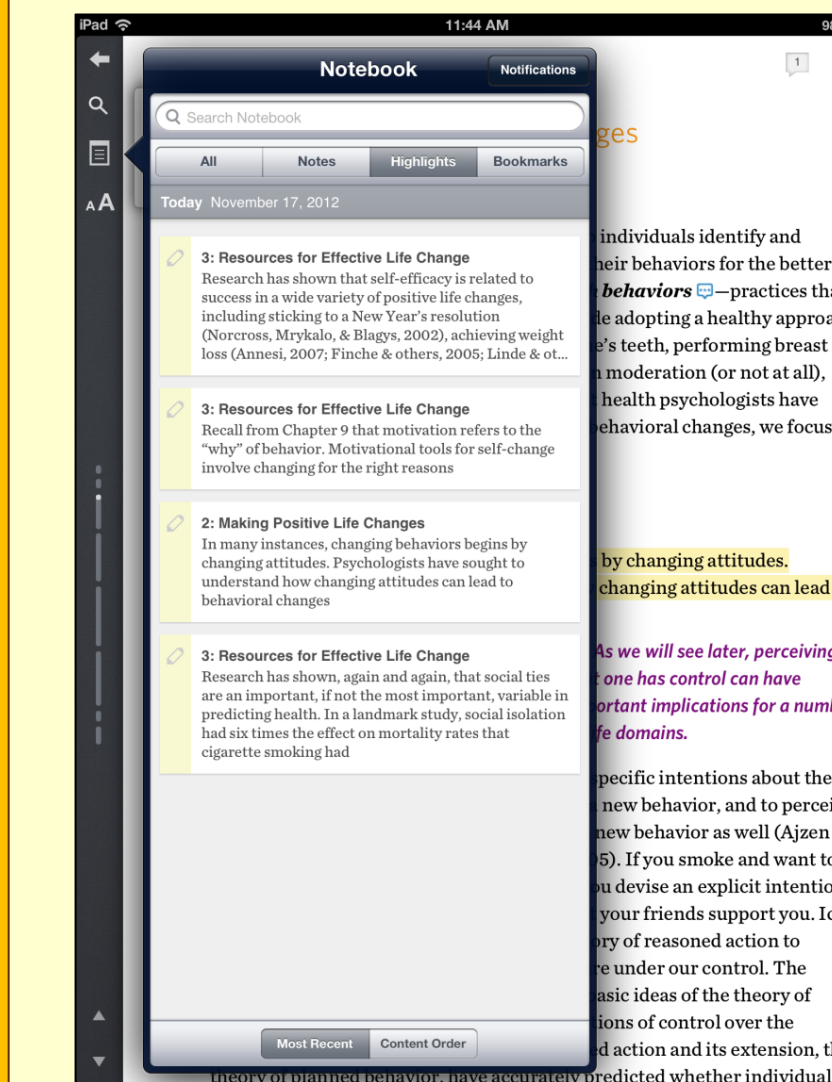
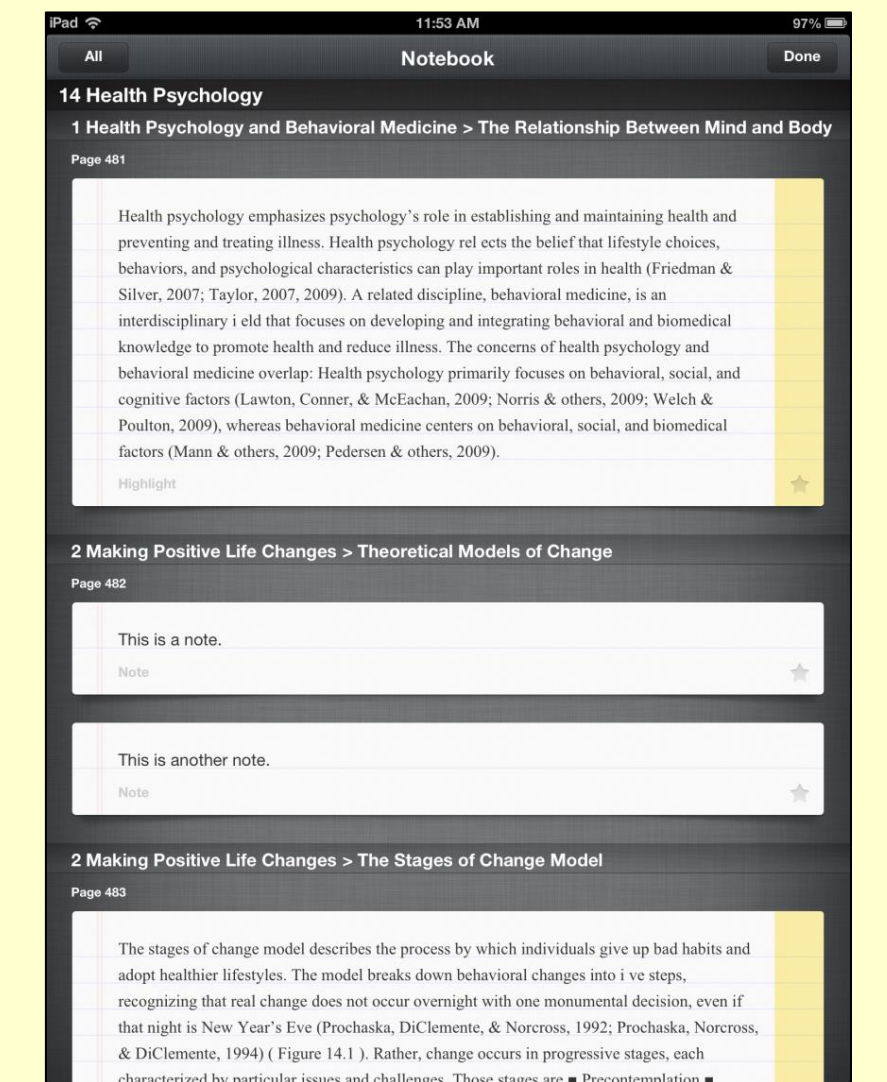


Table of Contents

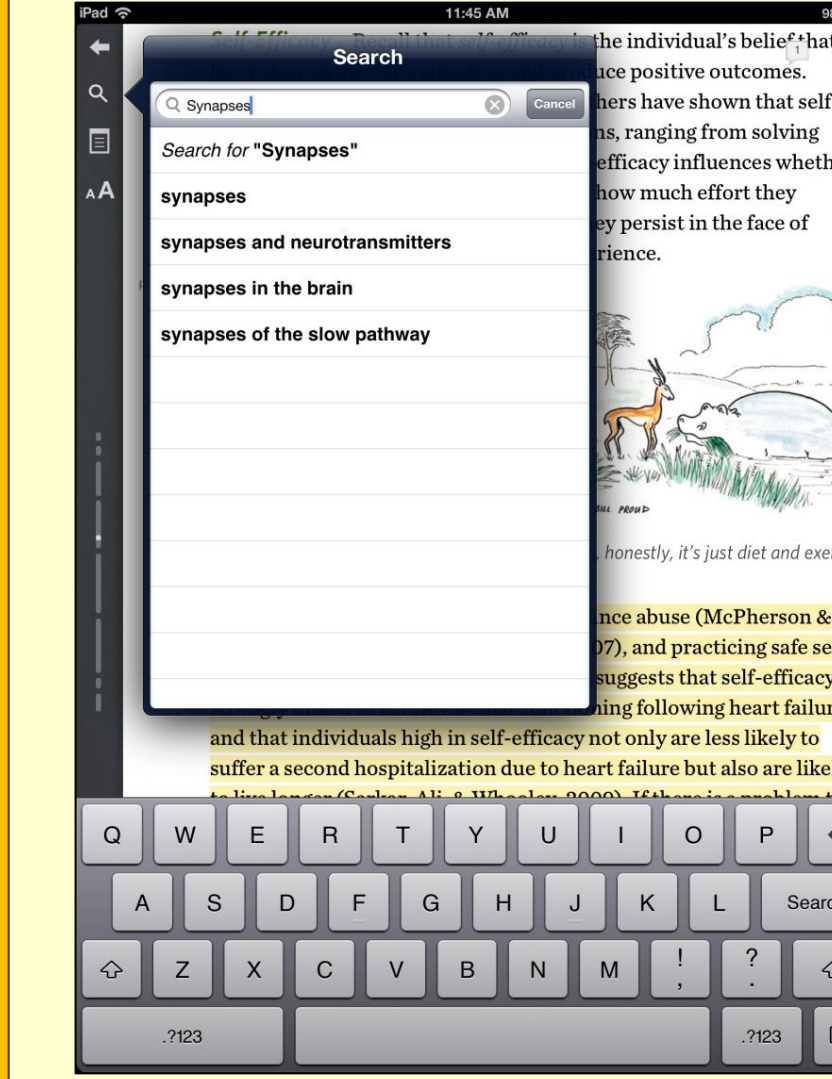
Locating Highlights



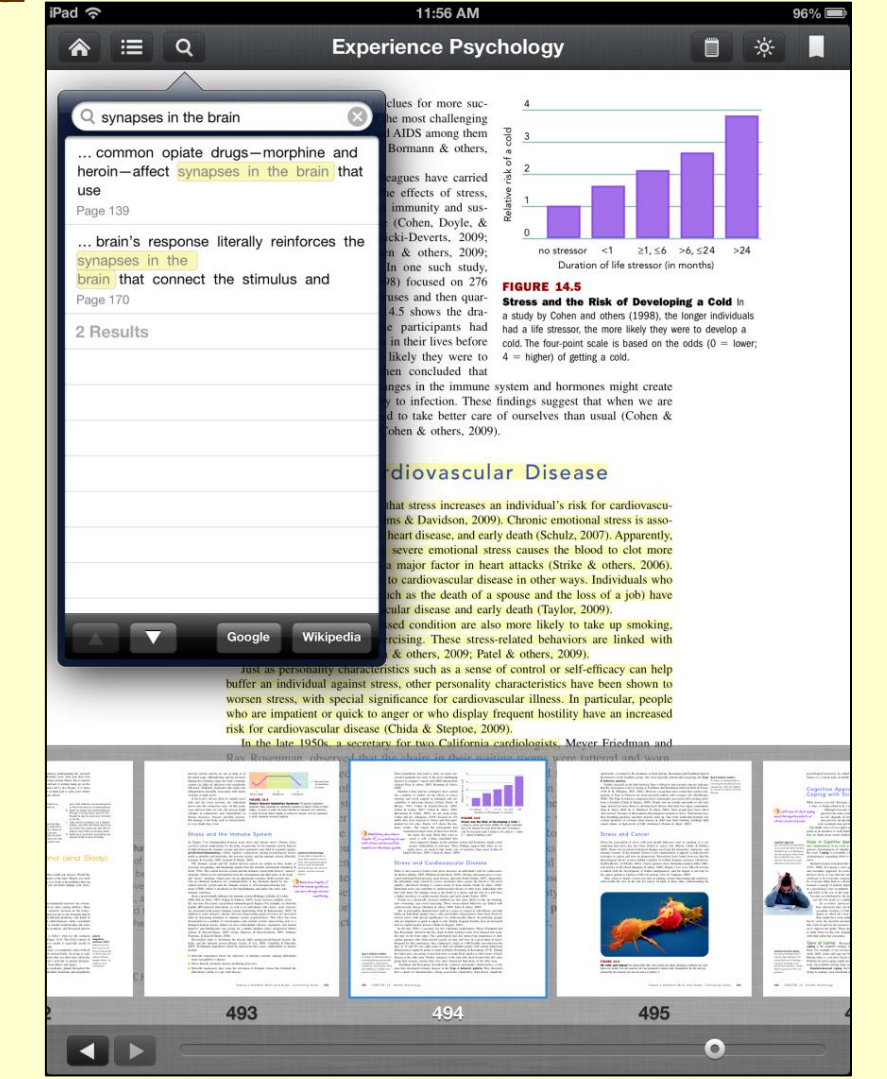
Division of markings made locating highlights easier on Inking.



Searching



The search feature was more sophisticated on Inking.



Measure	Inking	Kindle
Book Navigation	★	
Locating Highlight	★	
Turn Page		★
Delete Note		★
Bookmark		★
Performance	★	
Effort	★	
Searching	★	

Overall, participants liked using an e-textbook for studying. The Inking app proved to be the better app for e-textbook usage.