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NECESSARY FUNCTIONALITIES FOR TRADITIONAL AND ELECTRONIC ACTIVE LEARNING

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Abstract . *Reading is an active skill-based process of constructing meaning and/or gaining knowledge from oral, visual, and written text. It is a means of language acquisition, of communication, and of sharing information and ideas (wikipedia.org, 2009). People may read a book for their own reason such as reading for improve knowledge, or for entertainment. Reading frequently involves not just looking at words on a page, but also underlining, highlighting and commenting, either on the text or in a separate notebook. This combination of reading with critical thinking and learning is called active reading. Readers used to interact with printed document for greater understanding. However, reading on screen limits the interaction. Thus, certain aspects of book metaphor should be retained to allow readers to experience the same activities while reading on screen. However there are similarities and dissimilarities between necessary functionalities for traditional and electronic reading. This paper tries to determine necessary functionalities for both reading methods. The research framework involves two reading walkthroughs, and user surveys. After each reading walkthrough, respondents were required to answer a quiz and their assessment is recorded. The finding of this study is preferences of functionalities for traditional and electronic reading practices.*

Keywords: *active reading, reading, e-reading, functionalities*

1. Introduction

Active reading involves not just reading, but also underlining, highlighting and scribbling comments, either on the text itself or in a separate notebook. Readers use these marks to organize their reading for later review and retrieval. Furthermore, active reading often requires readers to move from one text to another to satisfy their information needs.

Paper reading practices normally involves annotating, highlighting, bookmarking, index searching and drawing. Some of these functionalities can easily be implemented into e-reading application, but the metaphor might not be the same. Thus, this paper tries to identify necessary functionalities for traditional and electronic reading in order to define which printed book metaphor should be retained to allow readers to experience the same activities while reading electronic document.

2. Reading functionalities

Functionalities for electronic reading are quite similar with the functionalities for traditional reading. However some metaphor might not be the same due to technical constraint of computer hardware. Listed below are some examples of reading functionalities.

2.1 Annotation

Annotation such as highlighting, labeling sticker or adding bookmarks are among normal reading activities (Norshuhada and Shahizan, 2004). Based on Rachel et al. (1999) also stated that another common form of annotation is underlining, highlighting, circling text or writing between lines. According to Schilit et al. (1998) reader often annotate directly on paper document while they are reading or write on removable post-it note or on slips of paper. Readers tend to scribble short comments in margin, draw asterisks to make an important statement, highlight, underline or circle key words or phrases (Levy & Marshall (1994) as cited by Schilit (1998). Hidi and Anderson (1986) as cited by Chin Yen Wang & Gwo Dong Chen (2004) indicate that writing summaries during reading process promotes cognition and learning. Annotation is also useful for future reading (Marshal 1997).

2.2 Searching

Searching is an important functionality for e-reading especially if it involve reading with specific task. Zing Liu (2005) claim that electronic media tend to be more useful for searching, while paper-based media are preferred for actual consumption of information with less searching activities.

2.3 Cutting, Copying and Pasting

This functionality is of great interest to the academic audience of e-books. This includes the ability to cut and paste portions of the e-text into other documents, as well as the added functionality of automatic creation of citations and bibliographies.

2.3 Navigating and Customizing

Navigation is the process of goal-directed locating and traversing hyperlinked information of electronic documents (Wikipedia.org). Navigation through software occurs at multiple levels such as among multiple windows, views, or pages, panes or frames within a window, view, or page, tools, commands, or menus, and within information displayed in a pane or frame for example scrolling, panning, zooming, and follow links (Cooper, A 2007). Customizing refers to the ability of users to modify the page layout or specify what content should be display (Wikipedia.org). Users may freely personalize their interface according to their needs.

3. Research framework

Figure 1 shows the research framework of this study. The framework used involves two sets of reading walkthroughs, quizzes and questionnaires in a controlled environment. Population of the study is undergraduate students of Universiti Utara Malaysia and respondents were selected using the convenience sampling method.

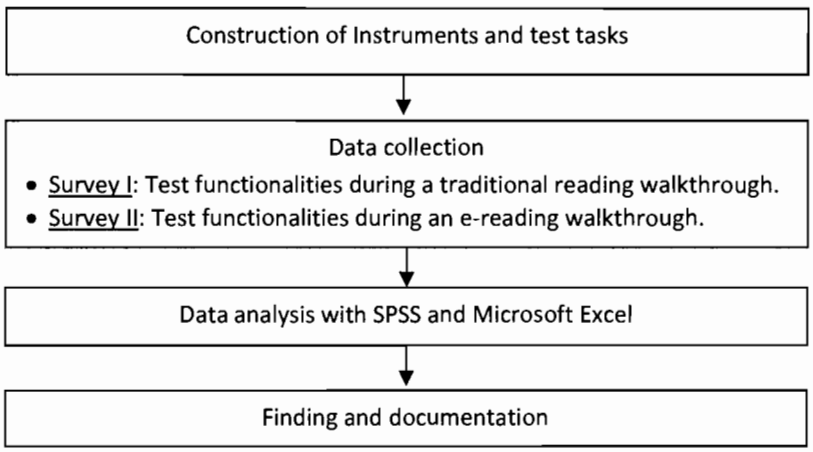

Figure 1. Research framework.

In Survey I, respondents were given nine pages of printed documents and reading materials likes highlighter, colourful pen, ruler, sticking note and labeling stickers. They read the whole documents for 40 minutes, and later did a quiz for another 30 minutes. During Survey II, respondents actively read nine pages of e-text on computer screen for 40 minutes, and later they were required to answer an open book quiz which took about 30 minutes.

4. Data analyses and findings

Table 1 shows profiles of respondents. From 36 respondents, 44.44% are males and 55.56% are females. 55.6% have previous computer experience between 1 to 5 years, another 36.11% have computer experience for 6 to 10 years, and the remaining 8.33% have used computer for more than 10 years. Respondents for the study are considered as expert users based on the following believes:

1. Reading, either traditionally or electronically, is a common task for all students.

2. These students read on computer screen frequently to search for information and carry out assignments as required by their program. They are equipped with robust computing skills due to they have taken at least 30 credits hours of Multimedia Computing courses and a minimum of a year computer experience.

Table 1. Respondent's profile

Background of respondents		Frequency	Percent
Gender	Male	16	44.44
	Female	20	55.56
Computer Experience	Less than a year	0	0.00
	1 - 5 years	20	55.56
	6 – 10 years	13	36.11
	more than 10 years	3	8.33

Data regarding respondents' reading behaviour was collected to identify category of user. Referring to Table 2, 77.78% respondents prefers traditional reading while only 22.22% declares to perform e-reading. This shows that even though more academic references are in electronic format, but readers prefer to print the electronic documents into hardcopies before continuing with reading activities.

Table 2. Reading background (gathered before reading walkthroughs)

Reading Background		Frequency	Percent
E-document Reading Pattern	print to hard copy	28	77.78
	perform e-reading	8	22.22
Previous experience of e-reading	yes	31	86.11
	no	5	13.89

Table 3 shows the reading pattern of the respondents. From 28 respondents, 12 of them carry out traditional reading activities weekly, and only 4 of them read daily. Meanwhile 17 out of 31 respondents perform e-reading activities daily and less of them read digital content at least once a week. This shows that majority of respondents perform e-reading on regular basis and practice traditional reading during leisure. So, it can be assumed that digital content reading has become the current culture among students.

Majority of respondents can read printed documents between two to three hours during a session, and most of them can only read digital content for less than an hour during a session. This fact indicates that even though most respondents practice traditional reading weekly, but they spend a longer time reading printed documents compared to e-documents. However, majority of respondents declared that they cannot read more than 3 hours at a time for both reading methods.

Table 3. Distribution of reading behaviour

		Traditional		E - reading	
		Frequency	Percent	Frequency	Percent
Reading frequency	occasionally	5	13.89	3	8.33
	monthly	7	19.44	2	5.56
	weekly	12	33.33	9	25.00
	daily	4	11.11	17	47.22
	Total	28	77.78	31	86.11
	Missing	8	22.22	5	13.89
Reading duration	below 1 hour	12	33.33	17	47.22
	2 - 3 hours	14	38.89	12	33.33
	4 - 5 hours	2	5.56	1	2.78
	Total	28	77.78	30	83.33
	Missing	8	22.22	6	16.67

Figure 2 shows comparison between traditional reading functionalities and e-reading functionalities. The pattern of data is quite difference between traditional reading and e-reading. This proves that students reading behaviour changes according to which method currently employed.

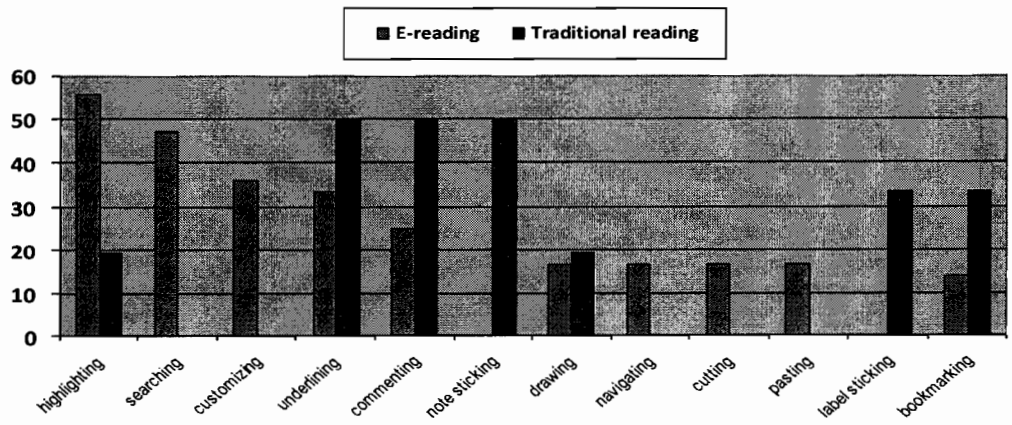

Figure 2. Distribution of reading functionalities usage

Based on Figure 2, list of functionalities of traditional reading arranged in most important to least important functionalities are highlighting (58.33%), commenting, note sticking and underlining (50%), label sticking and bookmarking (33.33%), and drawing (19.44%). Meanwhile, functionalities for e-reading arranged in the same

order are highlighting (55.56%), searching (47.22%), display customizing (36.11%), underlining (33.33%), commenting (25%), drawing, navigating, cutting or copying and pasting (16.67), and bookmarking (13.89%).

With the intention of measuring respondents' active reading performance, they were given two separate reading exercises which required them to perform intensive reading for 40 minutes and then answering a particular quiz. For traditional reading, most respondents preferred highlighting (97.22%) functionality, followed by underlining (80.56%), commenting (58.33%), note sticking (27.78%), label sticking (11.11%), and lastly drawing (5.56%) as shown in Figure 3. Minimum score for the first quiz is zero and the maximum score is four over total of five marks. The mean of score is 1.75. This information can be referred in Table 4.

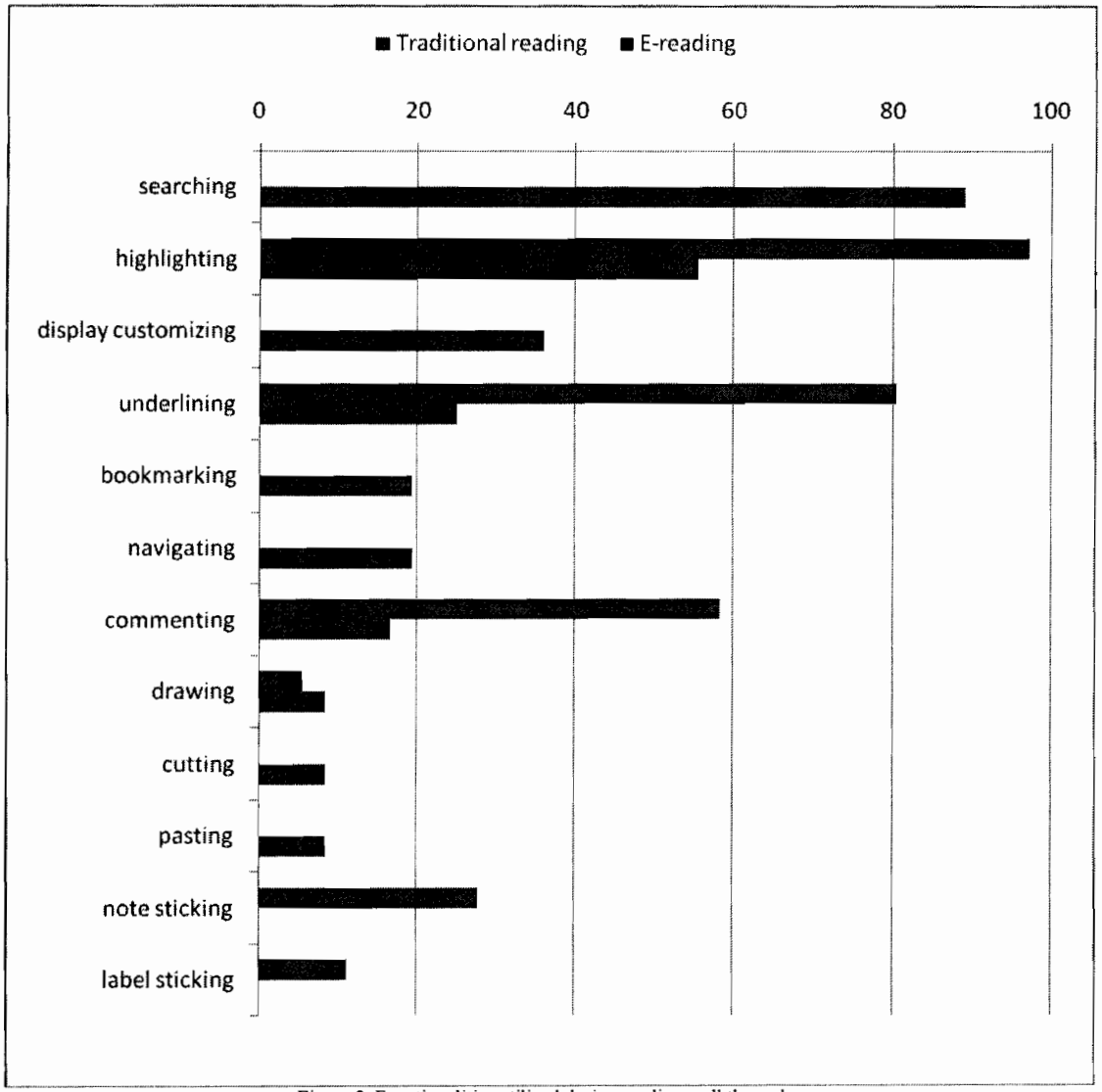

Figure 3. Functionalities utilized during reading walkthroughs

As for e-reading exercise with an e-document shows that respondents favoured searching (88.89%), highlighting (55.56%), display customizing (36.11%), underlining (25.00%), bookmarking and navigating (19.44%), commenting (16.67%), and lastly drawing, cutting and pasting (8.33%). Table 4 shows that minimum score of the second quiz is one and the maximum score is five over total of five marks. The mean of score is 3.69 which are extremely higher than the first quiz of traditional reading. This proves that reading method does not give much implication on active reading.

Table 4. Quizzes assessments

		Traditional reading (36)	E-reading (36)
Marks	Mean	1.75	3.69
	Minimum	0	1
	Maximum	4	5

Table 5 shows respondents' opinion of their preferable reading method after they have gone through the e-reading walkthroughs. 38.89% respondents claim to keep on reading printed documents and only 13.89% choose to read on screen. The remaining of 47.22% respondents is flexible and willing to read using both methods. This result proves that even though computing technology has provide alternatives to reading methods, traditional reading remains the most preferable reading method.

Table 5 Preferable Reading Method (gathered after reading walkthroughs)

Preferred Reading Method	Frequency	Percent
Printed document	14	38.89
On screen	5	13.89
Both	17	47.22

4. Conclusion

This study has proven that the necessary functionalities for traditional active reading are highlighting, commenting, note sticking, underlining, label sticking, bookmarking, and drawing in respective order from the most necessary to the least. Meanwhile, the necessary functionalities for digital content active reading are highlighting, searching, display customizing, underlining, commenting, drawing, navigating, cutting, pasting, and bookmarking in the same order. Interestingly, the list of necessary functionalities does change according to the current specific reading task goal, constraint or even software based reader in use at the moment.

However, this study was scoping to academic references only. Reading practices for entertainment purposes with different types of reading materials may differ from the result carried out in this study.

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