

## Chapter 5 Results and Discussion

### 5.1 Descriptive Statistics

#### 5.1.1 Participant Characteristics

Table 5.1 shows the results of the general characteristics for all the participants.

This data was collected prior to the computer experiment. Raw data for each of the participants are presented in Appendix for all of the participants.

Table 5.1 Participants Background

Variable	Type	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Gender	M	6	60	8	80	5	50	6	60
	F	4	100	2	20	5	50	4	40
Age	18	0	0	1	10	0	0	0	0
	19	0	0	2	20	0	0	0	0
	20	2	20	0	0	2	20	2	20
	21	2	20	1	10	1	10	2	20
	22	0	0	1	10	2	20	2	20
	23	0	0	1	10	0	0	0	0
	24	0	0	1	10	0	0	1	10
	25	2	20	0	0	4	40	2	20
	26	1	10	2	20	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	2	20	1	10	0	0	1	10
	29	1	10	0	0	0	0	0	0
32	0	0	0	0	1	10	0	0	
Education	1	0	0	2	20	0	0	0	0
	2	3	30	1	10	0	0	1	10
	3	1	10	3	30	3	30	4	40
	4	3	30	1	10	1	10	1	10
	5	0	0	1	10	1	10	0	0
	6	3	30	1	10	3	30	3	30
	7	0	0	0	0	2	20	1	10
	8	0	0	1	10	0	0	0	0

Table 5.1 Participants Background (continued)

Variable	Type	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Major	1	0	0	1	10	0	0	1	10
	2	3	30	7	70	4	40	2	20
	3	2	20	1	10	5	50	2	20
	4	3	30	1	10	0	0	3	30
	5	0	0	0	0	1	10	0	0
	6	2	20	0	0	0	0	1	10
Cell Phone	Y	10	100	9	90	10	100	10	100
	N	0	0	1	10	0	0	0	0
Cell Phone Experience	<1	2	20	6	60	0	0	1	10
	<2	1	10	0	0	2	20	2	20
	<3	2	20	1	10	2	20	2	20
	<4	2	20	1	10	2	20	2	20
	<5	1	10	1	10	1	10	1	10
	<6	1	10	0	0	3	30	3	30
	<7	1	10	0	0	0	0	0	0
	>7	0	0	1	10	0	0	0	0
PDA	Y	3	30	0	0	0	0	0	0
	N	7	70	10	100	10	100	10	100
PDA Experience	0	8	70	0	0	0	0	0	0
	<1	1	10	0	0	0	0	0	0
	>1	1	10	0	0	0	0	0	0
Online shopping	Y	4	40	5	50	7	70	2	20
	N	6	60	5	50	3	30	8	80
E-shopping Experience	0	6	60	4	40	4	40	7	70
	<1	1	10	3	30	2	20	1	10
	<2	1	10	2	20	2	20	1	10
	<3	1	10	1	10	1	10	1	10
	<4	1	10	0	0	0	0	0	0
	>4	0	0	0	0	1	10	0	0
Mobile shopping	Y	4	40	2	20	2	20	3	30
	N	6	60	8	80	8	80	7	70

## 5.2 Reliabilities of Measures

Table 5.2. Descriptive Statistics in Desktop Computer experiment

Treatment Conditions		Wholist-Imager (N= 10)		Wholist-Verbal (N= 10)		Analytic-Imager (N= 10)		Analytic-Verbal (N= 10)		
Variables	Task	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	
Performance	3	15.42	17.87	12.2	5.67	16.13	22.51	8.47	4.02	
Time (sec)	4	43.381	37.41	29.64	16.26	35.54	13.91	19.17	12.63	
	5	28.5	17.89	41.97	35.86	26.01	19.72	38.06	39.67	
	6	24.52	11.65	60.19	53.72	34.03	22.96	34.5	18.36	
	7	127.2	72.12	106.73	33.51	102.74	47.1	114.25	43.97	
	8	30.65	16.51	63.98	60.7	46.56	34.75	57.77	43.04	
	9	131.67	43.74	156.77	81.59	148.96	47.75	114.94	59.98	
	10	28.16	28.72	29.27	24.65	21.21	25.08	36.03	64.69	
	Total		429.53	130.52	500.76	224.08	431.18	105.8	423.18	92.36
	Error rate	3	0.6	0.7	0.5	0.97	0.3	0.48	0.1	0.32
		4	3.2	3.77	1	1.76	1.5	1.43	1.4	3.27
5		1	1.89	0.1	0.8	0.4	1.26	0.2	0.042	
6		1	1.57	0.32	1.47	0.7	1.89	1.1	1.6	
7		8.9	10.72	2.7	2.21	5.3	2.63	5.3	4.87	
8		5	0.97	2.2	3.36	1.4	2.17	1.7	1.89	
9		17.2	7.00	12.2	8.77	18.5	2.88	16.7	8.68	
10		2.3	3.23	1.4	2.8	0.4	0.97	1.3	2.26	
Total			34.7	18.29	20.9	10.322	28.5	5.44	27.8	10.4
Total steps			103.7	17.32	93.6	17.21	96.4	5.83	95.1	10.32
Mental Workload		57	17.51	52.3	21.38	53.2	21.24	46.6	17.32	
Disorientation		53.3	8.35	51.2	9.02	55.5	7.59	60.9	7.37	
Satisfaction		61.1	15.47	60.2	10.12	64.6	7.88	67.1	11.86	

Question 2, 5, 8, 10, 12, and 14 of the satisfaction questionnaire are used to determine the participants' overall satisfaction with performing the required tasks on the computer and the PDA. The internal consistency for the 7-item measure is determined using Cronbach's Alpha calculation for all the participants. The reliability of the satisfaction questionnaire is 0.776. The reliability of the disorientation

questionnaire is 0.7748 for the disorientation questionnaire.

Table 5.3 Descriptive Statistics in Handheld experiment

Treatment Conditions		Wholist-Imager (N= 10)		Wholist-Verbal (N= 10)		Analytic-Imager (N= 10)		Analytic-Verbal (N= 10)		
Variables	Task	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	
Performance Time (sec)	3	15.42	17.87	12.2	5.67	16.13	22.51	8.47	4.02	
	4	43.38	37.41	29.64	16.26	35.54	13.91	19.17	12.63	
	5	28.5	17.89	41.97	35.86	26.01	19.72	38.06	39.67	
	6	24.52	11.65	60.19	53.72	34.03	22.96	34.49	18.36	
	7	127.22	72.12	106.73	33.51	22.96	47.1	114.25	43.97	
	8	30.65	16.51	63.98	60.7	46.56	34.75	57.77	43.04	
	9	131.67	43.74	156.77	81.59	148.96	47.75	114.94	59.98	
	10	28.16	28.7	29.27	24.65	21.21	25.08	36.03	64.69	
	Total		925.97	575.7	1110.31	525.6	702.43	285.13	750.4	250.83
	Error	3	16.3	25.14	34.4	26.01	13.5	19.92	12.9	13.63
4		3	5.37	5.2	13.23	0.2	0.42	1.9	5.67	
5		1	1.33	0.8	1.87	0.8	1.48	0.6	0.97	
6		2.5	4.06	3.8	7.18	1.1	2.81	0.8	2.2	
7		0.4	0.7	1	2.21	1.6	2.68	2.5	4.06	
8		0.9	1.6	1	1.15	1.1	1.6	2.9	3.73	
9		6.6	5.64	9.3	3.92	6.1	3.7	5.6	5.1	
10		1.4	3.27	0.2	0.63	0.5	1.27	0	0	
Total			32.1	29.1	55.7	39.77	24.9	21.18	27.2	22.7
Total steps			100.2	30.54	124.7	39.92	94.1	20.77	92.5	23.06
Mental Workload		68.5	15.72	54.2	17.83	59.00	18.48	65.7	14.21	
Disorientation		49.6	9.13	50.1	8.1	50.6	9.86	49.6	10.94	
Satisfaction		58.2	16.32	58.8	10.12	62.4	11.5	58.00	9.02	

Descriptive statistics of the experiment including means ( $\bar{X}$ ) and standard deviation (SD) for different cognitive styles and devices are summarized in Table 5.2 and Table 5.3.

### 5.3 Normality and Homogeneity Testing

Before testing the hypotheses, all collected data were checked for model adequacy for statistical analyses. The assumption for normality was tested with the Shapiro-Wilk's test using the NORMAL option in the UNIVARIATE procedure of the SAS software (Schlotzhauer, 1987). The test statistics,  $W$ , is given from the output of the UNIVARIATE procedure. Small values of  $W$  indicate that data are not a sample from a normal distribution. Probability value labeled  $Prob < W$  describes how doubtful the idea of normality is. Probability values very close to zero indicate the data not a sample from a normal distribution. The assumption for homogeneity of variance was tested with the Barlett's test (Montgomery, 1991). The data was transformed if model adequacy did not hold. Nonparametric analysis was conducted for because model adequacy was not held after transformation. The variables for the computer and for the handheld device with or without transformation are summarized in Table 5.4 and Table 5.4.

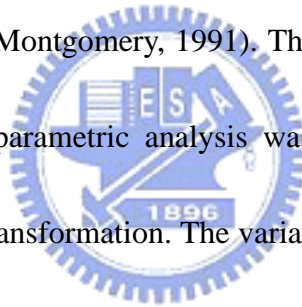


Table 5.4 Transformation Table for Collected Data of the Computer Experiment

Variable	Computer
Performance time(computer time)	nonparametric
Error (computer error )*	nonparametric
Disorientation (computer lost)	computer lost

<b>Sum of the total steps (computer steps)*</b>	<b>nonparametric</b>
<b>Satisfaction (computer Satis)</b>	<b>computer Satis</b>

\*: none of the transformation satisfied the assumption hence nonparametric analysis was used for this variable.

Table 5.5 Transformation Table for Collected Data of the Handheld Device Experiment

<b>Variable</b>	<b>Handheld Device</b>
<b>Performance time ( pda total time)</b>	<b>Log (pda total time)</b>
<b>Error (pda error )</b>	$\sqrt{(pdaerror + 1)}$
<b>Mental Workload (pda mental)*</b>	<b>nonparametric</b>
<b>Disorientation (pda lost)</b>	<b>pda lost</b>
<b>Sum of the total steps (pda steps)</b>	<b>Log (pda steps)</b>
<b>Satisfaction (pda Satis)</b>	<b>pda satis</b>

\*: none of the transformation satisfied the assumption hence nonparametric analysis was used for this variable.

## 5.4 Testing of Hypotheses

### 5.4.1 Testing of Hypothesis One

The intention of this hypothesis was to examine how Wholist and Analytic cognitive styles influence the online shopping performance using computer. It was hypothesized in this study that the Wholist participants on the computer would perform better in browsing than Analytic participants. The examination of the satisfaction, mental workload, and total steps in Table 5.6 for the computer indicated

that significant difference was only found in disorientation between the Wholist and Analytic participants. Hypothesis one is partially supported that significant difference was found in disorientation between the Wholist and Analytic participants while there were no significant difference found in error, satisfaction, mental workload, and total steps. Furthermore, the group mean of disorientation for the Wholist participants with the computer was (MEAN= 54.4000, SD= 7.8499), that is 3% smaller than that committed by the Analytic participants. (MEAN= 56.0500, SD= 9.4338).

Table 5.6 Data for Testing Hypothesis One

Variables	Wholist (N=20)		Analytic (N=20)		F	P
	$\bar{x}$	SD	$\bar{x}$	SD		
Performance time (sec)	430.36	115.64	461.97	171.49	Z=-0.10	0.09
Error	31.6	13.52	24.35	10.69	Z=-1.20	0.21
Satisfaction	62.85	12.08	63.65	11.3	1.99	0.17
Mental workload	55.1	19.04	49.45	19.16	0.6	0.45
Disorientation	54.4	7.85	56.05	9.43	5.38	0.02
Total steps	100	13.12	94.35	13.83	Z= -2.13	0.48

#### 5.4.2 Testing of Hypothesis Two

It was hypothesized that the Imager participants using computer would have better online shopping performance than Verbal participants. The examinations of the satisfaction, mental workload, and disorientation results in Table 5.7 with the computer indicate that no significant differences were found for the Imager participants and Verbal participants. There was no significant difference in performance time and total steps between Imager participants and Verbal participants

with the computer. In summary, Hypothesis Two was not supported.

Table 5.7 Data for Testing Hypothesis Two

Variables	Verbal (N=20)		Imager (N=20)		F	P
	$\bar{x}$	SD	$\bar{x}$	SD		
Performance time (sec)	465.14	182.18	427.18	96.75	Z=-.11	0.91
Error	27.8	16.10	28.15	8.09	Z=-1.71	0.09
Satisfaction	60.65	12.73	65.85	9.88	0.05	0.20
Mental workload	54.65	19.17	49.90	19.16	0.84	0.36
Disorientation	52.25	8.53	58.20	7.79	0.41	0.32
Total steps	98.65	17.59	95.75	8.19	Z=-1.33	0.18

### 5.4.3 Testing of Hypothesis Three

The intention of this hypothesis was to examine how different cognitive styles, such as Wholist-Analytic dimensions, will influence the browsing performance of the participants for different cognitive styles dimension using handheld devices. It was hypothesized in this study that the Wholist dimension participants using handheld devices would obtain better browsing performance than those Analytic participants. The results of total steps in Table 5.8 indicated that there was significant difference (F=1.55, p=0.0445) between the Wholist participants and Analytic participants.



The number of total steps committed by the Analytic participants with the handheld device was (MEAN=93.3000, SD=21.3766) 17% smaller than that committed by the Wholist participants (MEAN=112.4500, SD=36.8060). Hypothesis Three was partially supported that the Wholist participants performed better in terms of error rate and total steps than the Analytic participants with the handheld device.

Table 5.8 Data for Testing Hypothesis Three

Variables	Wholist (N=20)		Analytic (N=20)		<i>F</i>	<i>P</i>
	$\bar{x}$	<i>SD</i>	$\bar{x}$	<i>SD</i>		
Performance time (sec)	1018.14	544.79	726.41	262.53	2.56	0.12
Error	43.90	36.01	26.05	21.40	3.60	0.06
Satisfaction	58.50	13.22	60.20	10.31	0.25	0.66
Mental workload	61.35	17.93	62.35	16.40	Z=-0.08	0.94
Disorientation	49.85	8.41	50.10	10.15	0.01	0.93
Total steps	112.45	36.81	93.30	21.38	1.55	0.04

#### 5.4.4 Testing of Hypothesis Four

It was hypothesized in this study that the Imager dimension participants on the computer would obtain better browsing performance than those Verbal dimensions with the handheld device. The examinations of the satisfaction, performance time, disorientation, total steps, and error results in Table 5.9 indicated that no significant differences between the Verbal participants and the Imager participants with the handheld device. In summary, Hypothesis Four was not supported.

Table 5.9 Data for Testing Hypothesis Four

Variables	Verbal (N=20)		Imager (N=20)		F	P
	$\bar{x}$	SD	$\bar{x}$	SD		
Performance time (sec)	930.35	441.30	814.19	456.79	2.56	0.29
Error	41.45	34.74	28.50	25.04	2.26	0.14
Satisfaction	58.40	9.34	60.30	13.91	0.25	0.62
Mental workload	59.95	16.76	63.75	17.39	Z=-.623	0.53
Disorientation	49.85	9.37	50.10	9.26	0.01	0.93
Total steps	108.6	35.77	97.15	25.61	1.55	0.22

## 5.5 Discussion of Browsing tools


There are respectively ten tasks in the computer experiment and the handheld device experiment, and eight out of each ten tasks are searching tasks. Participants were provided three search tools on the testing Web sites in the experiments. Their usage of browsing tools had been observed and recorded by the researcher. Table 5.10 shows the frequency of searching tool usage for the computer tasks and Table 5.11 shows that for the handheld device tasks.

For the Wholist-Imager participants using computer, the mean of sitemap search is the highest (5.9). It means the Wholist-Imager participants use sitemap search most

frequently than the other two browsing tools. Also, the mean of the Wholist-Verbal participants is the highest (1.8), which implies that the Wholist-Verbal participants use the sitemap most frequently.

For the Analytic-Imager participants using computer, the mean of drop-down menu search (1.08) most frequently than the other two browsing tools. Then, the mean of the Analytic-Verbal participants is the highest (2.40), which indicates that the Analytic-Verbal participants use the sitemap most frequently.

Table 5.10 Frequency of searching tool usage for computer tasks



	<b>Key word search</b>		<b>Drop down search</b>		<b>Sitemap search</b>	
	<b>MEAN</b>	<b>SD</b>	<b>MEAN</b>	<b>SD</b>	<b>MEAN</b>	<b>SD</b>
<b>Wholist-Imager</b>	0.70	.48	2.10	0.88	5.90	9.49
<b>Wholist-Verbal</b>	1.30	1.34	1.50	1.43	1.80	4.32
<b>Analytic-Imager</b>	0.90	0.57	1.80	0.92	0.40	1.26
<b>Analytic-Verbal</b>	0.80	0.79	1.80	1.23	2.40	5.46

Table 5.11 Frequency of searching tool usage for PDA tasks

	Key word search		Drop down menu		Sitemap search	
	MEAN	SD	MEAN	SD	MEAN	SD
<b>Wholist-Imager</b>	<b>0.50</b>	<b>0.48</b>	<b>1.50</b>	<b>2.10</b>	<b>6.30</b>	<b>9.49</b>
<b>Wholist-Verbal</b>	<b>0.70</b>	<b>1.34</b>	<b>1.30</b>	<b>1.43</b>	<b>4.40</b>	<b>4.32</b>
<b>Analytic-Imager</b>	<b>0.70</b>	<b>0.57</b>	<b>1.40</b>	<b>0.92</b>	<b>1.60</b>	<b>1.26</b>
<b>Analytic-Verbal</b>	<b>0.40</b>	<b>0.79</b>	<b>1.50</b>	<b>1.23</b>	<b>2.00</b>	<b>5.46</b>

For Wholist-Imager participants using handheld devices, the mean of sitemap search is the highest, 6.3, which means the Wholist-Imager participants use sitemap search most frequently than the other two browsing tools. And, the mean of the Wholist-Verbal participants is the highest, (4.4), which implies that the Wholist-Verbal participants use the sitemap most frequent. It is noticeable that the results of Wholist dimension participants' in the handheld device experiment are the same as those in the computer experiment.

For the Analytic-Imager participants using handheld devices, the mean of sitemap is the highest (1.6), which implies that the Analytic-Imager participants use the sitemap most frequently. Then, for the Analytic-Verbal participants, the mean of the drop down menu is the highest (1.5), which implies that the Analytic-Imager

participants use the drop down menu most frequently.

Furthermore, both with computers and handheld devices, key word search was the least frequently used search tool. It is implied that the participants may considered the keyword search much complicated than the other browsing tools. Moreover, the structure of the two experimental websites is simple, thus the need to use keyword search is limited. Third, with the handheld device, the fact that all the participants were novice users of handheld devices and stylus may prohibit them from using keyword search.

## **5.7 General Discussion**



According to the previous statistical results for the hypotheses and other analyses, the detailed and supplemental discussions are represented as follows.

### **5.7.1 Discussion of Hypothesis One**

Based on the results of Hypothesis One, significant difference in disorientation was found between Wholist participants and Analytic participants. Sternberg and Zhang (2001) indicated that the Wholist regards a situation as a whole and are able to have an overall perspective, and to appreciate its total context. However, the analytic see a situation as a collection of parts and often focus on one or two aspects of the situation at a time to the exclusion of the others. The larger display of computer may

be fit for the Wholist participants It is likely that they understand the whole structure of the computer website more easily than the Analytic participants. The results of the Hypothesis One were consistent with the Sternberg and Zhang’s viewpoints and conclusions.

Furthermore, other dependent variables, such as errors, total steps, satisfaction, and mental workload, are not significantly different between the Wholist participants and the Analytic participants. It is implied that the selection of browsing tools would be a key issue for the result. Based on Table 5.12, the sitemap was used more frequently by the Wholist than the Analytic participants. Due to the frequent use of sitemap, the Wholist took more steps in conducting computer tasks.



Table 5.12 Results of Testing Hypothesis One

<b>Dependent Variable</b>	<b>Wholist-Analytic</b>	<b>Results</b>
<b>Total time</b>	---	
<b>Total error</b>	---	
<b>Number of Total Steps</b>	---	
<b>Satisfaction</b>	---	
<b>Disorientation</b>	<b>Wholist &gt;Analytic</b>	<b>The less disorientation the</b>

participants get, the better they will perform in the experiment.

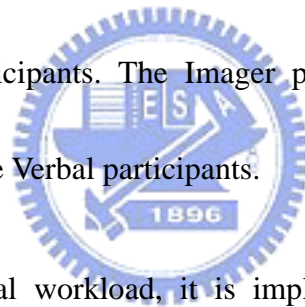
Mental workload

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### 5.7.2 Discussion of Hypothesis Two

The results of Hypothesis Two are shown in Table 5.13 that significant difference in total error was found between the Imager participants and the Verbal participants. Also, it is found that the Imager participants used fewer total steps in the computer experiment than Verbal participants. The Imager participants took fewer steps to conduct the same task than the Verbal participants.



For the results of mental workload, it is implied that mental workload is a multidimensional variable and can be affected by many factors, which is worthwhile to study further to affect mental workload. Also, no significant differences in performance time and total steps were found between the Imager and Verbal participants. It implies that the content of computer shopping websites may be more beneficial for the Verbal participants.

Table 5.13 Results of Testing Hypothesis Two

<b>Dependent Variable</b>	<b>Imager-Verbal</b>	<b>Results</b>
<b>Total time</b>	---	
<b>Total error</b>	<b>Imager &gt; Verbal</b>	<b>The fewer errors the participants make, the better they will perform in the experiment.</b>
<b>Number of Total Steps</b>	---	
<b>Satisfaction</b>	---	
<b>Disorientation</b>	---	
<b>Mental workload</b>	---	



### **5.7.3 Discussion of Hypothesis Three**

The results of testing Hypothesis Three are shown in Table 5.14 that the significant difference in error was found between the Wholist participants and the Analytic participants. The Analytic participants took fewer steps for the handheld device tasks than the Wholist. Due to low computing capacity of the handheld device, the content of the shopping web site was reduced.



Table 5.14 Results of Testing Hypothesis Three

Dependent Variable	Wholist-Analytic	Results
<b>Total time</b>	---	
<b>Total error</b>	---	
<b>Number of Total Steps</b>	<b>Analytic &gt; Wholist</b>	<b>The fewer steps the participants use, the better they will perform in the experiment.</b>
<b>Satisfaction</b>	---	
<b>Disorientation</b>	---	
<b>Mental workload</b>	---	

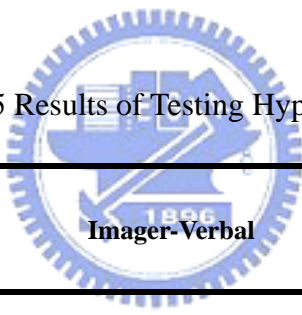


However, if the computing capacity of handheld devices would be upgraded, the participants may conduct the experiment faster, as well as fewer errors. Also, the results of other two dependent variables, mental workload, disorientation, and satisfaction might be different. Mental workload consisted of six different categories. If the participants were familiar with the handheld device, the results of time demand and physical demand might have been lower.

#### 5.7.4 Discussion of Hypothesis Four

The results of testing Hypothesis Four are shown in Table 5.15. The fact that no significant difference was found can be explained as following. First, due to low computing capacity of the handheld device, the content of the shopping web site was reduced. Also, the unfamiliarity of the handheld device could affect the performance of the participants. Almost all participants had no experiences in using the handheld device before.

Table 5.15 Results of Testing Hypothesis Four



Dependent Variable	Imager-Verbal	Results
Total time	---	
Total error	---	
Number of Total Steps	---	
Satisfaction	---	
Disorientation	---	
Mental workload	---	

### 5.7.5 Discussions for Different Task Types

- The Computer Experiment

The purpose of the computer experiment is to investigate how the cognitive styles influence the participants' browsing performance on shopping websites. Four types of tasks were designed: searching, purchasing, booking, and comparing the prices of the products, with two tasks to conduct for each type.

As shown in Table 5.16, no significant difference in the performance time for the four different task types was found. It is implied that the interface of booking task should add one unobvious hyperlink embedded with the title of the travel package, which might benefit with the Analytic participants who specialized in dealing with the detailed cues in hypertext. Thus, the designers should minimize the unobvious hyperlink so that the participants will enhance the motivation to purchase services or products the service on shopping websites.

In Table 5.17, the performance time of the searching type ( $F=5.58$ ,  $p=0.0237$ ) and the purchasing type ( $F=4.97$ ,  $p=0.0322$ ) was found significantly different between the Imager and the Verbal participants. No significant differences in the error of the four task types were found. The mean number of the performance time of the searching task conducted by the Imager participants is (MEAN = 55.2400, SD= 34.4977) 37% larger than that of the Verbal participants (MEAN= 34.7395, SD= 17.4441).

Concerning the second task, the mean number of the performance time of the second task type committed by the Imager participants is (MEAN= 56.5310, SD=24.9370) 35% larger than that of the Verbal participants (MEAN= 87.3595, SD= 56.9940), which indicated that the Verbal participants spend less time than the Imager participants for purchasing on the shopping Web site.



Table 5.16 The results of time and Error for Wholist-Analytic participants in the computer experiment

		Wholist (N=20)		Analytic(N=20)		F	P
		Mean	SD	Mean	SD		
<b>Time</b>	<b>Searching,</b>	<b>50.33</b>	<b>33.82</b>	<b>39.65</b>	<b>22.62</b>	<b>1.51</b>	<b>0.23</b>
	<b>Purchasing,</b>	<b>77.59</b>	<b>55.91</b>	<b>66.30</b>	<b>34.31</b>	<b>0.67</b>	<b>0.42</b>
	<b>Booking,</b>	<b>164.29</b>	<b>73.16</b>	<b>160.66</b>	<b>54.53</b>	<b>0.03</b>	<b>0.86</b>

	<b>Price comparison</b>	<b>172.94</b>	<b>73.14</b>	<b>160.57</b>	<b>60.16</b>	<b>0.33</b>	<b>0.57</b>
	<b>Searching,</b>	<b>3.65</b>	<b>3.22</b>	<b>2.65</b>	<b>2.43</b>	<b>1.28</b>	<b>0.27</b>
	<b>Purchasing,</b>	<b>2.45</b>	<b>2.01</b>	<b>2.20</b>	<b>1.82</b>	<b>0.17</b>	<b>0.68</b>
<b>Error</b>	<b>Booking,</b>	<b>8.15</b>	<b>8.17</b>	<b>7.85</b>	<b>4.70</b>	<b>2.93</b>	<b>0.09</b>
	<b>Price comparison</b>	<b>17.50</b>	<b>8.80</b>	<b>19.45</b>	<b>6.55</b>	<b>0.02</b>	<b>0.89</b>



Table 5.17 The results of time and Error for Imager-Verbal participants in the computer experiment

		<b>Imager (N=20)</b>		<b>Verbal(N=20)</b>		<b>F</b>	<b>P</b>
		<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>		
<b>Time</b>	<b>Searching,</b>	<b>55.24</b>	<b>34.50</b>	<b>34.74</b>	<b>17.44</b>	<b>5.58</b>	<b>0.02</b>
<b>e</b>	<b>Purchasing,</b>	<b>56.53</b>	<b>24.94</b>	<b>87.36</b>	<b>56.99</b>	<b>4.97</b>	<b>0.03</b>
	<b>Booking,</b>	<b>153.58</b>	<b>61.77</b>	<b>171.37</b>	<b>65.96</b>	<b>0.74</b>	<b>0.40</b>

	<b>Price comparison</b>	<b>165.01</b>	<b>54.42</b>	<b>168.50</b>	<b>77.98</b>	<b>0.03</b>	<b>0.87</b>
	<b>Searching,</b>	<b>3.80</b>	<b>3.00</b>	<b>2.50</b>	<b>2.63</b>	<b>2.16</b>	<b>0.15</b>
	<b>Purchasing,</b>	<b>2.55</b>	<b>2.24</b>	<b>2.10</b>	<b>1.52</b>	<b>0.54</b>	<b>0.47</b>
<b>Erro</b>							
<b>r</b>	<b>Booking,</b>	<b>9.05</b>	<b>7.84</b>	<b>6.95</b>	<b>5.02</b>	<b>1.47</b>	<b>0.23</b>
	<b>Price comparison</b>	<b>20.15</b>	<b>5.81</b>	<b>16.8</b>	<b>16.8</b>	<b>1.00</b>	<b>0.32</b>

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- The Handheld Device

As shown in Table 5.18, it is indicated that significant difference in performance time of the first task type was found between the Wholist participants and the Analytic participants. The mean number of the performance time of the first task type conducted by the Wholist with the handheld device is (MEAN= 420.1000, SD= 396.6473) 56.4% larger than that of the Analytic participants (MEAN= 183.0530, SD= 162.0475). The Analytic participants spend less time on searching on the shopping web site using handheld devices than the Wholist participants.

Table 5.18 The results of time and Error for Wholist-Analytic participants in the handheld device experiment

		Wholist (N=20)		Analytic(N=20)		F	P
		Mean	SD	Mean	SD		
Time	Searching,	420.10	396.65	183.05	162.05	6.16	0.01
	Purchasing,	187.03	278.50	119.48	92.60	1.03	0.32
	Booking,	107.20	40.59	161.81	141.53	2.77	0.10
	Price comparison	303.80	232.36	262.06	183.77	0.38	0.54
Error	Searching,	30.45	31.14	15.25	17.08	3.8	0.05
	Purchasing,	5.05	6.11	2.60	3.22	2.41	0.13
	Booking,	2.65	2.06	5.05	5.92	2.93	0.09
	Price comparison	9.75	5.87	7.10	4.22	2.59	0.12

Table 5.19 The results of time and Error for Imager-Verbal participants in the handheld device experiment

		Imager (N=20)		Verbal (N=20)		F	P
		Mean	SD	Mean	SD		
Time	Searching,	249.53	272.67	353.62	364.85	1.19	0.28

	<b>Purchasing,</b>	<b>180.16</b>	<b>289.44</b>	<b>126.34</b>	<b>56.95</b>	<b>0.65</b>	<b>0.43</b>
	<b>Booking,</b>	<b>123.97</b>	<b>47.19</b>	<b>145.06</b>	<b>144.18</b>	<b>0.41</b>	<b>0.52</b>
	<b>Price comparison</b>	<b>260.54</b>	<b>123.93</b>	<b>305.34</b>	<b>268.82</b>	<b>0.44</b>	<b>0.51</b>
	<b>Searching,</b>	<b>17.50</b>	<b>22.00</b>	<b>28.20</b>	<b>28.97</b>	<b>1.88</b>	<b>0.18</b>
<b>Erro r</b>	<b>Purchasing,</b>	<b>3.70</b>	<b>4.35</b>	<b>3.95</b>	<b>5.64</b>	<b>0.03</b>	<b>0.88</b>
	<b>Booking,</b>	<b>3.00</b>	<b>3.16</b>	<b>4.70</b>	<b>5.55</b>	<b>1.47</b>	<b>0.23</b>
	<b>Price comparison</b>	<b>8.30</b>	<b>5.72</b>	<b>8.55</b>	<b>4.81</b>	<b>0.02</b>	<b>0.88</b>

Moreover, results in Table 5.18 indicate that significant differences in the error of the first and the third task type were found between the Wholist participants and the Analytic participants. Then, the mean number of error of the first task type conducted by the Wholist participants using handheld devices is (MEAN=30.45, SD= 31.137) 50% larger than that of the Analytic participants (MEAN= 15.25, SD= 17.0812), which implied that the Wholist participants make more errors when searching on shopping websites using handheld devices than the Analytic participants. Also, the mean number of error of the third task type made by the Wholist participants using handheld devices is (MEAN= 2.65, SD= 2.059) 48 % smaller than that of the Analytic



participants (MEAN=5.05, SD= 5.916). The results implied that the Wholist participants make fewer errors on searching and booking on shopping websites using handheld devices than the Analytic participants.

As shown in Table 5.19, no significant differences were found in performance time and error for all the task types for the Imager and the Verbal participants.

