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CHAPTER 6. RESULTS AND ANALYSIS

6.1 Introduction

In Chapter 4, the research model and a set of hypotheses were developed. To test the hypotheses, this research employed an experiment, which best explains causal relationships in the model. Chapter 5 presented the process of the experimental study, which involved three stages: (1) the development of the instrument, (2) the main experiment, and (3) statistical analysis. This chapter describes the results of the statistical analysis of the instrument pilot test and that of the main experiment.

This chapter begins with the results of the instrument pilot test, which involved three main analyses: (1) a factor analysis for unidimensionality, (2) the corrected-total correlation analysis for construct validity, and (3) Cronbach's alphas for scale reliability. The following section describes the results of each analysis in detail, and the final instrument is presented.

The last section of this chapter explains the results of the experiment, which involved assumption testing and hypothesis testing. As a series of variance and linear regression analysis were applied, the assumptions of the statistical methods were tested. Then, the results of the hypothesis tests are reported in three parts: (1) Web site typology and social interaction, (2) moderator effects of Web literacy, and (3) social interaction and communication effects.

6.2 Results of the Instrument Pilot Test

6.2.1 Descriptive Statistics

The descriptive statistics for the pilot test are displayed in Table 6.1. The pilot test sample (n = 37) was made up of 57% females and 43% males. Most were full-time (95%) and undergraduate (62%) students. The age of participants ranged from 19 to 35 years, while more than half (57%) were aged 21 – 25 years. As would be expected of members of this population, most had a high level of web literacy (i.e., the mean summated score on the scale, which had a maximum value of 28, was 22). Given these characteristics, it was concluded that the pilot test sample was reasonably representative of the population from which it was drawn.

Table 6.1 Distribution of Pilot Test Respondents

Parameter	Percentage
Sex	
Male	56.8
Female	43.2
Mode of Study	
Full-time	94.6
Part-time	5.4
Year Level	
Undergraduate	62.2
Postgraduate	37.8
Age[a]	
19-20	21.6
21-25	56.8
26-30	8.1
31-35	10.8
Web Literacy[b]	
4-7 (extremely low)	0
8-11	0
12-15	13.5
16-19 (moderate)	18.9
20-23	24.3
24-27	21.6
28 (extremely high)	21.6

Notes: [a]. Total 97.3%: 1 missing [b]. Total 97.7%: rounding error

6.2.2 Scale Unidimensionality

Table 6.2 shows the scales in the draft instrument. There were a total of 26 scale items in the questionnaire including social presence scales (5 items), perceived usefulness (5 items), perceived ease of use (5 items), attitude toward the Web site (7 items), and revisit intention (4 items). Each of these scales was examined in the pilot test.

Table 6.2 Web Acceptance Model Construct Measurement Scales

Construct	Code	Statement
Social Presence	A1	When exploring this web site, I felt that I got to know the people in the company.
	A2	This web site gives me a realistic impression of the company.
	A3	When exploring this web site, it felt like I was in personal contact with people in the company.
	A4	When exploring this web site, I felt good about the people in the company.
	A5	Exploring this web site was like being in a face-to-face meeting with people in the company.
Perceived Usefulness	B1	This web site would help me to search more quickly for information about personal computers to buy.
	B2	This web site would improve my search for information when buying a personal computer.
	B3	This web would make my search for information about personal computers more productive.
	B4	This web would make my search for information about personal computers more effective.
	B5	Overall, this web site would be useful for obtaining information about available products when buying a personal computer.
Perceived Ease of Use	C1	Learning to use this web site was easy for me.
	C2	I could easily get this web site to do what I wanted it to do.
	C3	This web site was straightforward and easy to understand.
	C4	It was easy for me to become skilled at using this web site.
	C5	Overall, I found this web site to be easy to use.
Attitude Toward the Web Site	D1	This is a good web site.
	D2	I like this web site.
	D3	This is an attractive web site.
	D4	This is an enjoyable web site.
	D5	The web site is pleasant to use.
	D6	This web site is recommendable to my friends.
	D7	Overall, this is a user-friendly web site.
Web Literacy	F1	How frequently do you access the web (e.g., to search for information)?
	F2	How familiar are you with the web?
	F3	How would you rate your level of usage of the web?
	F4	How confident are you with your ability to navigate the web?

(1) Social Presence

First, Pearson product moment correlation coefficients were computed and the significance values scanned (see Table 6.3). The results revealed that the correlation coefficients between items A1 and A2, A1 and A4 were less than 0.3, which indicated they were seemed not suitable for factor analysis. Moreover, the significance value of the association between A1 and A4 was greater than 0.05, an unacceptable level (Coakes and Steed, 1999). A preliminary conclusion was that items A1, A2, and A4 were problematic and should be eliminated from the scales.

Table 6.3 Correlation Matrix for the Initial Social Presence Scale Items[a]

		A1	A2	A3	A4	A5
Correlation	A1	1.000	.274	.454	.152	.461
	A2	.274	1.000	.690	.653	.528
	A3	.454	.690	1.000	.526	.654
	A4	.152	.653	.526	1.000	.471
	A5	.461	.528	.654	.471	1.000
Sig. (1-tailed)	A1		.050	.002	.184	.002
	A2	.050		.000	.000	.000
	A3	.002	.000		.000	.000
	A4	.184	.000	.000		.002
	A5	.002	.000	.000	.002	

[a] Determinant = .117

For a more accurate judgment, further analyses were conducted. First of all, to examine whether the data set was appropriate for a factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Barlett's Test of Sphericity were utilised. As shown in Table A6.1 (Appendix 6), the KMO statistic showed 0.782 at a significance level of 0.001. Although a more rigorous cut-off point is 0.6 (Garson, 2001), generally the KMO measure should be greater than 0.5 (De Vaus, 1991; Field,

2000). In comparison with these cut-off levels, the KMO result was very high. Barlett's Test of Sphericity was also highly significant (chi-square = 71.9 with 10 degree of freedom, at $p < 0.001$). Therefore, it was concluded that a factor analysis of the scale items would be appropriate.

Next, the eigenvalue and the scree plot were investigated to determine the number of factors. An initial Principal Component Analysis for the five-item social presence scales generated one component with an eigenvalue of 2.996. As shown in Figure A5.1 (Appendix 5), the scree plot also identified one component resulting in a distinct break between the first component and other components (Gebotys, 2001).

Finally, factor loadings (component loadings in PCA) and communalities were investigated. Generally, factor loadings below 0.4 are considered low, and low-loading items should be suppressed (e.g., De Vaus, 1991; Field, 2000; Garson, 2001; Hair *et al*., 1995; Stevens, 1992). However, a more rigorous cut-off score is 0.6 (e.g., McCroskey and Young, 1979; Sankaranarayanan, Bhor, and Murawski, 2002). In this pilot study, the factor loading for item A1 (0.559) was slightly lower than the strict cut-off, but the other items were higher than 0.7 (see Table 6.4). Communality is also a useful measure for examining the interrelations between items. A good factor should have a minimum communality value of 0.4 (De Vaus, 1991; Field, 2000; Miles and Huberman, 1994). The result showed that, while communality values of most of the items exceeded the cut-off level, the value of A1 was below the generally accepted minimum of 0.4 (i.e., it was 0.313).

Clearly, the item A1 ("When exploring this Web site I felt that I got to know the people in the company") was unacceptable in that it was not well related to the other items in the scale, and so it was eliminated.

Table 6.4 Results of Factor Analysis for the Initial Social Presence Scale

Item	Factor Loadings	Communalities
A1	.559	.313
A2	.838	.702
A3	.878	.772
A4	.740	.548
A5	.813	.661

After reducing the scale to 4 items, the analysis was repeated. The correlations between the 4 items had coefficients of 0.471 and above (all were highly significant), a distinctly improved result (Table A5.2 in Appendix 5). The Principal Component Analysis extracted a single factor with an eigenvalue of 2.766 (this was also supported by the scree plot as shown in Figure A5.2). Furthermore, the KMO measure (0.764 with a significance of 0.001) and Bartlett's Test of Sphericity (chi-square = 61.7 with 6 degrees of freedom, a highly significant result) indicated that a factor analysis of the scale items would be appropriate. Factor loadings ranged from 0.792 to 0.869 as shown in Table 6.5 below. The communalities for all items were 0.627 and higher, a very satisfactory outcome. From this analysis it could therefore be concluded that the revised 4-item scale measuring social presence was unidimensional and represented a single concept.

Table 6.5 Results of Factor Analysis for the Revised Social Presence Scale

Item	Factor Loadings	Communalities
A2	.869	.756
A3	.869	.755
A4	.793	.627
A5	.792	.628

(2) Perceived Usefulness

The correlation matrix for the 5 scale items showed that the Pearson Product Moment correlation coefficients were all greater than 0.4, ranging from 0.465 to 0.768 (see Table A5.3 in Appendix 5) and all were highly significant (i.e., at the level $p < 0.01$). Both the KMO analysis (0.865, a highly significant result) and the Bartlett's test (chi-square = 119 with 10 degrees of freedom, highly significant) indicated that a factor analysis would be appropriate (see Table A5.1). The Principal Component Analysis generated one factor with an eigenvalue of 3.708, and the scree plot confirmed this (Figure A5.3). As shown in Table 6.6, the factor loadings of the items were 0.745 or higher, and the communalities ranged from 0.556 to 0.810 (i.e., showed that all items were highly inter-related). It was therefore concluded that the 5-item scale measuring the perceived usefulness of a Web site was unidimensional.

Table 6.6 Results of Factor Analysis for the Perceived Usefulness Scale

Item	Factor Loadings	Communalities
B1	.745	.556
B2	.886	.785
B3	.871	.758
B4	.900	.810
B5	.894	.800

(3) Perceived Ease of Use

As can be seen from Table A5.4 (Appendix 5), the correlation matrix for the 5 scale items showed that the Pearson Product Moment correlation coefficients were all greater than 0.4 (i.e., ranging from 0.448 to 0.783) and all were highly significant (at the level $p < 0.01$). Both the KMO analysis (0.836, a highly significant result) and the Bartlett's

test (chi-square = 107 with 10 degrees of freedom, highly significant) indicated that a factor analysis would be appropriate (see Table A5.1). The Principal Component Analysis generated one factor with an eigenvalue of 3.530, and the scree plot confirmed this (Figure A5.4). As can be seen from Table 6.7, the factor loadings of the items were 0.736 or higher, and the communalities ranged from 0.542 to 0.814. As a result, it was concluded that the 5-item scale measuring the perceived ease of use of a Web site was unidimensional.

Table 6.7 Results of Factor Analysis for the Perceived Ease of Use Scale

Item	Factor Loadings	Communalities
C1	.897	.804
C2	.808	.653
C3	.902	.814
C4	.736	.542
C5	.847	.717

(4) Attitude Toward the Web Site

The correlation matrix for the 7 scale items revealed some problems with this measure. As shown in Table 6.8, two of the correlations had coefficients of less than 0.3 (i.e., 0.262 and 0.148), and neither association was significant at the 0.05 level. At least one of the scale items seemed to be unacceptable. The KMO analysis (0.779, highly significant) and the Bartlett's test (chi-square = 131 with 21 degrees of freedom, highly significant) indicated that a factor analysis would be appropriate (see Table A5.1). An initial Principal Component Analysis of all scale items identified two components with eigenvalues of 3.956 and 1.174, a result which was confirmed by the scree plot (Figure A5.5). As can be seen from Table 6.9, communalities of all items were higher than the

cut-off level of 0.3. However, while the other items seemed sound, the factor loading of D7 (0.582) was very low. Thus, this analysis suggested that the scale was not unidimensional, and that the item D7 ("Overall, this is a user-friendly Web site") was problematic. That item was removed from the scale, and the analysis was repeated.

Table 6.8 Correlation Matrix for the Initial Attitude Toward the Web Site Scale Items[a]

		D1	D2	D3	D4	D5	D6	D7
Correlation	D1	1.000	.781	.406	.486	.358	.554	.262
	D2	.781	1.000	.412	.427	.407	.549	.148
	D3	.406	.412	1.000	.702	.708	.572	.483
	D4	.486	.427	.702	1.000	.498	.533	.324
	D5	.358	.407	.708	.498	1.000	.645	.582
	D6	.554	.549	.572	.533	.645	1.000	.380
	D7	.262	.148	.483	.324	.582	.380	1.000
Sig. (1-tailed)	D1		.000	.006	.001	.015	.000	.059
	D2	.000		.006	.004	.006	.000	.192
	D3	.006	.006		.000	.000	.000	.001
	D4	.001	.004	.000		.001	.000	.025
	D5	.015	.006	.000	.001		.000	.000
	D6	.000	.000	.000	.000	.000		.010
	D7	.059	.192	.001	.025	.000	.010	

[a]. Determinant = 1.865E-02

Table 6.9 Results of Factor Analysis for the Initial Attitude Toward the Web Site Scale

Item	Factor Loadings	Communalities
D1	.729	.827
D2	.709	.855
D3	.826	.757
D4	.765	.586
D5	.805	.777
D6	.817	.670
D7	.582	.657

After reducing the scale to six items, the correlation matrix showed that the correlation coefficients were all over 0.3 (i.e., they ranged from 0.358 to 0.781), and all associations were significant at the 0.05 level or higher (see Table A5.5). The Principal Component Analysis generated a single factor with an eigenvalue of 3.708, a result which was confirmed by the scree plot (Figure A5.6). Moreover, the KMO analysis (0.779, highly significant) and the Bartlett's test (chi-square = 115 with 15 degrees of freedom, highly significant) indicated that a factor analysis would be appropriate. As can be seen from Table 6.10, the factor loadings of the items were now all high (i.e., they ranged from 0.755 to 0.824) and the communalities were all well above 0.4 (i.e., they ranged from 0.569 to 0.679). It was therefore concluded that the revised 6-item scale measuring user attitudes toward the Web site was unidimensional.

Table 6.10 Results of Factor Analysis for the Revised Attitude Toward the Web Site Scale

Item	Factor Loadings	Communalities
D1	.757	.573
D2	.755	.569
D3	.813	.661
D4	.777	.604
D5	.772	.596
D6	.824	.679

(5) Web Literacy

The correlation matrix for the 4-item scale showed that the coefficients were all high (i.e., ranging from 0.625 to 0.809) and all associations were highly significant (Table A5.6). The KMO analysis (0.802, highly significant) and the Bartlett's test (chi-square = 107 with 6 degrees of freedom, highly significant) indicated that a factor analysis was

appropriate (Table A5.1). The Principal Component Analysis generated one factor with an eigenvalue of 3.708, a result confirmed by the scree plot (Figure A5.7). As shown in Table 6.11, factor loadings were all high (i.e., they ranged from 0.868 to 0.924), as were the communalities (i.e., ranging from 0.754 to 0.854). This analysis indicated that the 4-item scale measuring web literacy was unidimensional.

Table 6.11 Results of Factor Analysis for the Web Literacy Scale

Item	Factor Loadings	Communalities
F1	.868	.754
F2	.918	.843
F3	.887	.788
F4	.924	.854

6.2.3 Scale Construct Validity

To test for construct validity, the corrected item-total correlation was utilised. In other words, this study examined the correlations of each item's score with the total scale score in order to investigate whether the items measured the same construct. This method usually subtracts each item score from the total score to eliminate a spurious part-whole correlation (Doll and Torkzadeh, 1988; Xiao and Dasgupta, 2002). Each item's score is then compared with the corrected total score. Although there is no universally agreed cut-off point, the most widely adopted threshold is 0.05 (e.g., Bearden, Netemeyer, and Teel, 1989; Doll and Torkzadeh, 1988; Momani, Odedina, Rosenbluth, and Madhavan, 2000; Xiao and Dasgupta, 2002).

The corrected item-total correlations for each scale were above the cut-off point of 0.5 (i.e., they ranged from 0.556 to 0.858) and all were significant at the 0.01 level. This analysis also confirmed that it had been appropriate to delete one item from the social presence scale (that item's corrected correlation coefficient was only 0.397) and one item from the Web site attitude scale (its corrected correlation coefficient was 0.460). The findings support the results of the factor analysis described in the previous section and indicate that the scales do have construct validity. While further research and analysis is required to confirm this initial indication, the measures were considered acceptably reliable and valid for the purposes of the study.

Table 6.12 Item-Total Correlation

Construct	Item	Correlation Coefficient	*p*
Social Presence	A1	0.397	<.05
	A2	0.699	<.01
	A3	0.770	<.01
	A4	0.556	<.01
	A5	0.685	<.01
Perceived Usefulness	B1	0.629	<.01
	B2	0.811	<.01
	B3	0.793	<.01
	B4	0.786	<.01
	B5	0.771	<.01
Perceived Ease of Use	C1	0.821	<.01
	C2	0.695	<.01
	C3	0.829	<.01
	C4	0.615	<.01
	C5	0.754	<.01
Attitude Toward the Web Site	D1	0.624	<.01
	D2	0.608	<.01
	D3	0.728	<.01
	D4	0.659	<.01
	D5	0.708	<.01
	D6	0.724	<.01
	D7	0.460	<.01
Web Literacy	F1	0.769	<.01
	F2	0.849	<.01
	F3	0.796	<.01
	F4	0.858	<.01

6.2.4 Scale Reliability

After deleting two items from the original scales, Cronbach's alphas were calculated in order to assess the internal consistency of the resulting scales. Although some researchers suggest 0.7 as the accepted cut-off (Hair *et al*, 1995), a value more than 0.6 is regarded as a satisfactory level (Dinev and Hart, 2002; Hair, Bush, and Ortinau, 2000; Malhotra *et al*., 1996; Nunnally, 1978; Van de Ven and Ferry, 1980). As can be seen from Table 6.13, all of the scales had very high alpha scores, ranging from 0.8289 to 0.9206, and were well above the generally accepted lower limit of 0.7. From this finding we conclude that the scales have high levels of internal consistency and so may be considered to be suitably reliable.

Table 6.13 Cronbach's Alpha Scores for the Revised Measurement Scales

Measurement Scale	No. Items	Cronbach's alpha
Social Presence	4	.8289
Perceived Usefulness	5	.9097
Perceived Ease of Use	5	.8945
Attitude Towards Web Site	6	.8720
Web Literacy	4	.9206

6.2.5 The Final Instrument

On the basis of this pilot test analysis, it was decided to proceed with the experiment using the revised instrument to collect data (see Table 6.14).

Table 6.14 The Final Model Construct Measurement Scales

Construct	Statement
Social Presence	1. This web site gives a realistic impression of the company.
	2. When exploring this web site, it felt like I was in personal contact with people in the company.
	3. When exploring this web site, I felt good about the people in the company.
	4. Exploring this web site was like being in a face-to-face meeting with people in the company.
Perceived Usefulness	1. This web site would help me to search more quickly for information about personal computers to buy.
	2. This web site would improve my search for information when buying a personal computer.
	3. This web would make my search for information about personal computers more productive.
	4. This web would make my search for information about personal computers more effective.
	5. Overall, this web site would be useful for obtaining information about available products when buying a personal computer.
Perceived Ease of Use	1. Learning to use this web site was easy for me.
	2. I could easily get this web site to do what I wanted it to do.
	3. This web site was straightforward and easy to understand.
	4. It was easy for me to become skilled at using this web site.
	5. Overall, I found this web site to be easy to use.
Attitude Toward the Web Site	1. This is a good web site.
	2. I like this web site.
	3. This is an attractive web site.
	4. This is an enjoyable web site.
	5. The web site is pleasant to use.
	6. Overall, this Web site is recommendable to my friends.
Web Literacy	1. How frequently do you access the web (e.g., to search for information)?
	2. How familiar are you with the web?
	3. How would you rate your level of usage of the web?
	4. How confident are you with your ability to navigate the web?

6.3 Results of the Experiment

6.3.1 Descriptive Statistics

The descriptive statistics for the experiment are displayed in Table 6.15. The experiment sample (n = 160) was made up of 65% males and 35% females. While most were full-time (93%), there were 56% postgraduate and 44 % undergraduate students. The age of subjects ranged from 17 to 45 years, while around 40% were aged between 21 and 25 years. As would be expected of members of this population, most had a high level of web literacy (i.e., the mean summated score on the scale, which had a maximum value of 28, was 21). As shown in the table, a comparison of the demographic characteristics of the experiment sample and the study population indicates that the sample had significantly more male, full-time, and undergraduate students. The results of chi-square goodness-of-fit tests showed that there were statistically significant differences in distribution of subjects in each category (i.e., gender, mode of study, year level, and age) between the sample and population. Therefore, some caution is needed in generalizing the results of the study to the population.

Table 6.15 Distribution of Experiment Respondents

Parameter	Sample[a] (%)	Population[b] (%)	Chi-square test	
			χ^2	*P*
Gender[c]			16.988	.000
Male	65.0	51.2		
Female	34.4	48.8		
Mode of study			163.259	.000
Full-time	93.1	56.7		
Part-time	6.3	43.3		
Year level[c]			15.346	.000
Undergraduate Year 1 and 2 Year 3 and over	44.0 (24.5) (19.5)	70.5		
Postgraduate	55.6	29.5		
Age[d]			77.151	.000
Less than 20	16.9	19.5		
21-25	40.6	44.4		
26-30	25.0	15.9		
More than 31	16.3	20.2		
Web experience			NA	NA
4 (extremely low)	0.6	NA[e]		
5-8	1.3	NA		
9-12	7.5	NA		
13-16 (moderate)	8.8	NA		
17-20	28.1	NA		
21-24	33.1	NA		
25-28 (extremely high)	20.6	NA		

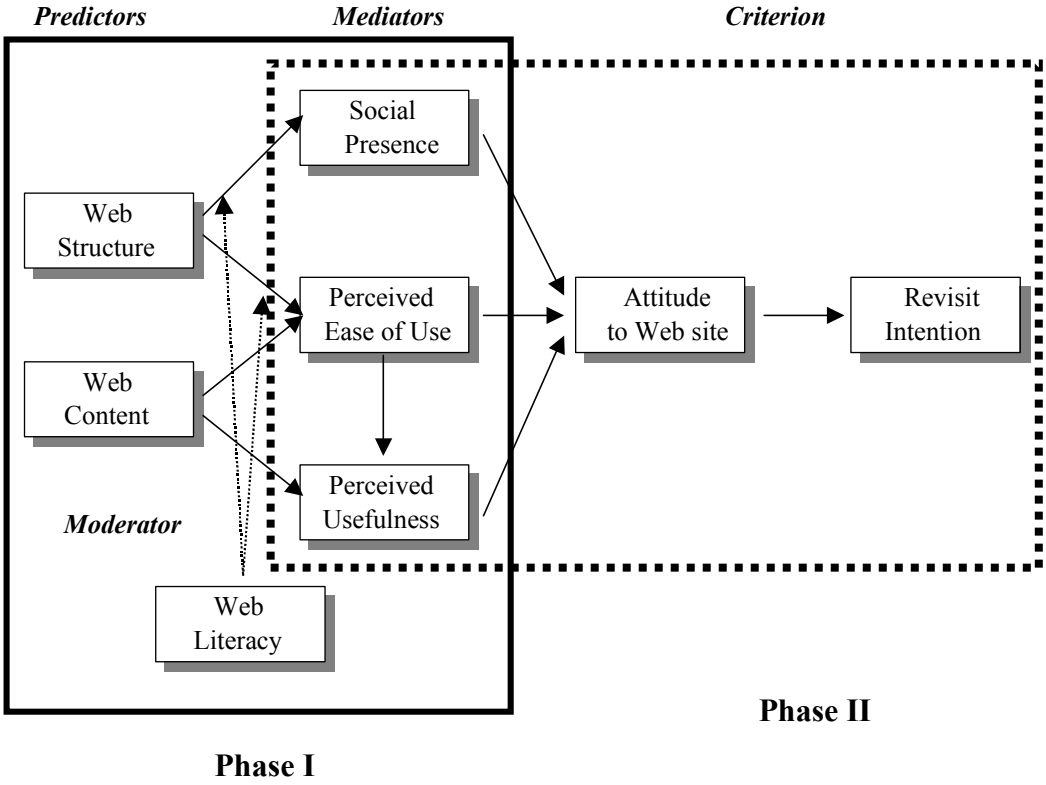
Notes:
[a]. Total 160, percentages based on the total [b]. Total 19,267, percentages based on the total
[c]. Total 99.4%: 1 missing [d]. Total 98.9%: 2 missing [e]. NA = Not Applicable

6.2.3 Approach to the Analysis

As discussed in the previous chapter, this study involved two different statistical approaches. To test hypotheses associated with the relation ships between predictors, mediators, and moderators, a series of variance approaches (i.e., MANCOVA, ANCOVA, and ANOVA) were conducted. Whereas, a series of linear regression analysis were carried out to assess hypotheses associated with the relationships between

mediator and criterion variables. Accordingly, The analysis was conducted in two phases as shown in Figure 6.1.

Figure 6.1 Two Phases of Analysis



In the first phase, the effects of Web site typology on the social interaction variables were tested (i.e., *H_1: The "hypermedia" type of Web site will have higher social presence than the "static image" type. H_2: The "static image" type of Web site will have higher perceived ease of use than the "hypermedia" type. H_3: The "integrated communication" type of Web site will have higher social presence than the "basic information" type. H_4: The "basic information" type of Web site will have higher perceived ease of use than the "integrated communication" type. H_5: The "integrated communication" type of Web site will have higher perceived usefulness than the "basic information" type*.). Based on a 2x2 factorial design with Web literacy as a covariate,

Multivariate Analysis of Covariance Analysis (MANCOVA) was performed. A MANCOVA was utilised to eliminate any bias in the analysis by statistically controlling the influence of an extraneous variable (i.e., the covariate Web literacy) on the dependent variables (Coakes and Steed, 1999). Subsequently, for understanding the effects of Web site typology on individual variables, a separate univariate 2x2 ANCOVA was performed.

Additionally, to test the moderator effects of Web literacy on the relationships between Web site typology and social interaction measures (i.e., H_{11a}: *People with high Web literacy will feel the "hypermedia" type of Web site to be higher in social presence than the "static image" type*. H_{11b}: *People with low Web literacy will feel the "static image" type of Web site to be higher in social presence than the "hypermedia" type*. H_{12a}: *People with high Web literacy will perceive no difference in ease of use between the "hypermedia" type and the "static image" type of Web site*. H_{12b}: *People with low Web literacy will perceive the "static image" type of Web site to be easier to use than the "hypermedia" type*.), Baron and Kenny's (1986) approach was adopted. They argued that when the independent variable is a categorical variable and the moderator is a continuous metric variable, it is impossible to measure moderator effects precisely because the moderator has many levels. Hence, they suggested that before measuring moderator effects, the researcher should find the level "in which the moderator changes the effect of the independent variable on the dependent variable" (Baron and Kenny, 1986, p. 1175).

As the independent variables were categorical and the moderator variable was a continuous variable, the effect of Web literacy on the social interaction measures (i.e.,

social presence, perceived usefulness, and perceived ease of use) were examined. A close investigation of the shapes of the relationships indicated that transformation of moderator variable from continuous to dichotomous (i.e., high vs. low) was necessary. Finally, a 2x2 ANOVA (Univariate Analysis of Variance) test was conducted to investigate the moderator effects of the two levels on social presence.

In the second phase, as all variable were continuous, a series of linear regression analyses were performed. In particular, multiple regression was used to examine the hypotheses in relation to the relationships between social interaction and communication effect measures (i.e., H_6*: The more positive the social presence of a Web site is, the more positive the attitude toward the Web site will be.* H_7*: The more positive the perceived ease of use of a Web site is, the more positive the attitude toward the Web site will be.* H_8*: The more positive the perceived usefulness of a Web site is, the more positive the attitude toward the Web site will be.* H_9*: The more positive the perceived ease of use of a Web site is, the greater the perceived usefulness will be*.). A simple regression analysis was employed to test the hypothesis regarding attitude toward the Web site and revisit intention (i.e., H_{10}*: The more positive attitude toward the Web site is, the higher revisit intention will be*.).

6.3.3 Data Screening and Assumption Testing

As MANCOVA, ANOVA, and linear regression are parametric analyses involving multivariate data, a data set should be explored to see if it meets the assumptions of the statistical methods applied to this study (i.e., MANCOVA, ANCOVA, ANOVA, and Linear Regression). The test statistics are reported in Appendix 6.

(1) Homogeneity of Variance

One assumption was the homogeneity of variance and covariance matrices of the dependent measures for each group. For social interaction measures, Levene's test and Box's M test assessed the homogeneity of variance of each dependent measure, which are typically used methods in MANCOVA (e.g., Hair *et al*., 1995). If Levene's test is significant, then the assumption of homogeneity of variance is violated. In this case, the null hypothesis is that the error variance of the dependent variable is equal across groups is rejected. However, as can be seen from Table 6.16, Levene's test was not significant for any of the dependent measures. Hence, it could be concluded that the homogeneity of variances assumption had not been violated.

Table 6.16 Levene's Test for Social Interaction Measures

Dependent Variable	*F*	*Sig.*
Social Presence	.728	.537
Perceived Usefulness	2.200	.090
Perceived Ease of Use	.168	.918

Box's M test examined whether intercorrelations (covariances) of multiple dependent variables are homogeneous or not. If Box's M test is significant, then homogeneity of variance is violated, thus the null hypothesis (i.e., The observed covariance matrices of the dependent variables are equal across groups.) is rejected. In this study, Box's M statistic (M = 14.661, F = 0.786) was not significant (p = .719), providing assurance that the assumption of equality of covariance matrices has not been violated. That is, social presence, perceived usefulness, and perceived ease of use were actually the same in their covariance matrix.

For the regression analyses, the scatterplots of ZRESID against ZPRED were used to detect whether the assumptions of homoscedasticity were satisfied. Figures A6.1 to A6.8 in Appendix 6 show the scatterplots of regression standardised residuals between Web literacy, social interaction (i.e., social presence, perceived usefulness, and perceived ease of use), and communication effect (i.e., attitude toward the Web site and revisit intention) measures. As can be seen from the figures, the points were randomly and evenly dispersed. Accordingly, it was concluded that variables did not violate the assumption of homoscedasticity.

(2) Normality

In MANCOVA, normality means multivariate normality, which assumes that "the joint effect of two variables is normally distributed" (Hair *et al*., 1995, p. 276). As there is no direct test for assessing multivariate normality (Hair *et al*., 1995), histograms of and normal probability plots of regression standardised residuals were examined. There were three possible combinations of the dependent variables: social presence and perceived ease of use, social presence and perceived usefulness, and perceived usefulness and perceived ease of use. As shown in Figures A6.9 to A6.14 in Appendix 6, histograms of standardised residuals provided clearer pictures of the shape of the distribution. The bell-shaped histograms approximated the normal distribution, i.e., they were approximately symmetrical and not too kurtotic. Moreover, points clustered around a straight line in each probability plot, supporting the normality assumption.

Figures A6.15 to A6.24 in Appendix 6 show the histograms of and normal probability plots of regression standardised residuals for variables (i.e., Web literacy, social presence, perceived usefulness, perceived ease of use, attitude toward the Web site, and

revisit intention) used in the linear regression analyses. As shown in the figures, all the histograms were bell-shaped and approximately symmetrical, and all points in the normal P-P plots were on straight line. These results confirmed a normal distribution of errors in testing the model.

(3) Linearity

Linearity between each pair of dependent variables was examined via scatterplots of three combinations: perceived usefulness vs. social presence, perceived ease of use vs. social presence, and perceived usefulness vs. perceived ease of use. If the residuals are randomly and evenly dispersed throughout the scatterplot, assumptions of linearity are met (Hair *et al*., 1995). It was obvious from the scatterplots (see Figures A6.25 to A6.27) that the dependent variables did not violate the assumption of linearity.

Figures A6.1 to A6.8 and A6.28 to A6.30 in Appendix 6 show the scatterplots of each pair of the variables (i.e., Web literacy, social presence, perceived usefulness, perceived ease of use, attitude toward the Web site, and revisit intention) used in the linear regression analyses. As shown in the figures, the points were randomly and evenly dispersed throughout the scatterplots, and any non-linear pattern (e.g., a curvilinear pattern or a funnel shape) was not found. It was obvious that variables did not violate the assumption of linearity.

(4) Multicollinearity

As a MANCOVA involved three dependent variables (i.e., social presence, perceived usefulness, and perceived ease of use), multicollinearity was tested, which refers to a correlation among three or more dependent variables. The most popular way of investigating collinearity is to examine the correlation matrix (Hair *et al*., 1995). Accordingly, collinearity was tested by the correlation matrix for the three dependent variables. While a general cut-off value is .90 and above (Hair *et al*., 1995), a more conservative level is .80 (Licht, 1997). Table 6.17 shows Pearson's partial correlation coefficients (r) between each pair of the dependent variables. The highest correlation was found between social presence and perceived usefulness (r = .658), indicating a lack of high correlations between two dependent variables.

Table 6.17 Correlation Matrix for Social Interaction Measures

	Social Presence	Perceived Usefulness	Perceived Ease of Use
Social Presence	1.000		
Perceived Usefulness	.658**	1.000	
Perceived Ease of Use	-.130	-.171*	1.000

** $p < .001$, * $p < .05$, two-tailed, n = 160

The correlation matrix examines only simple correlations between two variables. Thus, it is necessary to investigate multiple correlations among three variables, which reflect interaction effects as well as simple correlations. Two of the most widely used measures for assessing multicollinearity are the 'Tolerance' and the 'Variance Inflation Factor' (VIF). Those statistics were obtained through regression analyses by making each social

interaction variable a dependent variable and other two remaining variables independent variables (Kolacz, 2002). A low tolerance value means a high degree of multicollinearity among the corresponding variables. On the contrary, the VIF is the inverse (reciprocal) of the tolerance, so large VIF values indicate a high degree of multicollinearity. A rule of thumb is that a tolerance value less than .10 or a VIF value more than 10.0 is regarded as evidence of statistically significant multicollinearity (Hair *et al*., 1995; Kolacz, 2002). Table 6.18 shows tolerance values were not less than the cut-off level, .10 and the VIF values did not exceed 10.0. The results confirmed that multicollinearity among the variables was not a problem.

Table 6.18 Collinearity Statistics

Dependent Variable	Collinearity Statistics	
	Tolerance	VIF*
Social Presence	.971	1.030
Perceived Usefulness	.983	1.017
Perceived Ease of Use	.567	1.765

*VIF: Variance Inflation Factor

(5) Outliers and Independence of Residuals

Outliers can produce either Type I or Type II errors in hypothesis testing. An analysis of the standardised residuals was performed to identify possible outliers. The results of Casewise diagnostics and Influential observations for all the variables are displayed in Table A6.1 in Appendix 5. As a rule of thumb, 95% of standardised residuals should lie within ±2. As shown in Table A6.1 (A, B, and C), the analysis of standardised residuals among independent variables and social presence revealed that two cases (1.3% of the total sample) were outside of ±2. Similarly, perceived value showed five cases (3.1%)

and perceived ease of use had six cases (3.8%) were outside of ±2. These results suggested that the proportion of outliers in the sample was small, indicating that all cases could be included in the analysis.

Next, an outlier analysis was performed to identify influential observations for predictor (i.e., Web site structure and content), moderator (i.e., Web literacy), and mediator (i.e., social presence, perceived usefulness, and perceived ease of use) variables. Table A6.1 (D, E, and F) shows the results of Casewise diagnostics and Influential observations. The analysis of standardised residuals found that six cases (3.8% of the total sample) were outside of ±2. Similarly, perceived value showed five cases (3.1%) and perceived ease of use had seven cases (4.4%). In addition, Cook's D was utilised for examining the influence of the outliers. As shown in Table A6.1 (D, E, and F), all cases had a Cook's distance statistic smaller than 1. Hence, it could be concluded that the cases had no influence on the overall results.

In addition, the outlier analysis was performed for mediator variables (i.e., social presence, perceived usefulness, and perceived ease of use) and attitude toward the Web site. The analysis of standardised residuals among independent variables and the dependent variable revealed that only seven cases (4.4% of the total sample) were outside of ±2 (see Table A6.1, G). Furthermore, all seven cases had a Cook's distance statistic smaller than 1, indicating no influence of outliers on the overall results.

Further, Cook's distance was utilised for detecting the influence of the multivariate outliers. Cook's distance is regarded as the most representative diagnostic for the overall quality of the analysis regarding the model fit to the data. The general cutoff

value Cook's distance is below 1 (Field, 2000; Hair *et al*., 1995; Kolacz, 2002). As shown in Table A6.1, all the cases that had standardised residuals outside of ±2 had a Cook's distance statistic smaller than 1.0.

Independence of residuals for variables used in the linear regression analyses was examined via the Durbin-Watson coefficient. The Durbin-Watson D statistic close to 2 indicates that the residuals are uncorrelated (Field, 2000). The Durbin-Watson statistics for social presence, perceived usefulness, and perceived ease of use were 1.969, 1.801, and 1.702 at $p < .001$, respectively, that for social interaction measures and attitude toward the Web site was 1.882, and that for attitude toward the Web site and revisit intension was 1.768 at a significant level. Hence, it was concluded that the assumption of independence of residuals was satisfied.

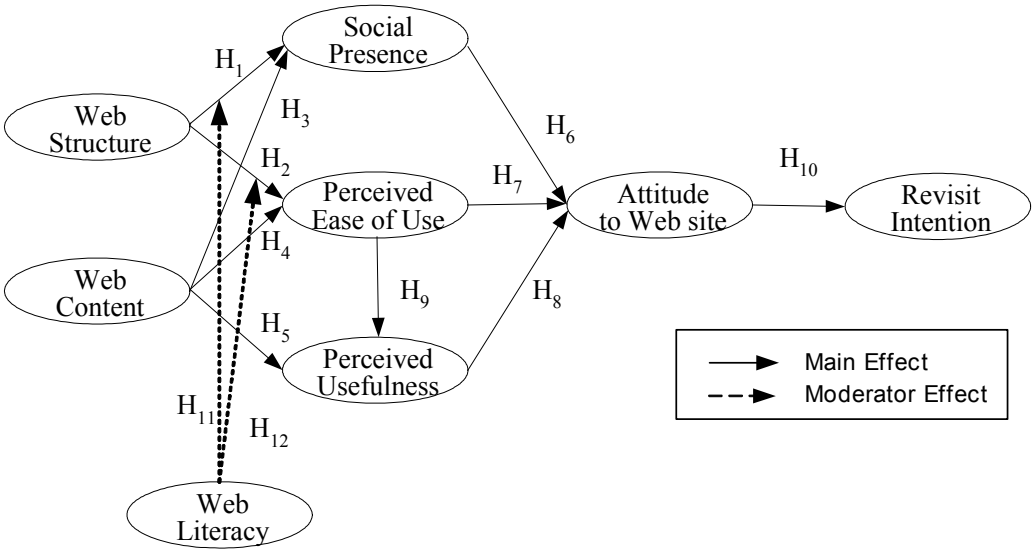
(6) Conclusions

The results of the assumption tests identified that there was no violation of assumptions, so there was no need for any data transformation. As data was suitable for the analyses, all the cases were included.

6.3.4 Hypothesis Testing

In Chapter 4, fourteen hypotheses were proposed. The results of the hypothesis tests are reported in three parts. First, this study investigated whether Web site typology has an effect on social interaction and so tests the associated hypotheses (i.e., H_1 to H_5) using MANCOVA. Next, the moderator effect of Web literacy and associated hypotheses (i.e., H_{11} and H_{12}) were tested by multiple regression. Additionally, to examine the moderator effect more precisely, a two-way ANOVA was performed. Finally, the results of the main effects between social interaction and communication effect measures and associated hypotheses (i.e., H_6 to H_{10}) were examined through multiple regression and simple regression.

Figure 6.2 Research Model and Hypotheses



(1) Web Site Typology and Social Interaction

The results of the multivariate tests confirmed that there were significant main effects and multivariate effects across Web site content and structure. Unexpectedly, the multivariate effect of interaction between content and structure was statistically significant (Wilks' lambda= .931, F = 3.792, $p < .05$), which implied that the relationship between one of the independent variables and the dependent variable was influenced by the other independent variable (Hair *et al*., 1995; Jaccard and Becker, 1990). Because there was an interaction effect on perceived ease of use, a separate univariate two-way ANCOVA was conducted. For social presence and perceived usefulness, as no interaction effect was identified, a MANCOVA was performed. In each MANCOVA and ANCOVA the independent variables were structure (hypermedia vs. static image), content (integrated communication vs. basic information), and Web literacy (as a covariate). The subsequent results are summarised Table 6.19 and 6.20 respectively.

Table 6.19 MANCOVA Summaries: Effects of Web Site Structure and Content on Social Presence and Perceived Usefulness

Source	Dependent Variable	F-value	df	Sig.
Main effects				
Structure	Social presence	21.725	1	.000**
Content	Social presence	22.980	1	.000**
	Perceived usefulness	133.571	1	.000**
Interactions				
Structure x Content				
	Social presence	1.643	1	.202
	Perceived usefulness	.879	1	.350
Residual			155	

** p < .001

Table 6.20 ANCOVA Summaries: Effects of Web Site Structure and Content on Perceived Ease of Use

Source	Dependent Variable	F-value	df	Sig.
Main effects				
Structure	Perceived ease of use	41.386	1	.000**
Content	Perceived ease of use	11.462	1	.001**
Interactions				
Structure x Content	Perceived ease of use	7.366	1	.007*
Residual			155	

* p < .01, ** p < .001

The first set of hypotheses addressed the effect of Web site structure (hypermedia vs. static image) on social presence. These hypotheses were:

$H1_0$: The "hypermedia" type of Web site will have the same level of social presence as "static image" type.

$H1_1$: The "hypermedia" type of Web site will have higher social presence than the "static image" type.

As shown in Table 6.21, the results of the MANCOVA showed that there was a main effect of Web site structure on social presence at a highly significant level [F (1, 155) = 21.725, $p < .001$]. The interaction effect was not significant [F (1,155) = 1.643, $p > .202$]. As the p-value was small, the null hypothesis ($H1_0$) was rejected and the result was considered to be "statistically significant".

To test the research hypothesis more precisely, the means of structure types were examined. An analysis of the individual means in Table 6.17 provides evidence in favour of the alternative hypothesis ($H1_1$). In detail, the mean of social presence for the hypermedia type (M = 18.36, SD = 4.493) was higher than the static image type (M = 15.10, SD = 4.577). Based on this finding, it could be concluded that the hypermedia type had higher social presence than the static image type.

Table 6.21 Means and Standard Deviations for Effects of Structure on Social Presence, Perceived Usefulness, and Perceived Ease of Use

	Static Image (n = 80)		**Hypermedia** (n = 80)	
Dependent Variable (Range)	Mean	SD	Mean	SD
Social Presence (4-28)	15.10	4.577	18.36	4.493
Perceived Usefulness (5-35)	19.56	6.185	23.39	6.490
Perceived Ease of Use (5-35)	27.74	4.161	23.81	4.213

The second set of hypotheses addressed the effect of Web site structure (hypermedia vs. static image) on perceived ease of use. These hypotheses were:

$H2_0$: The "static image" type of Web site will have the same level of perceived ease of use as the "hypermedia" type.

$H2_1$: The "static image" type of Web site will have higher perceived ease of use than the "hypermedia" type.

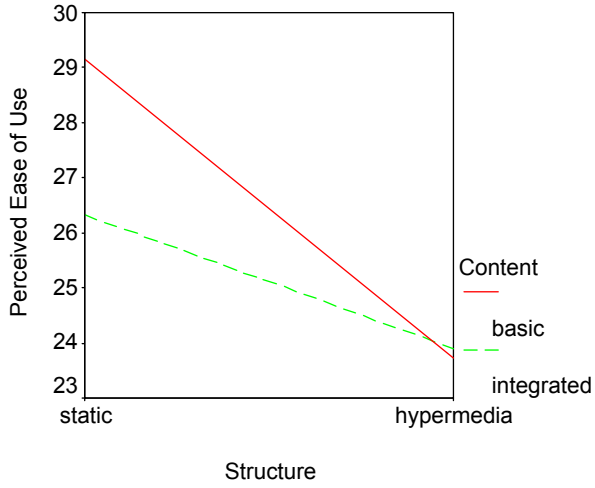
As can be seen from Table 6.20, the significant main effect for Web site structure on perceived ease of use was identified [F (1,155) = 41.386, $p < .001$]. Hence, the null hypothesis ($H2_0$) was rejected. However, as there was an interaction effect between structure and content [F (1,155) = 7,366, p < .01], further investigation of the data was essential.

Table 6.22 and Figure 6.3 depict the mean value of the two structure types (i.e., static image vs. hypermedia). These findings indicated that although there was an interaction effect, the static image type was higher than the hypermedia type across different content types: basic (M_{Static} = 29.15, SD_{Static} = 3.563 and $M_{Hypermedia}$ = 23.73, $SD_{Hypermedia}$ = 4.162) and integration (M_{Static} = 26.33, SD_{Static} = 4.275 and $M_{Hypermedia}$ = 23.90, $SD_{Hypermedia}$ = 4.349). The null hypothesis ($H2_0$) was rejected and it was concluded that the static image type had a significantly higher perceived ease of use than the hypermedia type.

Table 6.22 Means and Standard Deviations for Interaction Effects of Structure on Social Presence

	Basic				**Integrated**			
Dependent Variable (Range)	**Static** (n = 40)		**Hypermedia** (n = 40)		**Static** (n = 40)		**Hypermedia** (n = 40)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Perceived Ease of Use (5-35)	29.15	3.563	23.73	4.162	26.33	4.275	23.90	4.349

Figure 6.3 Line Graph of Interaction Effect: Structure vs. Perceived Ease of Use



The third set of hypotheses addressed the effect of Web site content (integrated communication vs. basic information) on social presence as following:

$H3_0$: The "integrated communication" type of Web site will have the same level of social presence as the "basic information" type.

$H3_1$: The "integrated communication" type of Web site will have higher social presence than the "basic information" type.

The results of the MANCOVA analysis (Table 6. 19) showed a significant difference of the treatment effects between two content types [F (1, 155) = 22.980, $p < .001$], thus the null hypothesis ($H3_0$) was rejected. As the interaction effect was not significant [F (1, 155) = 1.643, $p > .202$], individual mean scores were examined. As Table 6.23 indicates, the mean of social presence for the integrated communication type (M = 18.25, SD = 4.711) was higher than for the basic information type (M = 15.21, SD =

4.434). From this result, it could be concluded that the integrated communication type had a significantly higher social presence than the basic information type.

Table 6.23 Means and Deviations for Effects of Content on Social Presence, Perceived Usefulness, and Perceived Ease of Use

	Basic (n = 80)		**Integrated** (n = 80)	
Dependent Variable (Range)	Mean	SD	Mean	SD
Social Presence (4-28)	15.21	4.434	18.25	4.711
Perceived Usefulness (5-35)	17.24	5.095	25.71	5.045
Perceived Ease of Use (5-35)	26.44	4.703	25.11	4.455

The fourth set of hypotheses addressed the effect of Web site content (integrated communication vs. basic information) on perceived ease of use. The research hypotheses were:

$H4_0$: The "basic information" type of Web site will have the same level of perceived ease of use as the "integrated communication" type.

$H4_1$: The "basic information" type of Web site will have higher perceived ease of use than the "integrated communication" type.

As shown in Table 6.20, content had a significant main effect on perceived ease of use [F (1, 155) = 11.462, $p < .001$]. Therefore, the null hypothesis ($H4_0$) was rejected. As the interaction effect was significant [F (1, 155) = 7.366, $p < .01$], the individual mean scores for the main effect and the interaction effect were examined. First of all, as can

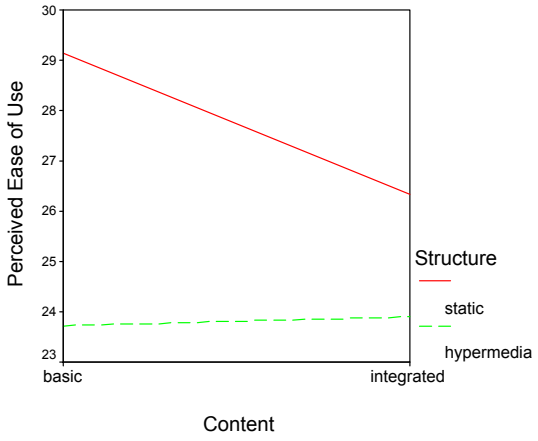
be seen from Table 6.19, the overall mean score for the basic information type (M = 26.44, SD = 4.703) was higher than the basic information type (M = 25.11, SD = 4.455).

Secondly, mean scores for the interaction effect were investigated as shown in Table 6.24 and Figure 6.4. The results demonstrated that the structure had an effect on the relationship between content and perceived ease of use. More specifically, the basic information type was higher than the integrated communication type only when structure was the static image type (M_{Basic} = 29.15, SD_{Basic} = 3.563 and $M_{Integrated}$ = 26.33, $SD_{Integrated}$ = 4.275). On the other hand, in the case of hypermedia type, the integrated communication type was higher than the basic information type (M_{Basic} = 23.73, SD_{Basic} = 4.126 and $M_{Integrated}$ = 23.90, $SD_{Integrated}$ = 4.349). The research hypothesis ($H4_1$) was acceptable only if the structure type was static image. Thus, the fourth research hypothesis ($H4_1$) was partially supported.

Table 6.24 Means and Standard Deviations for Interaction Effects of Content on Perceived Ease of Use

	Static				**Hypermedia**			
Dependent Variable (Range)	**Basic** (n = 40)		**Integrated** (n = 40)		**Basic** (n = 40)		**Integrated** (n = 40)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Perceived Ease of Use (5-35)	29.15	3.563	26.33	4.275	23.73	4.126	23.90	4.349

Figure 6.4 Line Graph of Interaction Effect:
Content vs. Perceived Ease of Use



The fifth set of hypotheses addressed the effect of Web site content (integrated communication vs. basic information) on perceived usefulness. These hypotheses were:

$H5_0$: The "integrated communication" type of Web site will have the same level of perceived usefulness than the "basic information" type.

$H5_1$: The "integrated communication" type of Web site will have higher perceived usefulness than the "basic information" type.

A MANCOVA analysis (Table 6. 19) showed a significant difference of the main effect between two content types [F (1, 155) = 133.571, $p < .001$], thus the null hypothesis ($H5_0$) was rejected. As the interaction effect was not significant [F (1, 155) = .879, $p > .350$], individual mean scores were examined. As Table 6.23 indicates, the mean of perceived usefulness for the integrated communication type (M = 25.71, SD = 5.045) was higher than the basic information type (M = 17.24, SD = 5.095). From this result, it

could be concluded that the "integrated communication" type will have a significantly higher perceived usefulness than the "basic information" type.

It is worth noting that the results of the MANCOVA (see Table 6.19) revealed that Web site structure had a significant main effect on perceived usefulness [F (1, 155) = 133.571, $p < .001$]. On the other hand, the interaction effect was not significant [F (1, 155) = .879, $p = .350$]. As can be seen from Table 6.21, an examination of the mean scores indicated that the mean of perceived usefulness for the hypermedia type was higher than the static image type ($M_{Hypermedia} = 23.39$, $SD_{Hypermedia} = 6.490$ and $M_{Static} = 19.56$, $SD_{Static} = 6.185$). Accordingly, it was concluded that the "hypermedia" type had a significantly higher perceived usefulness than the "static image" type.

(2) Moderator Effects of Web Literacy

The last two hypotheses were associated with the effects of Web site typology on the relationships between the Web site typology measures (i.e., structure and content) and social interaction measures (i.e., social presence, perceived usefulness, and perceived ease of use). A multiple regression analysis with three compound variables tested these hypotheses (e.g., Hair *et al*., 1995). The three compound variables were generated by multiplying structure by Web literacy, content by Web literacy, and multiplying all predictors (i.e., content, structure, and Web literacy). Using a two-step hierarchical linear regression analysis, the three predictor variables were entered into the regression equation first, and then a compound variable was added hierarchically.

The result of the analysis is presented in Table 6.25. As discussed above, this result also confirmed that structure and content have an effect on social presence, perceived usefulness, and perceived ease of use. On the other hand, while Web literacy also had a significant effect on social presence and perceived ease of use, it does not affect perceived usefulness. To compare the strength (or importance) of each predictor variable in the model, the absolute values of a standard coefficient (beta) were taken (e.g., Field, 2000). Structure was the best predictor of social presence ($\beta = .336$, $p < .001$) and perceived usefulness ($\beta = .655$, $p < .001$). It is worth noting that structure and content ($\beta = .336$, $p < .001$) had a comparable degree of importance for social presence. Web literacy, however, was the most important predictor of perceived ease of use ($\beta = .483$, $p < .001$). In addition, although the beta level is somewhat low ($\beta = -.160$, $p < .05$), there was a negative relationship between Web literacy and social presence.

Table 6.25 Results of Multiple Regression Analysis for Web Literacy

Criterion Variable	Predictor Variable	Unstandardised Coefficient		Standardised Coefficient (Beta)	t
		B	Std. Error		
Social Presence	Structure	3.222	.673	.336	4.785***
	Content	3.122	.671	.326	4.651***
	Web literacy	-.590	.260	-.160	-2.270*
Perceived Usefulness	Structure	8.621	.746	.655	11.562***
	Content	3.714	.743	.282	4.997***
	Web literacy	-.466	.288	-.092	-1.619
Perceived Ease of Use	Structure	-1.859	.560	-.202	-3.320**
	Content	-3.519	.558	-.383	-6.305***
	Web literacy	1.709	.216	.483	7.902***

* $p < .05$, ** $p <. 01$, *** $p <. 001$

Table 6.26 presents the results of the moderator (interaction) effect analysis. Model 1 shows the results of the linear regression analysis of three predictor variables without a compound variable. Model 2 shows the results of the analysis including a compound variable. When the incremental effect of R Square is statistically significant, a significant moderator effect is present (Hair *et al*., 1995).

Table 6.26 Moderator Effects of Web Literacy

Criterion Variable	Compound Variable	Model	R^2	R^2 change	F change	Sig. F change
Social Presence	Web literacy x Content	1	.241	.241	16.539	.000**
		2	.241	.000	.019	.889
	Web literacy x Structure	1	.241	.241	16.539	.000**
		2	.266	.024	5.146	.025*
Perceived Usefulness	Web literacy x Content	1	.507	.507	53.482	.000**
		2	.266	.024	.868	.353
	Web literacy x Structure	1	.507	.507	53.482	.001*
		2	.517	.010	3.046	.083
Perceived Ease of Use	Web literacy x Content	1	.431	.431	39.332	.000**
		2	.432	.001	.353	.553
	Web literacy x Structure	1	.431	.431	39.332	.000**
		2	.444	.013	3.748	.055

* $p < .01$ ** $p < .001$

The eleventh set of hypotheses addressed the moderating role of Web literacy on the relationship between Web site structure and social presence. The hypotheses were:

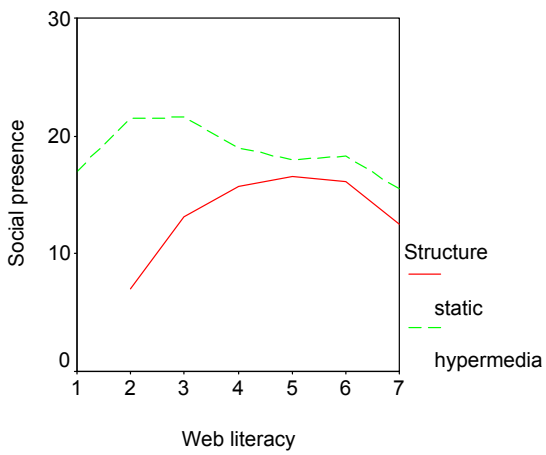
$H11_0$: People will feel no difference in social presence between the "hypermedia" type and the "static image" type of Web site regardless of their Web literacy.

$H11_{1a}$: People with high Web literacy will feel the "hypermedia" type of Web site to be higher in social presence than the "static image" type.

$H11_{1b}$: People with low Web literacy will feel the "static image" type of Web site to be higher in social presence than the "hypermedia" type.

As shown in Table 6.25, there was a positive relationship between structure and social presence (B = .336, t = 4.785, p < .001). Furthermore, the moderator effect of Web literacy on the relationship between structure and social presence was found to be statistically significant (Table 6.26). Therefore, the null hypothesis ($H11_0$) was rejected. In other words, a subjects' response to the different types of structure in terms of social presence varied according to their Web literacy. As the moderator variable had seven levels, this study utilised a line graph to examine how the effects of structure varied as a function of Web literacy. Figure 6.5 shows a plot of the effect of Web literacy on social presence. At level 4, the scores of social presence seemed to be changed.

Figure 6.5 Line graph of Interaction Effect:
Web Literacy x Content



This pattern was further tested by dichotomising the Web literacy at level 4, where the change seemed to have occurred (e.g., Baron and Kenny, 1986). The low level included cases with a value of less than 4, and the high level had the cases with more than 5. The analysis was a 2x2 ANOVA, in which Web literacy and structure were the predictor variables and social presence was the criterion variable. In this, a moderator effect would be indicated by an interaction effect. As shown in Table 6.27, the results of the ANOVA analysis identified the moderating role of Web literacy on the relationship between structure and social presence. Hence, mean scores for the interaction effect were investigated through Table 6.28 and Figure 6.6. The analysis showed very interesting results. That is, subjects with low Web literacy responded to the difference between hypermedia and static image types more strongly than subjects with high Web literacy did. However, it seemed that although Web literacy had a moderating effect on the relationship between structure and social presence, it was not strong enough to change the direction of the relationship. The results demonstrated that subjects felt the "hypermedia" type was higher in social presence than the "static image" type regardless of their Web literacy levels. Therefore, while $H11_{1a}$ was accepted, $H11_{1b}$ was rejected.

Table 6.27 Interaction Effect of Web Literacy (High vs. Low)

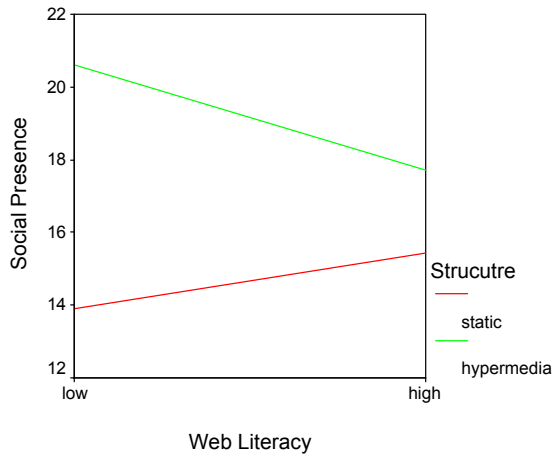
Source	Dependent variable	F-value	df	Sig.
Interactions				
Structure x Web literacy	Social presence	6.999	1	.009*
Residual			156	

* $p < .01$

Table 6.28 Means and Standard Deviations for Interaction Effect of Web Literacy on Social Presence

	Low				High			
Dependent Variable (Range)	**Static** (n = 18)		**Hypermedia** (n = 18)		**Static** (n = 62)		**Hypermedia** (n = 62)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Social Presence (4-28)	13.89	5.005	20.61	3.928	15.45	4.427	17.71	4.463

Figure 6.6 Line Graph for Moderator Effect: Web Literacy (Two Levels)

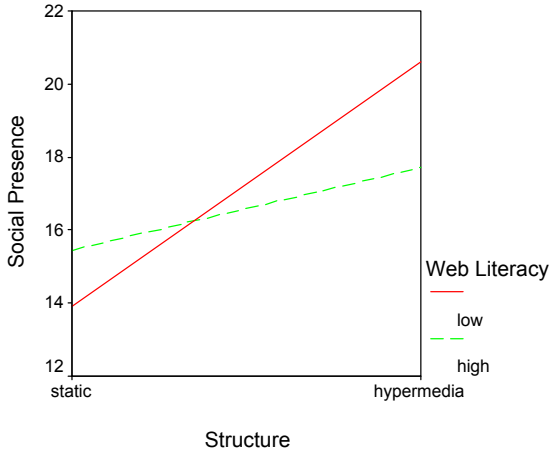


The results of the univariate ANOVA indicated that a subject's feeling of social presence for different structure types varied according to their Web literacy (see Table 6.29 and Figure 6.7). For instance, the static image type was felt to have a higher social presence by subjects with high Web literacy than those with low Web literacy. On the contrary, the hypermedia type was felt to have a higher social presence by subjects with low Web literacy than those with high Web literacy. In other words, it could be said that subjects with low Web literacy responded to differences between the static image type and the hypermedia type more strongly than those with high Web literacy did.

Table 6.29 Means and Standard Deviations for Interaction Effect of Structure on Social Presence

	Static				Hypermedia			
Dependent Variable (Range)	**Low** (n = 18)		**High** (n = 62)		**Low** (n = 18)		**High** (n = 62)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Social Presence (4-28)	13.89	5.005	15.45	4.427	20.61	3.928	17.71	4.463

Figure 6.7 Line Graph of Interaction Effect: Web Literacy x Structure



The last set of hypotheses addressed the moderating effect of Web literacy on the relationship between Web site structure and social presence. The following hypotheses were proposed:

$H12_0$: People will perceive no difference in ease of use between the "hypermedia" type and the "static image" type of Web site regardless of their Web literacy.

$H12_{1a}$: People with high Web literacy will perceive no difference in ease of use between the "hypermedia" type and the "static image" type of Web site.

$H12_{1b}$: People with low Web literacy will perceive the "static image" type of Web site to be easier than the "hypermedia" type.

Table 6.25 indicates that there was a negative relationship between structure and ease of use (B = -1.859, $t = 3.320$, $p < .01$). In addition, the interaction effect was not significant (Table 6.26). On the basis of this result, the null hypothesis ($H12_0$) was rejected and the research hypothesis ($H12_1$) that "the static image type will have higher perceived ease of use than the hypermedia type" regardless of their Web literacy was accepted. As a result, $H12_{1a}$ was rejected, whereas $H12_{1b}$ was accepted.

It is worth noting that Web literacy did not moderate the relationship between Web site typology (i.e., Web site structure and content), and perceived usefulness or perceived ease of use (see Table 6.26). In other words, Web literacy did not change the importance or direction of the relationship between those variables.

(3) Social Interaction and Communication Effects

The five hypotheses, from H6 to H10, were associated with the relationships between social interaction measures (i.e., social presence, perceived usefulness, and perceived ease of use) and communication effect measures (i.e., attitude toward the Web site and revisit intention). These hypotheses were initially tested by running a multiple linear

regression, in which the predictor variables were social interaction measures and the criterion variable was attitude toward the Web site. The results of the analysis are presented in Table 6.30.

Table 6.30 Results of Multiple Linear Regression: Social Interaction and Attitude Toward the Web Site

Predictor Variable	Unstandardised Coefficient		Standardised Coefficient (Beta)	t
	B	Std. Error		
Social Presence	.986	.100	.576	9.870*
Perceived Usefulness	.420	.073	.337	5.738*
Perceived Ease of Use	8.559E-03	.080	.005	.108
R	.836			
R^2	.699			
Adjusted R^2	.694			

* $p <$. 001

$H6_0$: There will be no relationship between the social presence of a Web site and the attitude toward the Web site.

$H6_1$: The more positive the social presence of a Web site is, the more positive the attitude toward the Web site will be.

As shown in Table 6.30, the individual contribution of social presence to the regression model was expressed by the unstandardised coefficients (B). The regression coefficient of social presence (B = .986, t = 9.870, p < .001) implied that there was a significant positive relationship between social presence and the criterion variable, attitude toward the Web site. The null hypothesis ($H6_0$) was rejected, and the research hypothesis ($H6_1$) was accepted. As a result, it was concluded that the more positive the social presence of Web site is, the more positive the attitude toward the Web site will be.

$H7_0$: There will be no relationship between the perceived ease of use of a Web site and the attitude toward the Web site.

$H7_1$: The more positive the perceived ease of use of a Web site is, the more positive the attitude toward the Web site will be.

As can be seen from Table 6.30, the regression coefficient of perceived ease of use (B = 8.559E-03, t = 9.870, p = .108) was very low and not statistically significant. Therefore, the null hypothesis ($H7_0$) was accepted. Accordingly, it could be asserted that there was no relationship between perceived ease of use and attitude toward the Web site.

$H8_0$: There will be no relationship between the perceived usefulness of a Web site and the attitude toward the Web site.

$H8_1$: The more positive the perceived usefulness of a Web site is, the more positive the attitude toward the Web site will be.

From the results of a multiple regression analysis (see Table 6.30), it was found that there was a significant positive relationship between social presence and attitude toward the Web site (B = .420, t = 5.738, p < .001). Hence, the null hypothesis ($H8_0$) was rejected, while the research hypothesis ($H8_1$) was accepted. In conclusion, it was argued that the more positive the perceived usefulness of a Web site is, the more positive the attitude toward the Web site will be.

Further examination of the data related to the relative contribution of the predictor measures was carried out using the standardised coefficients (β) of each predictor. The results indicated that social presence (β = .576, p < .001) was the best predictor of the attitude toward the Web site. Moreover, perceived usefulness (β = .337, p < .001) was also a strong predictor in the regression model. However, perceived ease of use (β = .005, p = .108) was not a significant predictor.

$H9_0$: There will be no relationship between the perceived usefulness of a Web site and the perceived ease of use.

$H9_1$: The more positive the perceived ease of use of a Web site, the greater the perceived usefulness will be.

To investigate these hypotheses, a simple linear regression analysis was conducted, in which perceived ease of use was the predictor variable and perceived usefulness was the criterion variable. As can be seen from Table 6.31, the negative regression coefficient of perceived ease of use (B = -.245, p < .05) implied that as the score of perceived ease of use increases by one, the score of perceived usefulness decreases by .245. From this result, it was concluded that the more positive the perceived ease of use of a Web site is, the lower the perceived usefulness will be.

Table 6.31 Results of Simple Linear Regression: Perceived Usefulness and Perceived Ease of Use

Predictor Variable	Unstandardised Coefficient		Standardised Coefficient (beta)	t
	B	Std. Error		
Perceived Ease of Use	-.245	.112	-.171	-2.183 *
R	.171			
R²	.029			
Adjusted R²	.023			

* $p <. 05$

$H10_0$: There will be no relationship between the attitude toward the Web site and the revisit intention.

$H10_1$: The more positive the attitude toward the Web site is, the higher the revisit intention will be.

A simple linear regression analysis was performed to test these hypotheses. In the linear regression, attitude toward the Web site (Aws) was treated as the predictor variable and revisit intention (RI) was the criterion variable. Table 6.32 presents the results. The regression coefficient (B = .145, t = 15.339, p < .001) indicated that there was a significant positive relationship between the two variables. Accordingly, the null hypothesis ($H10_0$) was rejected. It was therefore concluded that the more positive attitude toward the Web site is, the higher revisit intention will be.

Table 6.32 Results of Simple Linear Regression: Attitude Toward the Web Site and Revisit Intention

Predictor Variable	Unstandardised Coefficient		Standardised Coefficient (Beta)	t
	B	Std. Error		
Attitude Toward the Web Site	.145	.009	.773	15.339*
R	.773			
R^2	.598			
Adjusted R^2	.596			

* $p <. 001$

6.3.5 Summary of Results

This study involved two phases of data analysis. In Phase I, a series of variance approaches (i.e., MANCOVA, ANCOVA, and ANOVA) were conducted to test hypotheses H_1 to H_5, and H_{11} and H_{12}. In Phase II, a series of linear regression approaches were applied to test hypotheses H_6 to H_{10}.

Before running the statistical analyses, the assumptions of the statistical methods applied to this study were tested. In terms of homogeneity of variance, normality, linearity, multicollinearity, outliers, and independence of residuals, there was no violation of assumptions, so the analyses included all the cases without any data transformation.

The findings from the MANCOVA and ANCOVA showed that Web site structure and content have an effect on social interaction measures (i.e., social presence, perceived

usefulness, and perceived ease of use). In other words, different types of Web site structure and content created different levels of social presence, perceived usefulness, and perceived ease of use.

An ANOVA analysis assessed the moderator effect of Web literacy on the relationship between Web site structure and social presence. For instance, subjects with low Web literacy responded to the difference between hypermedia and static image types more strongly than subjects with high Web literacy. However, the moderating effect was not strong enough to change the direction of the relationship between Web site structure and social presence.

The findings from the series of linear regression analyses showed that there were positive relationships between social presence and attitude toward the Web site, perceived usefulness and attitude toward the Web site. However, it was found that there was no relationship between perceived ease of use and attitude toward the Web site. Interestingly, social presence was the best predictor of the attitude toward the Web site.

Finally, it was found that there was a positive relationship between attitude toward the Web site and revisit intention. More detailed discussion about the findings will be provided in the following chapter.