THE EFFECTS OF PERCEIVED INTERACTIVITY ON E-TRUST AND E-CONSUMER BEHAVIORS: THE APPLICATION OF FUZZY LINGUISTIC SCALE

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ABSTRACT

This paper identified the components of interactivity and investigated the impact of perceived interactivity on customer trust and transaction intentions in e-commerce. Data for this study were gathered in 2011 by means of a questionnaire administered to a convenience sample of 512 graduate students and business workers in Kaohsiung, Taiwan and Shanghai, China. Owing to the problem of dilution of measuring results due to the traditional linguistic value in which every scale interval is equal can be solved by using the fuzzy linguistic scale. Therefore, the empirical results indicate that the level of perceived interactivity is a major determinant of e-trust and e-loyalty through the fuzzy linguistic questionnaire. The findings suggest that perceived interactivity has positive effects on the user that ultimately result in e-loyalty behavior. Further, the fuzzy linguistic scale enables researchers not only to deal with different recognition styles, but also to notice differences in individuals by providing different linguistic variable combinations for researching purpose. Finally, the outcomes will be of interest to web designers and online marketers for how to enhance interactive online web applications.

Keywords: Perceived Interactivity, e-Loyalty, e-Trust, Fuzzy linguistic scale, e-Consumer Behaviors

1.   Introduction and Research Background

Over the past decade, the Internet has caused significant changes in the marketing, advertising and communications industries. However, although it is widely acknowledged that the Internet can be an effective marketing tool [Kim, 2011; Park and Park, 2009; Chung and Zhao, 2004; Cook and Coupey, 1998], as well as a medium to maintain good relationships with customers [Liao et al., 2011], very little is known about the factors that make using the Web a compelling experience for its users, and of the key consumer behavior outcomes of this compelling experience. [Chen and Wells, 1999; Korgaonkar and Wolin, 1999]. These pioneering studies have illuminated how interactivity, along with other constructs such as involvement and attitude, can be incorporated into an existing framework of consumer information processing. However, there has been little agreement among researchers on how interactivity should be conceptualized [Heeter, 2000]. Therefore, the aim of the study is to explore the impact of the perceptions of various interactive components on website usage intentions and customer trust in an e-commerce environment, by developing a comprehensive model and employing large empirical sample in our tests. In order to provide a solid theoretical basis for examining consumer behavior in an e-commerce context, this paper integrates two important streams of literature: those on interactivity [Cyr et al., 2009; Dholakia and Fortin, 2000; McMillan and Hwang, 2002], and on trust and e-loyalty [Lee, 2005; Cyr et al., 2009; van der Heijden and Junglas, 2006].

The questionnaire always plays a significant part in social science studies. It is also useful in collecting and analyzing data and in making sure if the assumption is correct. To construct an ordinal scale standard, researchers, for their own convenience, often adopt the Likert Scale and the semantic differential scale on the application of marketing research. However, in empirical studies, these two scales are usually assumed as interval. Studies conducted by scholars domestically and internationally also show that equal-distance scale unavoidably produces the

result of incorrect estimate of factors. This paper adopted Chu [2010] the process of a "fuzzy linguistic scale" to solve the linguistic scale transformation problems generated by the traditional quantitative methods based on Likert scale and semantic scale, and to reduce the difficulties of answering the fuzzy questionnaire. Given the lack of theoretical development in terms of the role of interactivity, this study seeks to understand how several key personal characteristics might influence consumer' perception of a website's interactivity.

Using the framework of consumer information search behavior, these personal factors are categorized into two groups in this study: general factors (need for cognition, product involvement, and product expertise) and Internet-specific ones (skills, challenges, and web shopping experience). Moreover, using this fuzzy linguistic conversion scale, we have taken into account the problems of linguistic devaluation and inflation in human expression. This enables researchers not only to deal with different recognition styles, but also to notice differences in individuals by providing different linguistic variable combinations for research purposes. The impacts of these two sets of factors on perceived interactivity are then examined. In addition, this study attempts to understand how perceived interactivity influences attitudes and purchase decisions. The objective of this study is to explore the relationships of perceived interactivity in the websites, consumers' e-trust and e-loyalty, and overall shopping satisfaction in a causal path framework. Surprisingly, there are only a limited number of previous papers that have empirically analyzed these three variables. Specifically, this study looks at the relationship between perceived website interactivity and attitude toward the site and subsequent purchase intention.

2. Literature Review and Hypotheses

A key advantage of the Internet, distinguishing it from other media, is its potential for interactivity [Kim, 2011; Ganguly et al., 2010]. Although Internet researchers have long focused attention on perceived interactivity, the results of the related studies lack consensus regarding the relevant qualities and consequences of interactive experiences.

2.1. The Concept of Perceived Interactivity

Perceived interactivity had been defined in various ways in the previous literatures [Rafaeli and Sudweeks, 1997; McMillan and Hwang 2002; Sundar and Kim, 2005], but most emphasize the importance of interaction between the user and system. Research on the dynamics of the online shopping process suggests that consumers demonstrate various search patterns stemming from the features of the interface [Mazursky and Vinitzky, 2005], which is quicker yet different from the search pattern characteristic of buying in a traditional shop. Before we identify the determinants of perceived interactivity, it is important to review what interactivity is and how it is measured. Newhagen, Corders, and Levy [1995] were the first to suggest the concept of perceived interactivity, viewing interactivity as a psychological variable in a content analysis of e-mail messages of viewers of the NBC news series Almost 2001[Song and Zinkhan, 2008]. The term perceived interactivity has been widely defined in various disciplines, and while there is no well-established scope and definition for the concept, it is regarded as crucial to successful website marketing [Lee, 2005; Johnson et al., 2006; Suntornpithug and Khamalah, 2010; Kim, 2011]. Therefore, many early conceptualizations of interactivity were similarly "channel" driven. A website that allows users to seek and gain access to the information on demand, and where the content is under their own control, can be perceived as giving greater interactivity to consumers when they are online. In this study, I manipulated the website so that users had different degrees of gaining or accessing the information that they wanted.

2.1.1. The Antecedents of Perceived Interactivity

Several researchers have attempted to define the antecedents of perceived interactivity as a multidimensional concept [Ha and James, 1998; Heeter, 2000; Downes and McMillan, 2000; Oblak, 2005; Zamith, 2008]. Based on a functional approach, Kalyanaraman and Sundar [2003] showed that perceived interactivity is related to customization, the idea that each individual user is able to receive his or her own unique combination of online messages and experiences. Before we identify the determinants of interactivity, it is important to review what interactivity is and how it is measured. This study proposes the following key components of online interactivity based on a review of the interactivity literature [Dholakia et al., 2000; Ha and James, 1998; Wu, 2005; Florenthal & Shoham, 2010]: (1) user control, (2) responsiveness, (3) personalization, and (4) connectedness. Castaneda et al. [2009] and Manganari et al., [2011] stated that perceived ease of use positively affects users' attitude toward using the Internet, which in turn influences their future use of it.

In this study, we have conceptualized perceived interactivity as a second-order formative construct. This is in alignment with others who have done work in this domain [such as Lee, 2005; Florenthal & Shoham, 2010]. Based on Cho and Fiorito [2009], Yoo et al. [2010], Manganari et al. [2011] and Kim [2011] proposed that users who perceive they have more control, responsiveness, personalization, and connectedness over the purchase process tend to perceive a higher level of interactivity in the online environment. Thus, the following hypotheses are proposed:

H_1: The level of perceived user control will be positively associated with perceived interactivity.

H_2: The level of perceived responsiveness will be positively associated with perceived interactivity.
H_3: The level of perceived personalization will be positively associated with perceived interactivity.
H_4: The level of perceived connectedness will be positively associated with perceived interactivity.

2.1.2.   Consequences of Perceived Interactivity: Attitude toward the Website

Attitude toward the website is considered a key determinant of both consumer adoption and usage of the web and website marketing effectiveness [Chen and Wells, 1999], just as attitude toward an advertisement is a key predictor of its effectiveness in the advertising literature. Empirically, interactivity has been found to be a major determinant of consumer attitudes [Fiore et al., 2005]. Wu [2005] found that the perceived level of interactivity has a positive effect on attitude toward the website as well as on purchase intention. Based on these arguments, the following hypothesis is proposed:

H_5: The level of perceived interactivity will be positively associated with customer attitudes toward the website.

Moreover, in an experimental study, Yoo et al. [2010] observed that consumers' "intention to interact" with a website positively influenced their attitudes toward the web site and purchase intention. Holding different views of what interactivity is, researchers have manipulated or measured the construct in various ways. It is not surprising, then, that there have been no conclusive results on how interactivity influences online communication, attitude toward website and purchase intention.

Several researchers have proposed trust as an important element of B2C e-commerce [e.g. Gefen and Karahanna, 2003; Jarvenpaa and Tractinsky, 1999; McKnight and Chervany, 2002]. Consumer trust in the website is fundamental to e-loyalty including online purchase intentions [Flavián et al., 2006] and willingness by consumers to buy from an online vendor [Flavián et al., 2006; Gefen et al., 2003]. In one study focused on perceived interactivity on customer trust in mobile commerce, Lee [2005] found that the interactivity components in the model (user control, responsiveness, personalization, and connectedness) were all significantly related to trust. Therefore, the following hypothesis is proposed.

H_6: A higher level of perceived interactivity will result in higher levels of customer trust toward the website.

Previous advertising research has shown that the attitude toward an advertisement is the most important indicator of advertising effectiveness and outcomes [Yoo et al., 2010; MacKenzie et al., 1986]. For example, Yoo et al. [2010] found support that the attitude toward the advertisement influences brand attitudes and purchase intentions. In addition, Haley and Baldinger [1991] found that the degree to which audiences like an advertisement is the leading predictor of sales. In the same manner, it is believed that consumers who hold a positive attitude toward the Internet would spend more time browsing it for fun or information, and feel satisfied with the convenient and resourceful websites that they visit. Therefore, the following two hypotheses are proposed.

H_7: Attitude toward the website is positively associated with consumers' web usage intention.
H_8: Attitude toward the website is positively associated with consumer satisfaction with it.

2.2.   E-Trust and E-Loyalty in the Websites Environment

Loyalty, or e-loyalty, has been conceived as a "consumer's intention to buy" from a website, and an indicator that consumers will not change to another website [Flavián and Guinalíu, 2006; Eid, 2011]. Cyr et al. [2009] defined e-loyalty as intention to revisit a website, or to consider purchasing from it in the future. Consumer trust in the website is fundamental to e-loyalty, including online purchase intentions [Flavián and Guinalíu, 2006; Gefen, 2000] and willingness by consumers to buy from an online vendor [Flavián and Guinalíu, 2006; Gefen et al., 2003; Pavlou, 2003]. E-trust captures specific cues of Internet sites important to consumers in visiting Websites and builds components as a key driver to e-retail, especially in the light of transaction based financial information continuing to be a major inhabiting factor for online consumers' success [Forrester, 2000; Merrilees and Fry, 2003; Eid, 2011]. Based on previous studies, McKnight and Chervany [2002] presented an interdisciplinary typology of trust that is related to e-commerce consumer actions. Following their work, trust in e-commerce is defined here as the belief that allows consumers to willingly become vulnerable to a website after having taken its characteristics into consideration. Indeed, prior research shows that trust plays a pivotal role in driving repurchase intention [Weisberg et al., 2011; Fang et al., 2011]. Further, it is expected that trust will result in e-loyalty, as outlined above, leading to our final hypothesis.

H_9: Higher levels of customer e- trust in the website will result in higher levels of e-loyalty toward it.

3.   Research Design and Methodology

3.1.   Research Conceptual Framework

As noted above, there is a significant lack of research on perceived interactivity and its effects on purchase intention. The research model for this study was designed to investigate the impact of consumers' perceived interactivity on their intention to engage in online shopping, based on the literature relating to interactivity and the online environment. The model includes customer trust and the attitudes toward the web as the mediating factors of

the relationship. The model builds on previous work on interactivity as well as adds new constructs. More specifically, we are interested in determining if perceived interactivity leads to attitudes toward the web and trust, and whether these constructs are precursors to website usage, satisfaction and user loyalty. The model and the hypothesized causal links are described below, and shown in Figure 1.
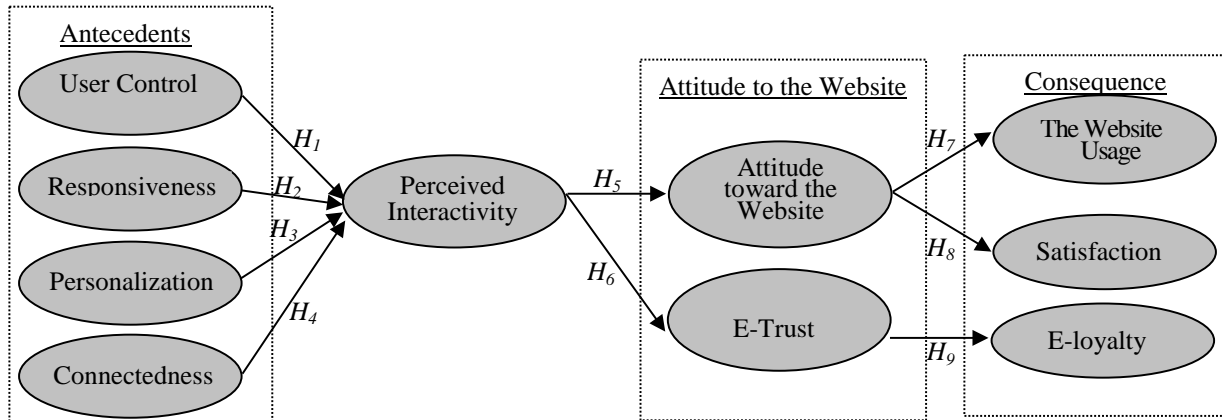

Figure 1 Research Model and Hypotheses

The Internet has become a very widely- used and accepted platform for shopping, and has brought significant changes to the retailing industry and commerce in general [Kim, 2011; Ganguly et al., 2010]. The quality of website design is very important to attract customers. According to Fiore and Fin [2003], increasing competition and advances in online technologies have resulted in the expansion of website factors that affect online marketing success, beyond extensive product offerings, customer convenience, ease of navigation, and security. In online trust studies, researchers generally adopt a definition of trust from the offline context.

3.2.   Fuzzy Linguistic Questionnaire

According to Bradley, Katti and Coons's research [1962], generally the linguistic intervals are not equal; in accordance with other domestic scholars' researches, the equal space measuring will lead to errors while estimating a parameter [Bollen & Barb, 1981; Olsson, Drasgrow & Dorans, 1982]. In order to completely reserve the ambiguous semantics, this paper will adopt Chu [2010] constructive model of fuzzy linguistic scale. Besides discovering the significant difference in different consumers' linguistic terms, we will also demonstrate that there is a specific difference in consumers of distinct nationalities and through the process of eliminating vagueness upon receiving the scores of any kinds of fuzzy linguistic scale. First, a questionnaire of house buying demand and behavior is handed to a potential customer. Second, after the first questionnaire is completed, a second questionnaire containing linguistic scale is handed to the potential consumers. The exchanged numbers are showed in Figure 3.

Then, according to the formula [1] and [6], convert each fuzzy number of Figure 2 to crisp scores. From Table 1, we quickly can obtain various types of linguistic terms' crisp scores.

Suppose L^{-1} and R^{-1} are inverse functions of functions L and R, respectively, and the graded mean h level value of generalized fuzzy number $A=(c, a, b, d; w)_{LR}$ is $h[L^{-1}(h) + R^{-1}(h)]/2$ as Figure 2. Then the graded mean integration representation of A is

$$P(A) = \int_0^w h \left\{ \frac{L^{-1}(h) + R^{-1}(h)}{2} \right\} / \int_0^w h\,dh \tag{1}$$

Therefore, the formula [2] and [3] is modified as below:

$$L^{-1}(x) = c + (a - c)h/w,\ 0 \le h \le w \tag{2}$$

Thus,

$$R^{-1}(x) = d - (d - b)h/w,\ 0 \le h \le w \tag{3}$$

$$\frac{L^{-1}(h) + R^{-1}(h)}{2} = \frac{c + d + (a - c - d + b)h/w}{2} \tag{4}$$

By formula (1), the graded mean integration representation of A is (Suppose A is a trapezoidal fuzzy number). Since,

$$P(A) = \int_0^w h \left\{ \frac{L^{-1}(h) + R^{-1}(h)}{2} \right\} \bigg/ \int_0^w h \, dh = \frac{c + 2a + 2b + d}{6} \tag{5}$$

A generalized triangular fuzzy number is a special case of generalized trapezoidal fuzzy number when $b=a$. Then, replacing b by a in formula (5), the graded mean integration representation of A becomes

$$P(A) = \int_0^w h \left\{ \frac{L^{-1}(h) + R^{-1}(h)}{2} \right\} \bigg/ \int_0^w h \, dh = \frac{c + 4a + d}{6} \tag{6}$$
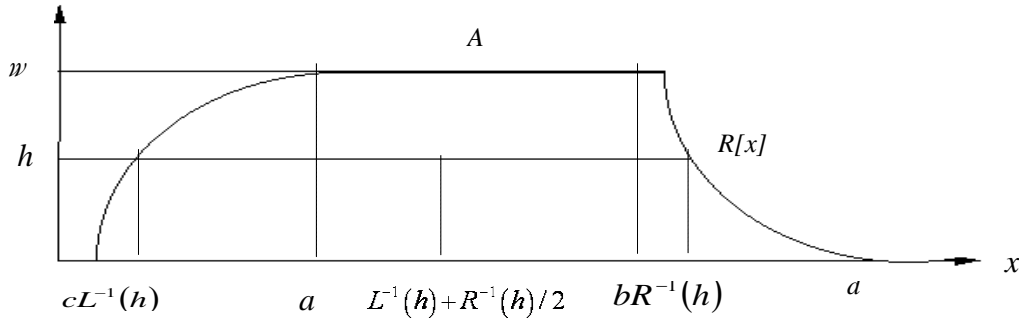

Figure2.The graded mean integration of a generalized fuzzy number $A=(c, a, b, d; w)_{LR}$

According to this method, convert fuzzy numbers of linguistic terms to crisp scores. Then, after process reorganization, you can obtain the various types of linguistic terms' translate table. From Figure 3 to Table 1, we quickly can obtain various types of linguistic terms' crisp scores.
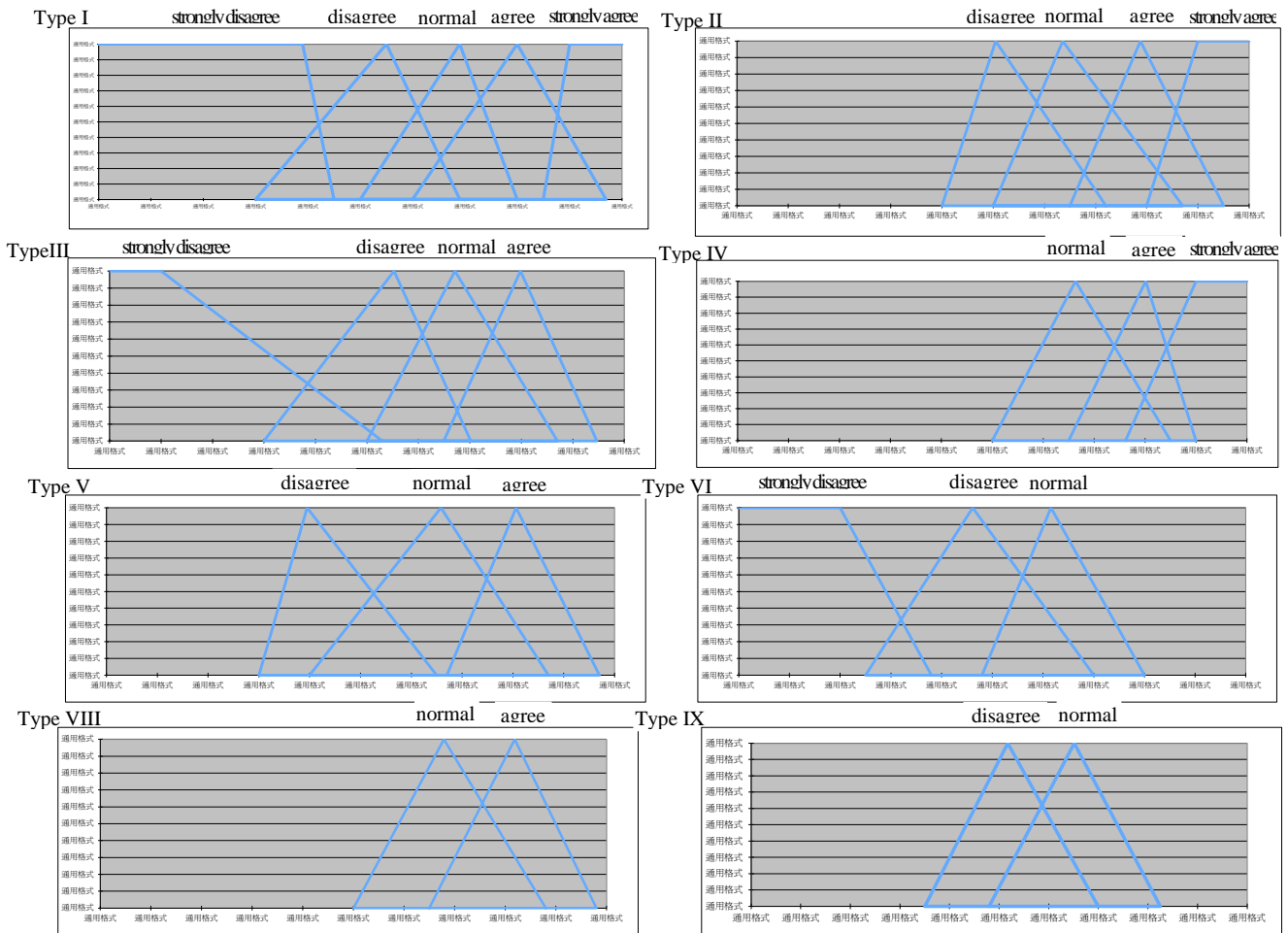

Figure 3. Various types of linguistic scales (Type I – X)

Table 1. The types of linguistic terms' crisp scores and Likert's score of Taiwan

Types	Likert's score	Type I	Type II	Type III	Type IV	Type V	Type VI	Type VII	Type VIII	Type IX	Type X
Strongly Agree	5	0.94	0.93		0.94			****			
Agree	4	0.80	0.79	0.80	0.81	0.74		****	0.82		
Normal	3	0.68	0.65	0.67	0.67	0.65	0.62		0.68	0.65	
Disagree	2	0.52	0.52	0.53		0.42	0.47			0.52	****
Strongly Disagree	1	0.19		0.17			0.13				****

3.3.   Sampling method

Data for this study were gathered in 2011 by means of a questionnaire administered to a convenience sample of 512 graduate students and business workers in Kaohsiung, Taiwan and Shanghai, China. Getting responses from businesses workers were the most difficult part of the study as generally people don't reply or give answers. We tried to include all segments of the online shoppers in our survey. The use of college students as a sample restricts external validity, yet this group was deemed appropriate for the purpose of this exploratory research given that college students constitute a major segment of online shoppers [Lee & Johnson, 2002]. Frey et al. [1991] described that it is a type of sampling where the researcher uses cases that are most convenient and available. For the respondents, the scope of the survey conducted was the students and business workers. Also, the number of respondents is large enough, that it can represent the whole population: statistically. It is not possible (in the stated time, and the number of researchers involved) to conduct a survey that takes the whole population at large.

Thirty graduate students volunteered to act as interviewers as an alternative class assignment, and were trained in the survey procedure. They visited the university campuses and offices and asked people whether they had the habit of shopping for clothing online, and only those who answered "yes" were selected as subjects. The participants were asked at the start of the survey to select the apparel website they had most frequently visited in the past six months. The surveys then began with an introductory statement that asked respondents to administer their own responses, and assured them of confidentiality. This was followed by the measures and a request for demographic information.

The sample consisted of 512 respondents including 305 (under) graduate students and 207 business workers in Taiwan and Shanghai. The average age of the participants was 28. The male/female ratio of the sample was 43.5% and 56.5%, respectively. In the sample, 61.6% of the respondents were in there twenties and, 38.4% in there thirties. About 75% of the participants stated that their total monthly expenditures on clothing were less than US$50. Half of the participants reported having spent over US$20 on clothing last month whereas 45% spent less than NT$10. As a whole, they represent a diverse sample that lends itself well to a replicative study.

3.4.   Measure Development

The measures of the constructs were developed in several stages. In the first stage, based on the defined constructs, tentative measures were developed from the existing literature. In the second stage, to establish content validity, a list of defined constructs and measures was submitted to a panel of five electronic commerce academics that are recognized as authorities on the subject of web behaviors. We asked the panel members to assign each measure to the construct they believed was appropriate, and note whether they thought the construct could be represented by any other measures. In the third stage, member of the faculty and doctoral students reviewed a preliminary version of the instrument for precision and clarity. Finally, a pretest was conducted among 30 online consumers. During all the stages, the questionnaire was progressively refined, simplified and shortened.

3.4.1.   Reliability and Validity of Measures

All the indicators of the constructs were measured using five-point multi-item scales. Internal consistency was assessed by computing Cronbach's α, with the results shown in Table 2. The Cronbach's α was found to be greater than 0.70, in accordance with Nunnally's [1967] standard. Multi-item measures were developed based on Cronbach's α and item-to-total correlations exceeding appropriate levels (Cronbach's α >0.60; item-to-total correlation > 0.30). Following Anderson & Gerbing [1988] and Sin, Tse, & Yim [2005], we also conducted confirmatory factor analysis to further establish the reliability and discriminant validity of the multi-item scales. The results are shown in Table 2.

Table 2 Results of the Confirmatory Factor Analysis (** significant at the .001 level)

Construct /items	Factor Loading	t-value	Construct Reliability	AVE	Cronbach's α
Perceived User Control			0.878	0.774	0.882
PUC1	0.795**	18.343			
PUC2	0.811**	19.372			
Perceived Responsiveness			0.902	0.847	0.906
PR1	0.833**	17.972			
PR2	0.827**	17.425			
Perceived Personalization			0.917	0.699	0.913
PP1	0.786**	20.731			
PP2	0.802**	21.197			
PP3	0.813**	21.869			
Perceived Connectedness			0.795	0.722	0.801
PC1	0.889**	19.553			
PC2	0.865**	19.025			
PC3	0.859**	18.995			
Perceived Interactivity			0.914	0.874	0.910
PI1	0.896**	20.779			
PI2	0.935**	21.257			
PI3	0.884**	20.328			
Attitude toward the Website			0.886	0.817	0.891
ATW1	0.817**	19.057			
ATW2	0.835**	19.362			
ATW3	0.827**	19.196			
Trust			0.864	0.725	0.859
T1	0.807**	19.003			
T2	0.932**	20.311			
T3	0.844**	19.579			
The Website Usage			0.835	0.753	0.839
WU1	0.772**	17.089			
WU2	0.824**	18.132			
Website Satisfaction			0.902	0.803	0.897
WS1	0.864**	18.225			
WS2	0.932**	19.597			
Consumer E-loyalty			0.849	0.747	0.863
CL1	0.911**	18.775			
CL2	0.898**	18.092			

The study uses Anderson and Gerbing's [1988] two-stage approach, starting with the measurement phase, followed by the structural model estimation phase. Before analyzing the entire model, the descriptive statistics as well as correlation analysis for all the research variables are presented in Table 3.

Additionally, the convergent validity of the scales was verified by using the following three criteria suggested by Fornell and Larcker [1988]: (1) all indicator loadings should be significant and exceed 0.7; (2) construct reliabilities should exceed 0.6; and (3) the average variance extracted (AVE) by each construct should exceed the variance due to measurement error for that construct (i.e., AVE by the latent construct should greater than 0.50). For the current CFA model, all loadings were above the 0.7 threshold (see Table 1), and AVE ranged from 0.72 to 0.87 (see Table 2). These results suggest that discriminant validity was achieved. With regard to the validity, all the variances reached a significant level, and thus each dimension has an acceptable level of validity.

4. Empirical Analysis and Result
4.1. Chi-Square Difference Test

The primary aim of this study is to identify the impact of consumers' perceived interactivity on their intention to engage in online shopping, based on the literature relating to interactivity and the Internet environment. The model includes explorer the relationship customer trust and the attitudes toward the web. Chi-square difference tests were conducted in order to test whether the differences in model fit were statistically significant across model, and

the results are presented in Table 4.

4.2. Hypotheses testing

AMOS 7.0 was used to test the proposed model (see Figure 1), resulting in a chi-square statistic of 557.939 (DF=294, p <0.01). Although the chi-square value was significant, this statistic is sensitive to sample size and model complexity; as such, the goodness-of-fit index (GFI), Non-normed Fit Index (NNFI), and Comparative Fit Index (CFI) are more appropriate for assessing model fit here [Bagozzi and Yi, 1988]. GFI (0.912), NNFI (0.935), CFI (0.941) indicate satisfactory model fit. Figure 4 illustrates the estimated coefficients and their significance with regard to the structural model.

Table 3 Descriptive Statistics and Correlation Matrix Analysis for all Research Variables

Latent Variables	Mean	S. D.	The Correlation Coefficients of Latent Variables									
			PUC	*PR*	*PP*	*PC*	*PI*	*ATW*	*T*	*WU*	*WS*	*CL*
Perceived User Control	0.963	0.235	0.774									
Perceived Responsiveness	0.813	0.197	0.357**	0.847								
Perceived Personalization	0.645	0.208	0.314**	0.293**	0.699							
Perceived Connectedness	0.825	0.235	0.433**	0.397**	0.483**	0.722						
Perceived Interactivity	0.784	0.275	0.347**	0.491**	0.392**	0.554**	0.874					
Attitude toward the Website	0.721	0.287	0.508**	0.387**	0.409**	0.471**	0.302**	0.817				
Trust	0.902	0.279	0.511**	0.508**	0.357**	0.546**	0.511**	0.500**	0.725			
The Website Usage	0.775	0.202	0.347**	0.379**	0.502*	0.415**	0.473**	0.377**	0.323**	0.753		
Website Satisfaction	0.697	0.243	0.419**	0.472**	0.399**	0.392**	0.464**	0.353**	0.365**	.493**	0.803	
Consumer E-loyalty	0.547	0.298	0.309**	0.487**	0.547**	0.465**	0.411**	0.487**	0.540*	.364**	0.437**	0.747

Notes: ** *the regression weights (standardized beta coefficients) are significant at the p<0.01 level,*
* the regression weights (standardized beta coefficients) are significant at the p<0.05 level.
Diagonal elements (in bold) are the square root of the average variance extracted (AVE).

Table 4 Chi-Square Difference Test

	Restricted Model	Proposed Model
Chi-Square	631.943 (p=0.00)	557.939 (p=0.00)
Df	297	294
GFI	0.899	0.912
SRMR	0.113	0.074
RMSEA	0.044	0.039
Chi-square difference test	$\Delta\chi^2 = 74.004$ $\Delta df = 3$ $\chi^2/df = 24.668$ (p< 0.01)	
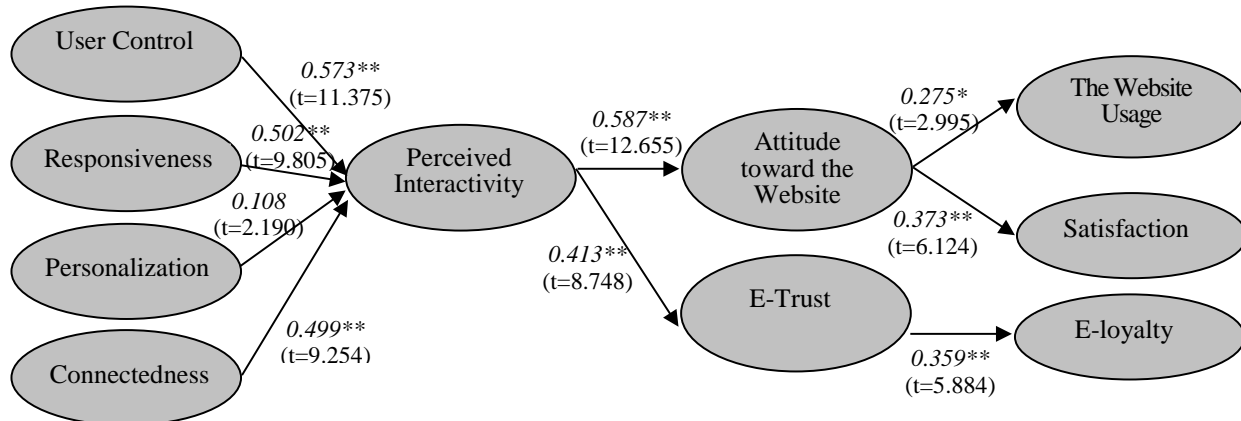
* *p value < 0.05*
** *p value < 0.01*

Figure 4 Results of Hypotheses Tests

As can be seen from Figure 4, the first two or the last three quality criteria for our overall model are well below the highest recommended values and above the minimum suggested ones. This means that the overall model in Figure 4 fits the data very well. The impacts of perceived user control (β=0.573, t=11.375), responsiveness (β=0.502, t=9.805), and connectedness (β=0.499, t=9.254) on perceived interactivity are significant. Therefore, H_1, HR_2, HR_4 can be accepted. However, perceived personalization (β=0.108, t=2.190) has no significant impact on trust, and thus HR_3 is rejected. These results indicate that consumer perceived user control, perceived responsiveness, and perceived connectedness have positive effects on perceived interactivity, while consumer perceived personalization has no significant influence on perceived interactivity.

The coefficients of the causal relationship from perceived interactivity to attitude toward the website and trust are 0.587 (t=12.655) and 0.413 (t=8.748), respectively. In summary, regarding the relationships among perceived interactivity, attitude toward the web site, and trust, HR_5 and H_6 were supported. Trust is positively related to e-loyalty (β=0.359, t=5.884). Therefore, H_9 is supported, while consumer attitude toward the website also had a significant positive impact on website usage (β=0.275, t=2.995) and satisfaction (β=0.373, t=6.124), validating H_7 and H_8.

5.   Discussion and Conclusions
5.1.   Conclusions

In this study the outcomes of perceived interactivity were investigated, with subsequent impacts on e-trust, e-loyalty, website usage and satisfaction. The model as developed and tested supports all hypothesized relationships, and confirms the importance of cognitive, cognitive-affective and affective components of interactivity [Stromer-Galley, 2004; Lilleker and Malagon, 2010; Jackson and Lilleker, 2010]. The model as developed and tested in this work supports all the hypothesized relationships except perceived personalization, and confirms the importance of both attitude toward website and trust with regard to perceived interactivity. The new findings of this work are as follows. First, perceived user control, responsiveness, and connectedness are shown to be direct antecedents of perceived interactivity, suggesting that context-based marketing communication at the point of need is a key component in consumer acceptance of websites, and thus deserves particular attention.

Among perceived interactivity, attitude towards the website and attitude towards purchase intention, attitude towards website was found to be the strongest predictor of purchase intention. In addition to survey data, qualitative comments from participants provided further insights into how interactivity impacts the user. Fuzzy Linguistic Scale is not equally distanced. It eliminates the problem presented by traditional questionnaires by giving different linguistic terms and fuzzy values. It was also found that perceived interactivity is a strong predictor of attitude towards a website, so future studies must undertake path analysis to examine if perceived interactivity has a significant indirect effect on trust and e-loyalty.

E-trust is the most important factor for any company's reputation, especially e-commerce. This may be due to a feeling of trust is akin to being re-assured that the company will look after the interests of the user or consumer and protect them in all respects. It is a form of meta-guarantee, one that goes beyond just a product guarantee. Given the virtual nature of the online shopping experience, trust is likely to be even more important in this context, due to major consumer concerns over credit card security or the way that privacy is handled could be detrimental to a company's reputation. To overcome this, firms are developing e-trust strategies, such as clearly articulating explicit policies regarding credit card security and the way privacy issues are handled.

Finally, this research use fuzzy linguistic conversion scale we have taken the problems of linguistic devaluation and inflation in human expression into account. It enables researchers not only to deal with different recognition styles, but also to notice differences in individuals by providing different linguistic variable combinations for researching purpose. The phenomenon that questionnaire-takers tend to choose scales close to the middle scale will underestimate the variable correlation and thus lead to an improper decision making.

5.2.   Theoretical and Practical Contributions

Although the concept of perceived interactivity has been considered important for some time in the literature, the theoretical development of a framework that clearly delineates the role of perceived interactivity and many other factors is still lacking. The research confirms the complexity of a model in which the relationship of perceived interactivity to efficiency, effectiveness and trust of the website, supporting work by Cyr et al. [2009]. In turn, efficiency, effectiveness and trust are tested for their influence on user behavioral intentions for acquiring e-loyalty. These results are also of relevance to the marketing practitioner. Assuming that e-retailers are trying to build interesting and effective, then the design of those sites should factor in ways to build e-trust, e-loyalty and interactivity. However, more research is needed to help untangle these relationships and provide more helpful suggestions for marketing strategies.

The current research is based on previous studies on perceived interactivity by Dholakia et al. [2000], Wu [2005], Yoo et al. [2010], Florenthal and Shoham [2010], and Kim [2011], as well as a number of works studying trust, attitude toward the website, satisfaction, and e-loyalty in an e-commerce environment, as previously outlined. More specifically, this study supports Kim [2011] in finding that interactivity results in trust and e-loyalty with regard to website shopping behaviors. Overall, these findings represent an extension of previous research on website usage, consumer satisfaction and e-loyalty, to now include how interactivity can lead to greater efficiency and effectiveness, as thus act as a precursor to positive and repeat customer relationship management.

Further, perceived user control, responsiveness, and connectedness result in perceived interactivity. As such, perceived interactivity has a hedonic component, supporting work by Lee [2005], Wu [2005] and Liao et al. [2011], who tested it with different in mobile commerce treatments. Manganari et al. [2011] indicated that managers should consider and apply the optimal level of ease of use at their web stores' virtual layouts in order to both facilitate use and engage consumers. In terms of the role of perceived interactivity, it was found in this work that its effect on purchase intention could be indirect, operating via its effects on attitude toward the website. Specifically, it was observed that perceived interactivity was highly correlated with attitude toward the website, but not a predictor for purchase intention. However, attitude toward the web site was found to be a good predictor for purchase intention. Future research needs to further explore the relationships between these constructs.

Regarding the drivers of purchase intention, the results suggest that websites may need to employ a combined strategy aimed at increasing trust and the net benefits of online shopping. To enhance customer satisfaction and loyalty, online stores should devote more resources to improving the information and system quality of their websites. Hence, if website designers and marketers wish to attract and retain more customers, then enhancement of web features that allow greater interactivity is desirable. The results of this work can thus be used as by designers to help create new forms of information visualization with interactive components. The applications used in this study offer presentations of data, as well as the abilities of the users to capture data based on assessments made by other users. The value of this work goes beyond e-commerce to include applications for other groups, such as online communities.

5.3. Research Limitations and Future Directions

A student population was recruited for this study, and thus findings can be further expanded using a broader base of Internet users. The Internet questionnaire method will become one of the major data collection methods in the future research. According to this study, linguistic bias exists between the internet questionnaire method and traditional method. However, it is important to note that a student sample is representative and appropriate for e-retailing research, since students are frequent users of the Internet for communication and commercial transactions [Walczuch & Lundgren, 2004; Hanzaee and Alinejad, 2012], and in the current sample 99% of the respondents considered themselves experienced Internet users. Nonetheless, this non-probabilistic sampling method and small sample size may limit the generalizability of the findings.

Several other issues should be addressed by future research. First, future studies should carefully operationalize each concept identified in this study and, with larger sample groups, consider additional types of statistical analysis. For example, a curvilinear relationship between the engaging sub dimensions of perceived interactivity and attitude toward the web site might exist. Second, near limitless options might overwhelm consumers and lead to negative attitudes toward a website, and future studies should not focus exclusively on enhanced statistical techniques. Instead, more in-depth qualitative work is also needed to explore individuals' reactions to web sites and to better understand the attitude formation process. Observation techniques, in-depth interviews, talk-along procedures, and focus groups could all provide insights into how consumers develop attitudes toward web sites. Finally, these findings should be confirmed in future studies by using many other features that can be used to enhance interactivity, such as pictures, video, audio, and so on.

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APPENDIX: Construct Measures

Perceived User Control
PUC1: I was in control over the information display format condition when using this website.
PUC2: I was in control over the content of this website that I wanted to see.
Perceived Responsiveness
PR1: This website had the ability to respond to my specific questions quickly and efficiently.
PR2: This website had the ability to respond to my specific questions relevantly
Perceived Personalization
PP1: I perceive this website to enable me to choose and learn the content I need.
PP2: I felt this website can make me feel that I am a unique user.
PP3: I perceive this website to be sensitive to my needs for product information.
Perceived Connectedness
PC1: Users share experiences about the product or service with other users of this website.
PC2: Users of this website benefit from the community visiting this website.
PC3: Users share a common bond with other members of the user community visiting this website.
Perceived Interactivity
PI1: I think this website is interactive.
PI2: I think this website is interpersonal.
PI3: I think this website has variety of content.
PI4: I think this website provides immediate answers to questions.
Attitude toward the Website
ATW1: I think use this website is a good idea.
ATW2: I think use this website is a wise idea.
ATW3: I think use this website is an appealing idea.
Trust
T1: I can trust this website.
T2: I trust the information presented on this website.
T3: I feel this online vendor would provide me with good service.
The Website Usage
WU1: It is easy to navigate around this website and I can quickly find the information that I need.
WU2: I think this website is a user-friendly website.
Website Satisfaction
WS1: This website provided me with relevant information to facilitate my decision.
WS2: I found my visit to this website enjoyable and pleasant.
Consumer E-loyalty
CL1: If this were a real website, it is very likely that I'd visit it again in the future.
CL2: Overall, I find that this website looks attractive and I am looking for travel information.