Association for Information Systems
AIS Electronic Library (AISeL)

AMCIS 2006 Proceedings

Americas Conference on Information Systems
(AMCIS)

December 2006

User Satisfaction and Web Portal Use

Li Xiao
The George Washington University

Subhasish Dasgupta
The George Washington University

Follow this and additional works at: http://aisel.aisnet.org/amcis2006

User Satisfaction and Web Portal Use

Li Xiao
The George Washington University
lilyxiao@gwu.edu

Subhasish Dasgupta
The George Washington University
dasgupta@gwu.edu

ABSTRACT

This study examines whether behavioral and demographical factors such as previous web use experience, type of web portal used, age, and gender influence user satisfaction with web portals, and whether user satisfaction influences usage of portals. A total of 340 undergrad and graduate students participated in a survey on their usage and satisfaction with different portals. The results show that the more people use the web, the more satisfied they are with web portals. Age has a negative effect on satisfaction with portals. Gender doesn't seem to influence user satisfaction with portals. And users of different types of portal usually have different levels of satisfaction. User satisfaction, however, doesn't seems to affect the actual use of web portals. This study addresses a gap in literature and is relevant to web portal companies and other IS practitioners.

Keywords

User Satisfaction, User Characteristics, Web Search Engine, Web Portals, System Usage, Portal Use

INTRODUCTION

The phenomenal growth of the Internet over the past several decades has changed the traditional computing environment completely. Internet or web-based systems provide a quite different computing platform from conventional standalone information systems. For example, the speed and amount of information exchange among different users are much increased; vast quantity of data are scattered about the network every second (Simmers and Anandarajan, 2001). Secondly, the increase of multimedia type of data brings new challenges for data storage and transportation as well as fun/entertainment (D'Ambra and Rice, 2001). Thirdly, constant availability of Internet enables 24/7 online business for companies while obscuring the boundary between work and life. How do these changes affect user evaluation of systems, and their satisfaction and use of them? Those questions present tremendous opportunities as well as great challenges for companies and important areas for researchers to explore.

With the wave of Internet expansion, more and more firms are now using web portals. A web portal is "a web site that offers a broad array of resources and services typically targeted towards specific categories of user populations" (Will, Ramaswamy, and Schaeck, 2004). Web portals are quickly gaining popularity and common adoption because they provide end users with unified access to content, applications, and collaboration services in a highly personalized manner. From the business side, portals help corporate IT staff by enabling them to integrate independently developed applications in a cost-effective way. Also, portals help companies establish a consumer community by creating a consistent, branded experience to customers (Will et al., 2004).

Despite the rapid increase of web portals, there is limited research studying user satisfaction with web portals. In fact, research on user satisfaction with Internet or web-based information systems in general is scarce (Simmers and Anandarajan, 2001). A search of keywords "user satisfaction" and "Internet or web" only yielded 39 academic articles[1]. On the other hand, researchers are starting to pay more attention to this fascinating research area. Studies such as (Abdinnour-Helm, Chaparro, and Farmer 2005; Carlos, Miguel, and Raquel, 2006; Garrity, Glassberg, Kim, and Sanders, 2005; Moshe, Chana, and Itay, 2006; Muylle, Moenaert, and Despontin, 2004) are among the pioneers to examine user satisfaction with Internet or web.

In order to address a gap in literature that may provide valuable insight for research and for companies that use web portals, we intend to examine user satisfaction with portals. Specifically, we partly adopt the DeLone and McLean (1992) model to

---

[1] Search conducted on February 28, 2006.

look at user satisfaction and system usage of portals; we also include behavioral and demographical factors that may influence user satisfaction based on literature review. The research questions we try to answer are:

Research questions

- Do behavioral and demographical factors, such as previous web use experience, type of web portal used, age, and gender influence user satisfaction with web portals?
- Does user satisfaction influence the use of web portals?

The contributions of this study will be meaningful for both academic research and business practices. Firstly, it addresses a literature gap by examining user satisfaction with and usage of web portals. Secondly, it is extending the DeLone and McLean (1992) IS success model to include demographical and behavioral factors as antecedents of user satisfaction and system usage. Thirdly, the findings of this study will be valuable for IT staff of enterprises because it may provide guidance for customizing and personalizing web portal services to increase customer satisfaction with the web portals.

The rest of this paper is organized as follows. In the theoretical framework section, we review relevant literature and propose our research model. Then we discuss the research methodology adopted in this study to collect data and procedures for hypotheses testing. After that we present our data analyses and findings from the study. Finally we explain the implications of the research findings, discuss the limitations of the study, and identify areas for future research.

THEORETICAL FRAMEWORK

In this section we review relevant literature including IS success, user satisfaction, system usage, web portals, and factors that influence user interaction.

IS Success

IS success research examines the various approaches, criteria, and methods to evaluate the effectiveness of information systems, which has been an enduring research theme in IS literature (DeLone and McLean, 2003). Among the numerous studies examining IS success over the past years, DeLone and McLean's (1992) IS success model is considered the most comprehensive information system assessment model available in IS literature (Helail and Girish, 2005). According to the DeLone and McLean model, IS success is a multidimensional construct, which includes system quality, information quality, system usage, user satisfaction, individual impact, and organizational impact (DeLone et al., 1992). Due to complicatedness of IS success, surrogate measures have been developed and are usually used to measure how successful information systems are, among which system usage and user satisfaction are widely accepted and used (Bokhari, 2005). Next we will review literature on user satisfaction and system usage individually.

User Satisfaction

User satisfaction is "the affective attitude towards a specific computer application of someone who interacts with the application directly" (Doll and Torkzadeh, 1988 p. 261). User satisfaction has drawn much attention from IS researchers. A great number of studies have been conducted on user satisfaction, which can be classified into three categories: measurement of user satisfaction, antecedents of user satisfaction, and consequences of user satisfaction. There has been considerable research devoted to establishing a standard user satisfaction instrument since the 1980s (Bailey and Pearson, 1983; Baroudi, Olson, and Ives, 1986; Benson 1983; Doll and Torkzadeh, 1988; Ives, Olson, and Baroudi, 1983). Among the user satisfaction instruments developed, the End User Computing Satisfaction (EUCS) instrument by Doll and Torkzadeh (1988) is well accepted for validity, reliability and robustness; therefore we will use the EUCS instrument to measure user satisfaction with web portals. As for antecedents of user satisfaction, prior research identify a number of factors that may influence user satisfaction, such as user involvement (Ives et al., 1983), system quality (DeLone and McLean, 1992), and information quality (DeLone and McLean, 1992). When talking about consequences of user satisfaction, system usage is often regarded as the results of satisfaction with systems (Bokhari, 2005). In the next subsection we review literature on system usage.

System Usage

System usage is defined as "either the amount of effort expended interacting with an information system or, less frequently, as the number of reports or other information products generated by the information system per unit time" (Trice and Treacy, 1988). In IS research, system usage has been adopted as the dependent variable (Bokhari 2005), such as (Baroudi et al., 1986; Trauth and Jessup, 2000; Zinkhan, Joachimsthaler, and Kinnear, 1987). The number of hours spent with a system and frequency of use are two prominent measures of system usage in literature (Hendrickson and Collins, 1996).

Research on user satisfaction and system usage have been conducted with a variety of information systems. For example, Zviran (1992) examine user satisfaction with hospital information systems; Chen, Soliman, Mao, and Frolick, (2000) study satisfaction and use with data warehouse systems; Zviran, Pliskin, and Levin (2005) and Somers, Nelson, and Karimi (2003) look at ERP setting; and Abdinnour-Helm et al., (2005) investigate user satisfaction with Web sites. However, there has not been much research on user satisfaction and system usage with web portals. Next, we will review literature on web portals.

Web Portals

Web portals started to develop in early 1990s (Will et al., 2004). A web portal is usually a gateway to information, such as documents, data, records, reports, images, ideas, and services (Moore, 2003). Although there's no single model of what comprises a portal, most offer a core set of functions involving connection, content, commerce, and community (Rao, 2001). Portals can be classified into three types based on the functions they perform: horizontal portals, vertical portals and enterprise portals. A Horizontal portal is a web site that provides consumers with access to a number of different sites in terms of content and functionality. This portal is generally a consumer portal that can be personalized and customized by the user. Horizontal portals are also called general public portals or mega portals. My Yahoo! and My Excite are examples of horizontal portals. A Vertical portal or vortal focuses on a specific community of users (Isaacs, 1999). This portal is geared towards a narrow audience or a community with specific interests, such as, consumer goods, computers, retail, brokerage services, and banking. An enterprise portal (also called a corporate portal) provides access to proprietary internal information within a company via a company intranet and access to selected Internet sites. For example, employees can have access to their pay stubs, retirement contributions through an enterprise portal. There are other specialized portals based on technology or location that have been identified in information systems research. Examples of such portals are: WAP portals that use mobile technology, and embedded or appliance portals where the portal is embedded in an appliance such as WebTV and OnStar in vehicles.

In this research we restrict our discussion to the two major types of web portals: horizontal portals and vertical portals. Although we find a number of papers in IS literature classify web portals, there is little research on user satisfaction and usage of web portals, which is the main focus of this study.

The widespread use of Internet and web portals make it necessary to explore whether the IS success theories established based on traditional standalone type of information systems will still apply in web portals. In this study we examine whether user satisfaction and system usage of web portals are related as argued in the DeLone and McLean (1992) model.

Although DeLone and McLean (1992) model is valuable for understanding the success of an IS, it may not be enough for Internet and web portals. The fast development of web portals makes customization and personalization not only a possibility for firms, but also a necessity for firms to meet their customers' individual needs, especially in a hypercompetitive environment. Customers' behavioral and demographical characteristics have become much more important than in traditional IS environment. Our paper intends to contribute to knowledge by also including behavioral and demographical factors that may influence user satisfaction and system usage of web portals. In the subsection that follows, we review literature on those factors influencing user interaction with web portals.

Factors Influencing User Interaction

What factors may influence user satisfaction and system usage? Different authors present a long list of potential factors such as user expectation (Ginzberg, 1981), previous experience (Igbaria, Parvi, and Huff, 1989; Yap, Thong, and Raman, 1994), training (Simmers and Anandarajan, 2001), demographics such as age, gender, organizational position (Simmers and Anandarajan, 2001). Based on literature, we propose that general experience with web, age, gender, and the type of portal used may impact user satisfaction, which may in turn influence system usage of web portals. Our research model is presented and described below.

Research Model

Based on our review of literature we propose the research model as shown in Figure 1. While earlier research in the field have identified the individual variables in our model as potential factors that influence user satisfaction with a system, the role of portal type is unclear. We consider horizontal and vertical portals in this study. Horizontal portals provide users with a site that integrates content and functionality from multiple sites. A vertical portal, on the other hand, focuses on a specific community of users. This could be a community that shares specific interests. We believe that users use horizontal and vertical portals for completely different reasons. User expectations are also different for these two types of portals. Therefore, we propose that the type of portal will also influence user satisfaction with the web portal and its use.
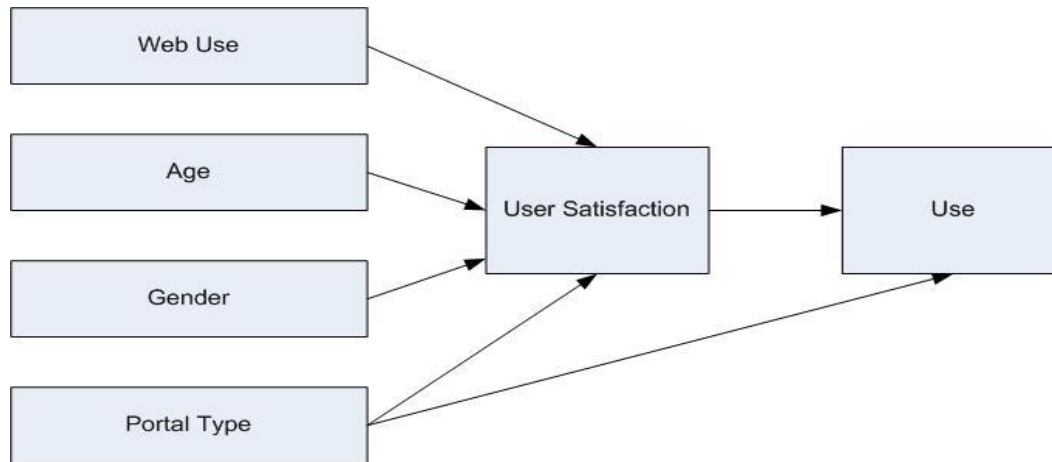
Figure 1: The Research Model

In our model we propose that prior use of the Web (we call it Web Use), age of the user, gender and portal type influence a user's satisfaction with a web portal, and satisfaction, in turn, influences actual use. Past research has shown that demographical variables such as age and gender may influence users' evaluation of web (Simmers and Anandarajan, 2001). Therefore, we state our hypothesis as follows:

Hypothesis 1

Prior web use, age, gender and type of web portal will influence user satisfaction with the web portal.

In information systems research a number of studies have considered use as a measure of success (Baroudi et al., 1986; Trauth et al., 2000; Zinkhan et al., 1987). In fact, as two important measures of information systems success, user satisfaction and system usage, or web portal use in this study, are regarded as closely related (Bokhari, 2005). We believe that the type of portal will also influence use of a portal. Therefore, we state our second hypothesis as follows:

Hypothesis 2

User satisfaction and type of portal will influence web portal use.

In this section we have provided our theoretical framework including a review of literature, the research model and hypotheses. We present our research methodology next.

RESEARCH METHODOLOGY

Sample

The sample for this study consisted of 340 students from a large mid-Atlantic university in the USA. The gender distribution was nearly equal with 174 males (52%) and 158 females (48%). A third of the subjects had work experience of less than a year, another third had one to three years of experience, and rest worked for more than four years. The subjects in this study used their computers both at work and home – 77 percent used computers at school, 86 percent at home and 41 percent at work. Tables 1A, 1B and 1C provide descriptive statistics regarding the sample used in this study.

	Portal Type		
Age	**Horizontal Portal**	**Vertical Portal**	**Total***
Under 25	110 (38%)	117 (40%)	227 (78%)
25 – 35	35 (12%)	19 (7%)	54 (19%)
36 – 45	3 (1%)	4 (1%)	7 (2%)
Over 45	2 (1%)	1 (0%)	3 (1%)
Total	150 (52%)	141 (48%)	291
* N = 340. There are some missing data.			
Table 1A: Sample Characteristics - Age and Portal Type			

	Portal Type		
Web Use	**Horizontal Portal**	**Vertical Portal**	**Total***
< 30 mi	0	0	0
30 – 60 mi	7 (2%)	4 (1%)	11 (4%)
1 – 2 hr	21 (7%)	20 (7%)	41 (14%)
3 – 5 hr	44 (15%)	43 (14%)	87 (29%)
6 – 10 hr	40 (13%)	36 (12%)	76 (26%)
> 10 hr	40 (13%)	42 (14%)	82 (28%)
Total	152 (51%)	145 (49%)	297
* N = 340. There are some missing data.			
Table 1B: Sample Characteristics - Web Use and Portal Type			

	Portal Type		
Gender	**Horizontal Portal**	**Vertical Portal**	**Total***
Male	84 (29%)	70 (24%)	154 (53%)
Female	66 (23%)	70 (24%)	136 (47%)
Total*	150 (52%)	140 (48%)	290
* N = 340. There are some missing data.			
Table 1C: Sample Characteristics - Gender and Portal Type			

We believe that our sample is good representation of the end user population since some of the students were full-time students with little work experience, whereas, others were part-time students from different industries and organizational levels. Our sample size is comparable to other user satisfaction studies such as McHaney and Cronan (1998) and McHaney, Hightower, and Pearson (2002).

Data Collection

We used a survey methodology for data collection. A paper-based questionnaire was distributed to the 340 undergraduate and graduate students to gather data about their satisfaction with web-based portals. We informed students that participation in the study was voluntary and anonymous; we did not collect any identifying information from respondents. Respondents needed around 10 minutes to complete the survey.

In the survey instrument we collected data in three major categories: descriptive data about the user (gender, work experience, use of computers), detailed data about the use of the World Wide Web and the Internet (hours of Internet use, types of portals used), and data on user satisfaction with web portals. We operationalized user satisfaction with portals as a second order construct that consists of five components: content, accuracy, ease of use, and timeliness (Doll and Torkzadeh, 1988). We also measure user satisfaction as a single order construct.   Other independent variables such as web use, age of

the user and portal type were all categorical variables. Only two types of portal types were listed in our study they were vertical portals and horizontal portals. Subjects were asked to answer all questions regarding their satisfaction with the (one) portal they used the most. This portal could either be a horizontal or vertical portal. In the sections that follow we provide details of our analysis and results.

Analysis

After collecting data, we run pair-wise correlation to identify any multicollinearity issues. Then we test our two hypotheses by testing parts of our overall model. It is important to note here that we have two measures for user satisfaction with web portals: a second-order construct that has five components and a measure of overall satisfaction. We test each hypothesis using these two different measures. We use multiple regressions for our statistical analysis. We found no evidence in the limited literature on satisfaction with web portals that suggests that interaction effects between independent variables, such as, age and web use, are significant. Therefore, we do not test for these interaction effects in our model. We provide the results from our analysis in the next section.

RESULTS AND DISCUSSION

In this section we report on results of our data analysis. Results from running pair-wise correlations are shown in a correlation matrix (Table 2 below). The matrix does not reveal any significant issues with multicollinearity since none of the correlations are greater than 0.8. Since there are no multicollinearity issues with the data we proceed to hypothesis testing.

	Mean	SD	1	2	3	4	5	6	7
1. Web Use	4.600	1.134	1.000						
2. Age	1.293	0.567	0.147***	1.000					
3. Content	3.711	0.716	0.005	-0.131*	1.000				
4. Accuracy	3.859	0.791	0.061	-0.163***	0.653***	1.000			
5. Format	3.935	0.726	0.029	-0.205***	0.580***	0.588***	1.000		
6. EOU	4.191	0.771	0.0479	-0.164***	0.417***	0.467***	0.628***	1.000	
7. Timeliness	3.994	0.654	0.100*	-0.165***	0.505***	0.569***	0.547***	0.518***	1.0000
*p-value < 0.10; **p-value<0.05; ***p-value<0.01; EOU = Ease of Use									

Table 2: Correlation Matrix

We test our hypotheses by using multiple regressions. In hypothesis 1 we test the effect of web use, age, gender and type of portal on user satisfaction with the portal. We operationalized user satisfaction using two measures. The first is an overall satisfaction measure provided by Doll and Torkzadeh (1988). The second measure represents user satisfaction as a second order construct that consists of five components: content, accuracy, format, ease of use and timeliness (Doll and Torkzadeh, 1988). Therefore, we test each of the hypotheses using these two different measures of satisfaction. We ran separate multiple regressions for the two measures of user satisfaction.

Multiple regression of web use, age, gender and type of portal on overall user satisfaction shows that web use and age of the user have significant effect on the overall user satisfaction with the portal. Table 3 shows the results of multiple regression. Greater the extent of web use by the individual user greater is the overall user satisfaction. Age has a negative effect on user satisfaction, which means that older the user, lesser is their satisfaction with web portals. Gender and portal type do not affect on user satisfaction.

Dependent Variable	R^2	F-value	Independent Variable	Coefficient	T-value
Overall Satisfaction	0.0461	3.43***	Web Use	0.083	2.06*
			Age	-0.172	-2.04**
			Gender	0.089	0.96
			Portal Type	0.178	1.93*
*p-value < 0.10; **p-value<0.05; ***p-value<0.01					

Table 3: Overall Satisfaction

In the second analysis we considered user satisfaction to be a second order construct. In this we ran separate regressions of the independent variables in hypothesis 1 with each of the components of satisfaction: content, accuracy, format, ease of use, and timeliness. Tables 3A through 3E show the results of regression analysis. Table 4A shows the results of a regression of web use, age, gender and portal type on user satisfaction. We found that the model was not significant. Therefore, we can say that the independent variables do not have a significant effect on the content component of satisfaction.

Dependent Variable	R^2	F-value	Independent Variable	Coefficient	T-value
Content	0.0224	1.62	Web Use	0.014	0.40
			Age	-0.136	-1.83
			Gender	0.066	0.81
			Portal Type	0.098	1.21
*p-value < 0.10; **p-value<0.05; ***p-value<0.01					

Table 4A: Content

We found that web use has a positive effect and age has a negative effect on accuracy (see Table 4B). Gender and portal type were not significant in the model.

Dependent Variable	R^2	F-value	Independent Variable	Coefficient	T-value
Accuracy	0.0420	3.10**	Web Use	0.067	1.69*
			Age	-0.228	-2.76***
			Gender	0.029	0.32
			Portal Type	0.117	1.30
*p-value < 0.10; **p-value<0.05; ***p-value<0.01					

Table 4B: Accuracy

We found that age has a negative effect on two components of user satisfaction: format and ease of use. None of the other independent variables are significant in the regression models. Tables 3C and 3D provide the results of our analysis for format and ease of use.

Dependent Variable	R^2	F-value	Independent Variable	Coefficient	T-value
Format	0.0529	3.96***	Web Use	0.050	1.33
			Age	-0.289	-3.65***
			Gender	0.027	-0.31
			Portal Type	0.083	0.97
*p-value < 0.10; **p-value<0.05; ***p-value<0.01					

Table 4C: Format

Dependent Variable	R^2	F-value	Independent Variable	Coefficient	T-value
Ease of use	0.053	3.99***	Web Use	0.039	0.98
			Age	-0.261	-3.18***
			Gender	0.061	-0.68
			Portal Type	0.156	1.74*
*p-value < 0.10; **p-value<0.05; ***p-value<0.01					

Table 4D: Ease of use

Web use and age have a significant impact on the timeliness component of satisfaction. Web use has a positive effect, whereas, timeliness has a negative effect on timeliness. Table 4E provides the results.

Dependent Variable	R^2	F-value	Independent Variable	Coefficient	T-value
Timelines	0.048	3.59***	Web Use	0.09	2.70*
			Age	-0.172	-2.49**
			Gender	-0.015	-0.20
			Portal Type	0.097	1.29
*p-value < 0.10; **p-value<0.05; ***p-value<0.01					

Table 4E: Timeliness

We found support for hypothesis 1 based on the results described above. Greater the use of the web greater is the user's satisfaction with web portals. Age has a negative effect on satisfaction with portals. This relationship is true for both, user satisfaction as a single order construct, as well as, satisfaction as second order construct. Our findings support prior research on age. Age has been known to negatively impact technology acceptance (Venkatesh, Morris, Davis, and Davis, 2003).

Let us move to the analysis for our second hypothesis which examines the relationship between user satisfaction and portal use. Here we also examine whether the type of portal has an impact on portal use. Here again we operationalize user satisfaction using two measures. Table 5 and Table 6 show that the model was not significant.

Dependent Variable	R^2	F-value	Independent Variable	Coefficient	T-value
Use	0.0041	0.52	Overall Satisfaction	39.321	0.75
			Portal Type	57.090	0.32
*p-value < 0.10; **p-value<0.05; ***p-value<0.01					

Table 5: Overall Satisfaction and Portal Type on Portal Use

Dependent Variable	R^2	F-value	Independent Variable	Coefficient	T-value
Use	0.018	0.78	Content	-9.187	-0.16
			Accuracy	92.944	1.76
			Format	-11.243	-0.19
			Ease of Use	-1.270	-0.03
			Timeliness	-26.133	0.43
			Portal Type	0.156	1.74*
*p-value < 0.10; **p-value<0.05; ***p-value<0.01					

Table 6: Satisfaction components and Portal type on Portal Use

Our results show that we did not find support for Hypothesis 2. User satisfaction and the type of portal used do not have a significant effect on the use of the portal. The insignificant relationship between satisfaction and usage does agree with existing literature, which suggests the correlation between them is very low (Bokhari, 2005).

There are a number of reasons that can explain these results. First, there could be other extraneous factors that impact use of the portal. One such factor could be the user's need to aggregate information from various electronic sources on one site. The other could be the ability to personalize the portal pages to meet the user's needs. Second, the use of the portal may be required or mandatory. Information provided in some organizational portals may be job-related and individuals may use them whether they are satisfied with them or not. Third, use of a portal may be influenced by network effects. Portals provide tools for instant messaging and sharing of calendars, albums, files and folders. Individuals may use a portal because their colleagues or friends use the same system to communicate and share information. All these reasons could possibly explain our finding that user satisfaction with a web portal does not influence its use.

In this section we presented the results of statistical analysis, and discussed our findings. Next, we will discuss the value of this study for practitioners and researchers and identify areas of future research.

CONCLUSION

In this study we found that the number of hours of web use had a positive effect and age of the user had negative impact on satisfaction with web portals. More experienced users were more satisfied with web portals, and older users were less

satisfied. We also found that the satisfaction was different for different web portals. We found that this difference can be attributed to the differences in the ease of use of the two types of portals. Our results also indicate that there is no significant relationship between satisfaction of the user with a web portal and actual use of the system.

Our findings provide important implications for researchers and practitioners. We have in this research identified some factors that influence user satisfaction with web portals. But we have not found a significant relationship between user satisfaction and use of a web portal. Researchers in this field should identify additional factors that could influence use of a portal. Practitioners in the field should pay greater attention to our results that show that web use, age and type of portal influence user satisfaction. For example, for frequent web users, more short cuts should be provided on the web portal site so that the user can access the information they need quickly, with a minimum number of clicks. Since age of the user has a negative impact on satisfaction, web portals should be designed differently for higher age groups. Here additional research may be necessary to determine what factors influence such difference in satisfaction between the various age groups.

Our study also has its limitations. Our first limitation is that we use a student sample in this study. This does raise some generalization issues. Although our sample consisted of students, they were full-time or part-time students and we believe they were representative of users on the Web. We recommend additional studies in corporate settings.

REFERENCES

1. Abdinnour-Helm, S.F., Chaparro, B.S., and Farmer, S.M. (2005) Using the End-User Computing Satisfaction (EUCS) Instrument to Measure Satisfaction with a Web Site, *Decision Sciences,* 36, 2, 341-364.

2. Bailey, J.E., and Pearson, S.W. (1986) Development of a Tool for Measuring and Analyzing Computer User Satisfaction, *Management Science,* 29, 5, 530-545.

3. Baroudi, J.J., Olson, M.H., and Ives, B. (1986) An empirical study of the impact of user involvement on system usage and information satisfaction, *Communications of the ACM,* 29, 3, 232-238.

4. Benson, D.H. (1983) A Field Study of End User Computing: Findings and Issues, *MIS Quarterly*, 7, 4, 35-45.

5. Bokhari, R.H. (2005) The relationship between system usage and user satisfaction: a meta-analysis, *Journal of Enterprise Information Management*, 18, 1/2, 211.

6. Carlos, F., Miguel, G., and Raquel, G. (2006) The role played by perceived usability, satisfaction and consumer trust on website loyalty, *Information & Management*, 43, 1, 1.

7. Chen, L.-d., Soliman, K.S., Mao, E., and Frolick, M.N. (2000) Measuring user satisfaction with data warehouses: An exploratory study, *Information & Management*, 37, 3, 103-110.

8. D'Ambra, J., and Rice, R.E. (2001) Emerging factors in user evaluation of the World Wide Web, *Information & Management*, 38, 373-384.

9. DeLone, W.H., and McLean, E.R. (1992) Information Systems Success: In search of the independent variable, *Information Systems Research*, 3, 1, 60-95.

10. DeLone, W.H., and McLean, E.R. (2003) The DeLone and McLean model of information systems success: A ten-year update, *Journal of Management Information Systems*, 19, 4, 9.

11. Doll, W.J., and Torkzadeh, G. (1988) The Measurement Of End-User Computing Satisfaction, *MIS Quarterly*, 12, 2, 259.

12. Garrity, E.J., Glassberg, B., Kim, Y.J., Sanders, G.L., and et al. (2005) An experimental investigation of Web-based information systems success in the context of electronic commerce, *Decision Support Systems*, 39, 3, 485.

13. Ginzberg, M.J. (1981) Early diagnosis of MIS implementation failure: promising results and unanswered questions, *Management Science*, 27, 4, 459-469.

14. Helail, A., and Girish, H.S. (2005) An empirical application of the Delone and McLean model in the Kuwaiti private sector, *The Journal of Computer Information Systems*, 45, 3, 113-122.

15. Hendrickson, A.R., and Collins, M.R. (1996) An assessment of structure and causation of IS usage, *The Database for Advance in Information Systems*, 27, 2, 61.

16. Igbaria, M., Parvi, F.N., and Huff, S.L. (1989) Micro computer applications: an empirical look at usage, *Information & Management*, 16, 187-196.

17. Isaacs, N., (1999) Looking at Web Portals, article on CNET Builder.com, http://www.builder.com/Business/Portal/.

18. Ives, B., Olson, M.H., and Baroudi, J.J. (1983) The measurement of user information satisfaction, *Communications of the ACM*, 26, 10, 785-793.

19. McHaney, R., and Cronan, T.P. (1998) Computer simulation success: On the use of the end-user computing satisfaction instrument: A comment, *Decision Sciences*, 29, 2, 525-536.

20. McHaney, R., Hightower, R., and Pearson, J. (2002) A Validation of the End-User Computing Satisfaction Instrument in Taiwan, *Information & Management*, 39, 503-511.

21. Moore, M.A. (2003) Through the eye of a needle: The importance of portals to environmental information management, *Environmental Quality Management*, 13, 1, 55.

22. Moshe, Z., Chana, G., and Itay, (2006) A. User satisfaction from commercial web sites: The effect of design and use, *Information & Management*, 43, 2, 157.

23. Muylle, S., Moenaert, R., and Despontin, M. (2004) The conceptualization and empirical validation of web site user satisfaction, *Information & Management*, 41, 5, 543-560.

24. Rao, S.S. (2001) Portal proliferation: An Indian scenario, *New Library World*, 102, 9, 325.

25. Simmers, C.A., and Anandarajan, M. (2001) User satisfaction in the Internet-anchored workplace: An exploratory study, *JITTA: Journal of Information Technology Theory and Application*, 3, 5, 39.

26. Somers, T.M., Nelson, K., and Karimi, J. (2001) Confirmatory Factor Analysis of the End-User Computing Satisfaction Instrument: Replication within an ERP Domain, *Decision Sciences*, 34, 3, 595-621.

27. Trauth, E.M., and Jessup, L.M. (2000) Understanding Computer-Mediated Discussions: Positivist and interpretive Analyses of Group Support System Use, *MIS Quarterly*, 24, 1, 43-79.

28. Trice, A.W., and Treacy, M.E. (1988) Utilization as a dependent variable in MIS research, *Data Base*, 33-41.

29. Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. (2003) User acceptance of information technology: Toward a unified view, *MIS Quarterly*, 27, 3, 425-478.

30. Will, R., Ramaswamy, S., and Schaeck, T. (2004) WebSphere Portal: Unified user access to content, applications and services, *IBM Systems Journal*, 43, 2, 420.

31. Yap, C.S., Thong, J.Y.L., and Raman, K.S. (1994) Effect of government inventive on computerisation in small business, *European Journal of Information Systems*, 3,3, 191-206.

32. Zinkhan, G.M., Joachimsthaler, E.A., and Kinnear, T.C. (1987) Individual Differences and Marketing Decision Support System Usage and Satisfaction, *Journal of Marketing Research*, 24, 2, 208.

33. Zviran, M. (1992) Evaluating User Satisfaction in a Hospital Environment: An Exploratory Study, *Health Care Management Review*, 17, 3, 51.

34. Zviran, M., Pliskin, N., and Levin, R. (2005) Measuring user satisfaction and perceived usefulness in the ERP context, *The Journal of Computer Information Systems*, 45, 3, 43.