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Website design: Viewing the web as a cognitive landscape

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Abstract

Web content has been identified as one of the main factors contributing to repeat visits. As content on the web includes text, pictures, graphics, layout, sound, motion and, someday, even smell, making the right web content decisions are critical to effective web design. While an understanding of marketing strategies that attract visitors to websites is beginning to emerge, how to convert web surfers to repeat visitors is a less well-understood phenomenon. Through an empirical study, the authors develop the Website Preference Scale (WSPS) based upon the work in environmental psychology of Rachel Kaplan and Stephen Kaplan. The results identify underlying dimensions of effective website design and provide insight into site design characteristics, which may lead to a higher likelihood of revisit.

Keywords: Website design; Website assessment; Web content; Web environment

1. Introduction

By whatever measure used, the web is big. The majority of American homes now have computers, 64% of Americans age 12 or older have used the Internet in the past year (CyberAtlas, 2000), and retail sales are projected to reach US$74 billion by 2002 (Forrester Research, 2001). It is, then, no small wonder that most companies feel that they need at least some level of web presence today. The question facing all companies contemplating web initiatives is how to build a successful website.

Amazon has raised and spent millions of dollars on building and maintaining their site, and creating the Amazon brand. During its heyday, Amazon's valuation was attributed, at least in part, to its ability to capture and hold their customers' attention. As a result, many e-retailers adopted the Amazon web design format when developing their own sites.

By contrast, traditional retailers going online provide an alternative to the Amazon model. Their tendency is to transfer what works in the brick-and-mortar world to the Internet. However, even the seasoned retailers (e.g., Disney) are finding it difficult to create the right formula to succeed online (Couzin, 2000).

With the increasing number of companies taking advantage of the Internet, it is important to understand what drives utilization of one site over another. A recent study by Forrester Research indicates that high-quality content, ease of use, speed and frequency of updating are the top four factors contributing to repeat visits (Numbers, 1999). Yet, another study of 50 shopping sites run by US and UK retailers indicated a failure to satisfy the customer's shopping experience on at least some of these dimensions (Kane, 1999).

While an understanding of marketing strategies that attract visitors to websites is beginning to emerge (e.g., Schwartz, 1996), how to convert web surfers to repeat visitors through effective web design is a less well-understood phenomenon. Practitioners' advice on site design and content abound and is often conflicting. The research presented in this paper suggests that one way to assist in the development of effective web designs is to examine the web from the perspective of cognitive psychology.

The work of environmental psychologists, Rachel Kaplan and Stephen Kaplan, provides a means of understanding how to facilitate the interactive experience through the concept of a cognitive environment. Kaplan and Kaplan view environments as providing information in many ways—through signs, icons, with or without words. Their studies apply cognitive psychology to the design of physical

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landscapes. Through their research, they have found that informational needs influence preferences for certain landscapes. People both want to make sense of and get involved in their landscapes. By utilizing principles from cognitive psychology, Kaplan and Kaplan have demonstrated that it is possible to develop landscapes, which facilitate sense making and involvement.

In many ways, designing effective web content is very similar to designing a physical landscape. Computer interaction is intensely cognitive involving perceptions and preferences. Interactivity implies not only perceiving the web landscape, but also entering into it and "experiencing" the space.

In an attempt to develop a better understanding of what constitutes high-quality web content (i.e., design which facilitates revisit and purchase), the authors propose the Website Preference Scale (WSPS) as a way to assess effective web design based on the perspective that a website is a cognitive landscape. After a brief discussion of web content, Kaplan and Kaplan's application of cognitive psychology to physical landscapes (the Preference Framework) is presented. The Preference Framework is then extended to the web environment. An exploratory study designed to develop the WSPS is then presented. Finally, conclusions and a future program of research are discussed.

2. Web content

Research has repeatedly demonstrated that the sensory shopping experience contributes to making the sale and building customer relationships for the brick-and-mortar retailer. Further, there is evidence that sensory stimuli such as music, color and lighting can influence the amount of time and money which a shopper spends in a retail establishment (e.g., Herrington and Louis, 1994). For the e-retailer, the sensory shopping experience must be played out on the template of the web page.

Thus far, two of the most common ways used to measure website effectiveness are the number of "eyeballs" or click-throughs. These measures merely capture how effective the firm's strategy is in regards to driving traffic to the site. To measure how effective a site is in terms of developing an appropriate e-retail sensory environment requires measuring the attitude toward the site design and intention to revisit. In the case of a site designed for retail sales, purchases would be an additional measure. In the study presented in this paper, the focus is on attitude towards the site design and intention to revisit.

Website design presents a new challenge for marketers conversant in print media. Unfortunately, many companies have taken what they developed for other media (magazine advertisements, catalogues, etc.) and applied it directly to their website (e.g., www.pathfinder.com). Others involved in web page design believe that the theories that have evolved for effective use of print media do not transfer well to the web. For example, when designing ads for a newspaper, one has a large canvas to work with which lends itself to striking, intricate designs. Yet, newspaper layout does not transfer to the web as a computer screen cannot handle the same volume of information effectively (Nielsen, 1999). Consequently, simplicity of design has become the mantra of some web design gurus.

Many elements of design and graphic art can be used to convey content on the web. The choices are truly endless. Elements of space, use of images, size of images, use of animation and/or audio, number of words per line, color and size of characters are among just a few of these factors. Additionally, the work of content design does not stop with selecting the appropriate elements for the particular audience. Content design also involves deciding on the placement of those elements to facilitate their use. The Preference Framework of Kaplan and Kaplan (1982) and Kaplan et al. (1998) provides a means of sorting out these many options and designing an effective web landscape.

3. Cognitive landscapes

The work of Rachel Kaplan and Stephen Kaplan now spans several decades. Their research examines physical environments in an attempt to develop patterns for environmental designs that incorporate the end users' use of environmental cues, thus, making it easier for people to process information and function effectively.

Kaplan and Kaplan's research is also predicated on the love–hate relationship that people have with information. We are inundated with information from a wide variety of sources. Some of this information is important; some of it is trivial. Marketers are often accused of trying to make us think it is all important. In the case of web design, many developers have lamented that they just started piling on the elements and once they put things in, they were afraid to take things out (Hamilton, 1999). The target of this information blitzkrieg are left with is the onerous task of sorting through all of it.

One way in which humans cope with processing information is through the use of cognitive maps. Using a cognitive or mental map provides us with a means of sorting and storing information from our environment. Cognitive maps are an accumulation or summary of experiences. Humans draw on these maps to make their way through an environment. These maps influence "how the environment 'feels' to that person, what is noticed, what is ignored" (Kaplan and Kaplan, 1982, pp. 5–6).

Having a cognitive map, however, is not enough. Humans must be motivated to use and extend these maps through environments designed to take advantage of these cognitive maps (Kaplan, 1973a). People appreciate and are motivated to use information, which helps them expand previous knowledge contained in their cognitive maps. On the other hand, they have trouble understanding and are not

motivated to use information, which is not connected to the maps they already have. Further, providing too much information creates a barrier to engaging the recipient's internal map. Cognitive maps allow someone to go where he/she has never been before.

By recalling previous experiences stored in the cognitive maps, an individual gains a level of confidence in his/her ability to find his/her way (Kaplan et al., 1998). For example, having traveled on subways in New York or Boston, an individual traveling to Washington, DC for the first time would be able to draw on his/her cognitive map of a subway system and be able to anticipate how he/she would navigate from Points A to B.

3.1. Kaplan and Kaplan's Preference Framework

Based on the research of psychologists, architects and planners, Kaplan and Kaplan (1982) developed a Preference Framework (Table 1) to describe how people use information to satisfy their needs of making sense and exploring in an uncertain world. Their framework is based on a series of studies in which subjects were asked to view photographs of physical landscapes and landmarks and assess them against a list of items. These items were then factor analyzed resulting in the four factors, which comprise the Preference Framework.

From these studies, Kaplan and Kaplan found that making sense (understanding) and exploring (involvement) represent the two basic informational needs. These needs are further categorized by a time dimension that focuses on immediate versus longer-term possibilities. Individuals have preferences for environments, which will enable them to meet these needs in the future.

Humans, as cognitive animals, can quickly calculate the future possibilities of present choices. Kaplan and Kaplan's framework depicts both the immediate and future calculations, which can occur quickly but sequentially. The primary level of the Preference Framework represents an immediate or direct perception of the elements in a scene. For example: "Can I comprehend this situation (coherence); is there enough going on to maintain my interest (complexity)?" These dimensions allow a rapid assessment of a scene or situation based upon a surface examination. Settings which are orderly (coherent) increase the individual's ability to understand the environment. Environments containing richness of elements (complexity) encourage exploration. Neither complexity nor coherence alone is sufficient to motivate activating one's cognitive map and, hence, feeling confident and comfortable in an environment; both are required.

Table 1
Preference matrix

	Understanding	Exploration
Two-dimensional	Coherence	Complexity
Three-dimensional	Legibility	Mystery

Source: Kaplan et al. (1998, p. 13).

This immediate assessment is followed by an inference of what is deeper within a landscape. Kaplan et al. (1998) have equated this with moving from a two-dimensional space (coherence and complexity) to a three-dimensional space (legibility and mystery). In other words, standing at the garden gate (two-dimensional space) versus walking through the garden (three-dimensional space). The questions one would have on the latter level would be: "Does this environment have a memorable component that will help me find my way in the future (legibility); is there a chance to learn more (mystery)?" Having a memorable component act as a landmark assists in understanding an unfamiliar landscape while being distinctive reduces confusion in finding one's way in the future. To motivate someone to explore a landscape, there must be a promise of future satisfaction compelling the subject onward.

The fact that these two levels of assessment occur rapidly is why there is a preference for landscapes which score high on all four dimensions. Research demonstrates that people favor landscapes which recognize a preference for coherence and legibility (Lynch, 1960), while at the same time accommodating a desire for some complexity (Wohlwill, 1976) and mystery (Kaplan, 1973b).

3.2. The Preference Framework and the Internet

The Preference Framework makes sound theoretical sense in the context of an information approach to human functioning. Information, according to Kaplan et al. (1998), is central to human effectiveness. Thus, how information is presented, both in terms of content and organization, can facilitate or impede its utilization. Developed to provide guidance in designing physical landscapes, the Preference Framework is applicable to the Internet as it too is a highly cognitive, information-laden environment. Each of the elements of this framework can be associated with elements of the web landscape.

Coherence refers to the degree to which the environmental landscape hangs together. As such, coherence relies on redundancy of elements and textures. An example would be the coordinated colors in L.L. Bean's website (http://llbean.com). All of the colors in the menubars and the products highlighted give an "outdoorsy" feel, utilizing shades of blue, green and brown.

Complexity refers to the richness of the elements in a setting. FTD's website (http://ftd.com) contains color photos of floral arrangements, product selection suggestions, short articles, as well as a left-hand menubar for navigation.

It is relatively easy to see how these first two dimensions can be related to website design. Through consistent deployment of a complementary color scheme or through variety in design elements, the user can make sense of and become interested in the Webscape.

Legibility is defined by distinctiveness. By possessing a memorable component, a landmark, a scene facilitates finding one's way. In the web, this is similar to having a

site map to make navigation of the website easier or having a distinctive graphic or icon that makes way-finding much more straightforward. For example, in L.L. Bean's website, the menubar remains positioned at the bottom of the screen no matter to what page one moves.

Mystery is used in landscape design, whereby a curved path is far more enticing than a straight one. Mystery enhances one's desire to explore a space by conveying the feeling that much more can be found if one keeps on going. Many websites try to establish "mystery" by having pages linked together not only mechanically but through the very content itself. For example, after an explanation of basic color theory on one site, the author ends one page with a link to the next with the phrase "let's go" hoping that they have developed the desire to learn more (http://alistapart.com/stories/color/).

Making websites "user friendly" requires making them easy to use and understand. A web developer can use coherence, complexity, legibility and mystery to tap into the cognitive maps individuals employ to make sense of their world, thus, building sites users feel comfortable returning to over and over again. The preference matrix provides a useful way to begin to develop an understanding of how to select appropriate web content elements.

In the remainder of this paper, we present a study designed to develop the WSPS. Based on the previous discussion, we test the following hypothesis to demonstrate the usefulness of this scale to website development:

Hypothesis 1: The stronger the WSPS score, the more positive will be the overall impression of the site.

Hypothesis 2: The stronger the WSPS score, the more likely it will be that the site will be revisited.

4. Method

This empirical study was designed to develop and test the WSPS, which represents the first phase of a larger research program. The overall goal of the program is to identify the content elements, which can facilitate preference, thus, providing site developers with guidance as to how to cultivate repeat visits through attractive cognitive environments. This represents a first step in establishing that the WSPS may be an indicator of effective web design from an information processing perspective.

4.1. Questionnaire development

The four dimensions—coherence, complexity, legibility and mystery—which comprise the WSPS, were operationalized as a five-point rating scale. Each dimension was measured using multiple items. These items were developed through a variety of techniques. First, studies used to develop the Preference Framework were reviewed for insight into item format. Second, to adopt these questions to the web, critical incident technique was utilized. In this phase of questionnaire development, open-ended questions were administered to a student population with the same demographic characteristics as those used in the study presented below. For example, the respondents were asked to identify characteristics of websites they liked (e.g., what helped them to "make sense of" a website). These responses were then content analyzed using the themes from the work of Kaplan and Kaplan (1982) and Kaplan et al. (1998).

Web effectiveness was operationalized as two separate items, (1) overall impression of the site and (2) likelihood of revisit. These items were measured using a five-point rating scale. There is precedence in the marketing literature for the use of single item measures (e.g., Anderson and Narus, 1990).

An initial draft of the questionnaire was pretested. In refinement of this instrument, two sets of analyses were performed on the data. First, factor analysis was performed to ascertain whether the items loaded on the dimensions they were written to represent. In this analysis, three factors emerged which fit well with Kaplan and Kaplan's (1982) and Kaplan et al.'s (1998) dimensions of coherence, complexity and legibility. Because mystery did not emerge as a factor, additional items were written in the attempt to better delineate this dimension. One item, "is friendly to first time visitors" was changed to "would be friendly to first time visitors" in the attempt to capture the future temporal aspect of mystery.

Second, using the three factors which emerged, item-to-total correlations and reliability analysis were performed to assess the reliability of the factors. Coefficient alphas were well above .70, which suggests a satisfactory level of reliability (Nunnally, 1978).

4.2. Data collection

Subjects in the study were 211 undergraduate students at two Northeastern institutions of higher education. The group was comprised of an equal number of males and females with an age range of 18–25. After removal of incomplete surveys, 2035 usable responses were gathered.

The subjects Internet behavior matched the typical web user's behavior at the time of data collection (Internet Use Trends: Mid-Year, 1999). While 49% had never purchased online, their web research behavior indicates greater familiarity with the web. Only 1% of the subjects never use the web for research and over 82% use the web on a weekly basis. Consequently, the subjects were generally conversant in navigation on the web, but not necessarily heavy purchasers. Again, this was consistent with the web behavior of consumers.

The students were asked to evaluate the websites while thinking of the site as a whole. The sites selected represent the broad spectrum of sites, which web surfers might visit. Research sites (e.g., Market Guide) as well as retail sites

(e.g., L.L. Bean) were selected. The e-retailers were selected from a variety of categories, which this population might patronize. As actual websites were chosen for this study, the subjects' familiarity with the sites as well as familiarity with the brands were also assessed as a part of background data collection efforts.

Data collection took place in a controlled setting. University computer labs with one computer per subject were utilized. All subjects were given instructions and began the survey at the same time. The students were instructed to wander through each site as if they were searching for information using their regular surfing behavior. They were instructed not to complete the evaluation of the site until they had navigated through the home page and at least three sub pages of the site. The order of site evaluation was randomly distributed to avoid an order effect. Students were supervised to minimize any discussion and to make sure websites; navigational software and hardware were functioning.

As the ultimate goal of this research program is to build an inventory of specific site features, which lead to effective website design, the subjects were asked to discuss site design elements in their debriefing session. Subjects were shown the sites that ranked highest and lowest on the WSPS as well as on each of the factors. They were then asked what features led to these evaluations.

5. Results and discussion

5.1. Measurement

Each construct of the WSPS was measured with multiple items and was subjected to scale development and purification procedure (Churchill, 1979). On the basis of item-to-total correlations, three ill-fitting items were dropped. The remaining 12 WSPS items were factor analyzed. As was true in the pretest, dimensions consistent with the work of Kaplan and Kaplan (1982) and Kaplan et al. (1998) emerged, however, from this factor analysis three not four factors were identified (Table 2). The three factors that emerged (coherence, complexity and legibility) explained 69.3% of the total variance. These factors displayed coefficient α's above .70, which suggests a satisfactory level of reliability (Nunnally, 1978). Factor scores were calculated by averaging across the items for each subject's score.

The first factor, coherence explains 30% of the variation. Coherence in this study, with one exception, is identical to Kaplan and Kaplan's construct of coherence. The items included in this factor describe an environment, which is logical and friendly. In addition to Kaplan and Kaplan's development of the construct, coherence in this study captures that the site is well written and easy to navigate, two items that make "making sense" on the web possible.

Complexity implies the website design contains a variety of images that satisfy the desire to explore the environment. Like Kaplan and Kaplan's complexity, the construct here is defined by the use of many, varied visual images. Further, using images that fit the site content ties the complexity of the site to its content enhancing comprehensibility and encouraging rather than discouraging exploration. This is consistent with a recent study by Fram and Grady (1997). Their findings indicate that web shoppers wanted more visuals and graphics as this would improve the online shopping environment. This factor explains 20% of the variation.

Similarly, legibility (explaining 17% of the variation) mirrors the legibility construct as developed by Kaplan and Kaplan and includes being memorable and distinctive. This construct provides assurances that understanding in the future can be facilitated through the creation of a distinct identity for the site. This is a must in order to stand above other sites in the eyes of web surfers.

The factor that did not emerge was that of mystery. The items designed to capture mystery did not load as expected. Mystery may, in fact, not be relevant on the web. Consumers, though purchasing online in ever increasing numbers, actually turn to the web more for information than purchase.

A WSPS score was then calculated by summing the factors. Table 3 presents these results, listing the websites in descending order of preference on the Website Preference Scale.

Table 2
Factors

Item	Factors		
	Coherence	Complexity	Legibility
Has logically organized information	.838		
Makes sense	.831		
Is well written	.715		
Has enough content to be interesting to repeat visitors	.702		
Is easy to navigate once you get past the home page	.672		
Caused me to want to learn more	.619		
Uses many visual images		.821	
Graphics and pictures fit with content		.804	
Uses different types of visual images		.765	
Unlike other sites I have visited			.882
Has created a distinct identity			.829
Has memorable elements			.563
Coefficient α	.8671	.8376	.7647
Variance explained	30.59%	20.87%	17.8%

All items were measured using a five-point Likert scale anchored by *strongly agree* to *strongly disagree*.
Extraction method: principal component analysis, rotation method: varimax with Kaiser normalization. Rotation converged in five iterations.

Table 3
Website WSPS scores and correlations with dependent measure

Website	WSPS	Overall impression	Correlation with WSPS *	Likelihood of revisit	Correlation with WSPS *
Banana Republic	8.9951	4.1000	.791	3.8469	.645
Net Grocer	8.7249	3.6381	.626	2.9078	.424
The Gap	8.6160	4.0721	.643	3.9758	.512
Macy's	8.4217	3.8000	.632	3.4019	.553
L.L. Bean	8.3071	4.0096	.753	3.7225	.495
Nordstrom	8.1634	3.7745	.722	3.3251	.620
Rei	7.9943	3.6425	.708	3.1716	.550
Peapod	7.4828	3.2933	.747	2.4444	.485
Wall Street City	6.3144	3.1014	.761	2.6505	.558
Market Guide	6.1780	3.0288	.784	2.5388	.627
Total	7.9204	3.6468	.753	3.2004	.593

* Significant at the .01 level.

Web effectiveness was assessed as two separate items: (1) overall impression and (2) likelihood of revisit. Overall impression and likelihood of revisit were discrete measures between 1 and 5.

5.2. Hypotheses tests

Based on an ANOVA, each of the three factors, separately or together as the combined WSPS, has a significant impact on overall impression and probability of revisit. Websites scoring highly on coherence, complexity and legibility have a greater overall impression and probability of revisit.

To test whether familiarity with the site or with the "brand" might provide an explanation of these results, a MANCOVA was also run using site familiarity as a covariate. Even after removing these effects, the results are significant (Table 4).

Hypothesis 1, which states that overall differences exist, was supported at $P < .01$, $F(118,2013) = 24.47$. Websites scoring higher on the WSPS exhibited a higher average overall impression of websites ($X = 4.2$ for the lowest group, $X = 10.19$ for the highest group). The magnitude of effect, as indexed by η^2, was .604.

Further, websites scoring higher on the WSPS exhibited a higher likelihood of revisit ($X = 5.88$ for the lowest group, $X = 9.79$ for the highest group) that was statistically significant at $P < .01$, $F(118,2013) = 10.15$. The magnitude of effect, as indexed by η^2, was .387. These relationships hold across all the websites as can be seen in the correlations in Table 3.

Table 4
MANCOVA

Source	*df*	SS	Mean^2	*F*	Significance
WSPS score					
Overall impression	118	1125.18	9.535	24.469 *	.000
Likelihood of revisit	118	1260.064	10.679	10.147 *	.008
Familiarity with website (covariance)					
Overall impression	1	17.477	17.477	44.848 *	.000
Likelihood of revisit	1	145.574	145.574	138.323 *	.000
Error					
Overall impression	1893	737.685	0.39		
Likelihood of revisit	1893	1992.233	1.052		
Total					
Overall impression	2013	13041.0			
Likelihood of revisit	2013	19322.0			
Corrected total					
Overall impression	2012	1931.491			
Likelihood of revisit	2012	3531.119			

* Significant at the .01 level.

5.3. Findings from debriefings

In the debriefing, students articulated the features that led them to preferring one site over the others (Table 5). In addition to the importance given to pictures and other visual images, the students' overall preferences were driven by simplicity of design, sites that were easy for first time users to navigate and sites that did not look like ads. They preferred simple subject headings, which describe broad categories rather than lengthy lists or paragraphs of descriptions. They did not like sites, which made them feel that they had to search extensively, hence, a preference for an absence of mystery.

Bananarepublic.com scored in the top 3 on each factor and was number one overall. It was the only site to have:

- access to home page from every page,
- a site map,

Table 5
The WSPS and web design features

Coherence	Complexity	Legibility
Simplicity of design	Variety in content (text and graphics)	Mini home page on every subsequent page
Easy to read	Changing graphics	Same menu on every page
Use of categories	Different categories of text	Site map
Absence of information overload		
Adequate font size		
Uncrowded presentation		

- the same menu on every page,
- a product list and
- video.

Further, this site had two additional characteristics that may have helped set it off from the rest. First, the site had limited text (as low as 10% of space on the home page) versus as much as 80% on other e-retailer sites in this study. Second, the site had a mini-home page on each subsequent page.

6. Conclusions and future research directions

For practitioners, the implications of these results reinforce what many site designers have tried to articulate: make it simple. Adopting a minimalistic approach to the design of the home page with eye-catching but appropriate graphics and categories that draw the web surfer further into the site appears to be more effective. Web design should not result in information overload. The goal, rather, should be to give access to the information web surfers' desire in the most expedient way possible. Hence, the design goal should be access not abundance.

Simplicity of design should be a major consideration as it not only makes the site more appealing, it also makes it far faster to load. Web surfers are not a patient group. Some web design experts have estimated that they have exactly 10 seconds to lure people into a site. It is not, therefore, surprising that slow loading sites are a major frustration and turnoff for web surfers. Another prerequisite is to make the website distinctive. A website with a distinct identity will appeal to web-weary surfers, differentiate the company and make the site more memorable.

To be truly useful to the practitioner, the WSPS requires further refinement. That mystery did not emerge needs to be further examined. There are at least two possible explanations for this. One is that the construct was not effectively captured by the items. A second explanation is that, in fact, mystery may not be a relevant information processing dimension on the web. As time (or absence thereof) is one of the factors which drive people to utilize the web, being coherent, nonambiguous and direct (as opposed to mysterious) would be preferred characteristics of the web as a cognitive landscape.

In light of this second explanation, an alternative framework is proposed for future exploration. This alternative framework would build on the three dimensions identified in this study (coherence, complexity and legibility) and add a fourth dimension, engagement or flow. The incorporation of this dimension stems from comments made during the debriefing as well as from recent research.

In the debriefing, subjects praised Banana Republic's homepage for "rewarding" the web surfer by responding to mouse movements on the page with changing graphics. Though the site was not selling a unique product, the site's response to actions of the surfer was very exciting to the subjects causing them to want to go deeper into the site. This description corresponds to the flow concept identified by Csikszentmihalyi (1975). Characteristics of flow include a feeling of control and an absence of worry. Flow activities contain coherent, noncontradictory demands and provide unambiguous feedback to a person's actions. Flow experiences do not require external reward; the reward is in the involvement with the activity itself. In operationalizing this dimension, the intent would be to measure the psychological dimensions of engagement/flow as an information processing requirements. In this, our concept of flow differs from that of Hoffman and Novak (1996) who combine interactivity (the means) with the psychological aspects of flow in their construct.

After further refinement, a next stage in this research program would be to empirically link the preference scale dimensions to content elements such as those identified in the debriefing. Designing an experiment would be the best way to test what site design elements contribute to creating web landscapes, which encourage understanding and exploration. As many things might impact this (level of use, purpose of visit, etc.), an experimental study should be designed to incorporate these contingencies.

The current study only demonstrates a relationship between the WSPS and overall impression and likelihood of revisit. From an e-retailer's viewpoint, the efficacy of the WSPS would be much stronger if it could be demonstrated that incorporating site design features based upon this program of research generates higher consumer response in the form of higher sales volume. Thus, the next step would be to test the impact on sales of sites designed based on the WSPS.

The issue of preferences differing depending upon the audience also needs to be explored. Audiences may differ both in their purpose for visiting the web and in terms of their demographics. One of the constant themes of site development guides is that the site must be designed to fit the audience. This study has limited external validity due to the subjects utilized. Though not heavy web purchasers, these students do surf the web on a frequent basis. They demonstrate a web behavior pattern similar to that identified in a study of Internet use trends (Internet Use Trends: Mid-Year, 1999) published at the time of data collection. Future studies, however, need to verify that this pattern of preferences holds in other populations. Many sites have multiple segments to which they cater. If preferences are distinctly different among different segments, different options might be made available to different groups. What must be determined is how much flexibility must be built into website content to satisfy the increasing diversity of users. At the same time, there are commonalities between experts and casual users. It is evident from the students' comments that even light users of the web can equate content quality, ease of use, etc. with design and typographic factors. As pointed out by Forrester Research's

recent study, these are important for the development of repeat visits.

A major complicating factor to all of this is the fact that the web is an extremely dynamic environment. Site design options change with each technological wave. Many of the sites used in this study were redesigned before the final draft of this paper was written. This should actually reinforce the desire for simplicity in site design as it makes moving to the next level easier to accomplish. By providing site designers with a better idea of how to facilitate interacting through the cognitive landscape of the web, simplicity may be more effectively accomplished.

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