WHY USERS CHOOSE PARTICULAR WEB SITES OVER OTHERS: INTRODUCING A "MEANS-END" APPROACH TO HUMAN-COMPUTER INTERACTION

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ABSTRACT

Gutman's means-end theory, widely used in market research, identifies three levels of abstraction – attributes, consequences, and values – associated with the use of products, representing the process by which physical attributes of products gain personal meaning for users. The primary methodological manifestation of means-end theory is the laddering interview, which it has been claimed generates better insights than other qualitative or quantitative methods. This study asked: Can means-end theory, and its concomitant laddering methodology, be successfully applied in the context of human-computer interaction research, specifically to help understand the relationships between Web sites and their users? The study employed laddering interviews to elicit data concerning Web site attributes, their consequences, and user end-values. This data was duly processed and the results were subsequently appraised. Examination determined that means-end chains do indeed characterize the process by which the physical attributes of Web sites gain personal meaning for their users, thus proving the theory's applicability.

1. Introduction

Gutman's means-end theory [Gutman 1982], which discusses the core underlying values that motivate consumers' purchase decisions, is immensely popular in the marketing research community [Peter & Olson 1994], and enjoys an impressive track record in the commercial sector where it is often used to generate message strategy themes for promotional campaigns [Gengler, Mulvey & Oglethorpe 1999]. W. D. Wells [personal communication, July 2000] suggested to this researcher that means-end theory could also be an excellent point of reference for unearthing the underlying core values that motivate Web site users as well, and that he did not know of any prior studies that have used this theory in the substantive context of Web usage, or, for that matter, anywhere else within the broader field of human-computer interaction (HCI).

Meanwhile, the primary methodological manifestation of means-end theory in the field of marketing research is laddering, a method by which the core attributes and values that motivate product users are identified through a special form of in-depth, one-on-one interviews that force the respondent up a ladder of abstraction, thereby bridging relatively concrete product meanings at the product attribute level with more abstract meanings at the consequence and personal value levels [Gengler et al. 1999]. In support of laddering, Fortini-Campbell [1990] claims that other quantitative or qualitative social scientific research methods – such as focus groups, surveys, and demographic information – often fall short of generating key insights about a product and of identifying a target audience in concise and well-defined terms, since common responses to the question of why a person chooses a particular product do not even begin to describe the deep underlying psychological and emotional reasons that influence people's choices.

2. Research Question

This research study essentially revolves around the question: Can means-end theory, and its concomitant laddering methodology, be successfully applied in the context of human-computer interaction research, specifically to help understand the relationship between Web sites and their users? The study attempts to explore this question by employing a laddering methodology with the aim of eliciting data concerning the site-attributes, consequences, and end-values that motivate Web users to choose particular Web sites over others. With the resultant data at hand, detailed analysis can be done to conclude if means-end theory is indeed useful in the context of Web usage in particular, and HCI in general.

However, it must be emphasized here that the object of this study is simply to be an introductory demonstration of the use of a new theoretical and methodological framework within the substantive context of Web usage research, and not the formulation of meaningful hypotheses about the characteristics of Web users. The latter could be the goal of a future study, or meta-analysis, that enjoys access to a much more extensive set of interview data.

3. Motivation for the Study

As mentioned earlier, there are no known prior studies in the literature that have used means-end theory or laddering interviews in the substantive context of Web usage or other aspects of HCI, and therefore this study could be a potentially valuable introduction of this new theoretical and methodological framework to the field of Web usage research in particular, and HCI in general. One of the points the author of this paper seeks to make is that the three levels of abstraction delineated by Gutman's means-end theory can also be applied to other fields, and not just limited to marketing and advertising (as it has been thus far). This author happens to be interested in HCI research, which is why this paper concerns itself with the application of means-end theory to HCI issues (a decision helped by the fact that the HCI literature does not contain prior instances of the application of such a theoretical or methodological perspective). It is possible that other researchers who are interested in other areas of inquiry might be able to apply means-end theory to explain human behavior in their respective areas also.

It is hoped that the insights uncovered by this study – along with those generated by subsequent studies of a similar nature – could be subsequently drawn upon to describe and delineate the characteristics of distinct Web user segments with respect to their value orientations for classes or brands of Web sites, through the use of techniques such as consumer prototyping, at an appropriate future occasion. Information of this nature would be of great potential significance to academic researchers, as well as to professionals in the Web industry. Meanwhile, from the practitioner's point of view, Reynolds & Gutman [1988] suggest that the insights obtained through laddering procedures can also serve as a basis for assessing Web sites in a fashion similar to the use of more traditional ratings; evaluating advertising of competing Web sites; and developing advertising strategies for one's own Web sites.

4. Review of Literature on Means-End Theory and Laddering

4.1 Means-End Theory

The focus of means-end theory is on understanding how consumers think about products and actions. More specifically speaking, the center of attention is on examining the important meanings that consumers associate with the products they purchase and consume. In means-end theory, it is useful to distinguish among three levels of abstraction, or categories of meaning, that typically are associated with a product [Olson & Reynolds 1983]. These categories are: a product's attributes; consequences of the product's consumption; and personal values relevant to the product's consumer. Product attributes are relatively concrete meanings that represent the physical or observable characteristics of a product. Consequences are more abstract meanings that reflect the perceived benefits or costs (for the product's consumer) associated with the product's specific attributes. Finally, personal values are highly abstract meanings that refer to centrally held, enduring beliefs, or end states of existence, that consumers seek to fulfill through their purchase and consumption behavior [Rokeach 1973]. In this sense, values are the end goals the consumer strives for in life [Bagozzi & Dabholkar 1994; Gengler et al. 1999; Pieters, Baumgartner & Allen 1995; Wickert 1940b].

Taken together, this pattern of associations from attributes to consequences and from consequences to personal values represents a special type of knowledge structure called a means-end chain [Gutman 1982; Howard 1977; Olson & Reynolds 1983]. The means-end chain model provides a convenient and effective way of characterizing the basic pattern of relationships by which the physical features or attributes of products gain personal relevance or meaning for their consumers. In other words, observable aspects of the world, or attributes, are personally relevant to people because they are, for the latter, a means to gaining some desired consequence. Consequences, in turn, are important because they are a means for people to achieve a desired end state of existence, or personal value [Gengler et al. 1999].

Simply put, the rationale underlying the means-end model is that people choose products with attributes which produce the consequences that they desire and minimize the consequences that they do not desire [Gutman 1982]. The desirability or importance of these consequences in turn is determined by the personal values with which people associate them. Gutman [1982], like Rokeach [1973], suggests that consequences have positive or negative valences, depending on their relationship to people's personal values. Thus, from a means-end perspective, values are the key factors underlying consumers' preferences and choice behavior [Gengler et al. 1999; Henshel 1971; Homer & Kahle 1988; Rokeach 1973; Rosenberg 1956; Wickert 1940ab).

According to Gengler et al. [1999], the emphasis of the means-end model is different from those of the more traditional multi-attribute choice models. The traditional multi-attribute approach concentrates on determining if, and to what extent, particular product attributes and benefits are important. The means-end approach, on the contrary, focuses on why and how product attributes are important. The why and how questions are addressed by assessing the sequence of means-end relations that link products' attributes to their consumers' personal values.

4.2 Laddering

Laddering is the primary methodological manifestation of Gutman's means-end theory. It is a technique by which the core attributes and values that drive product consumers are identified through a specialized type of indepth interview. These interviews are conducted to develop insights into what is important to consumers and how a product or service can be meaningfully differentiated from others [Wansink 2000]. According to Gengler et al. [1999], laddering interviews are akin to the classic act of a psychologist interviewing patients on the couch and uncovering insights into their lives that are not apparent even to the latter themselves. The psychologist is trying to get to the root of the patients' problems through questioning. Similarly the researcher is trying to find the core reasons for the consumer's purchase of a particular product. As Gengler et al. [1999] describe, laddering is like peeling an onion in order to do away with the superficial and get down to what is really important. To facilitate this, the researcher analyzes the consumer's purchase through a series of "why is that important to you" questions in order to reveal the key personal reasons for which the purchase was made. This procedure is called laddering because it forces the respondent up a ladder of abstraction, thus bridging relatively concrete product meanings at the attribute level with more abstract meanings at the consequence and personal value levels.

The following exchange summarizes the dialogue from a laddering interview of a Web user's views about his favorite Internet search engine. It can be clearly seen how the sequence of questioning moves from more concrete, tangible characteristics of the search engine to the more abstract end-value desired by its user:

Interviewer: "Why do you prefer Yahoo to Excite or AltaVista?"

Respondent: "I am more familiar with Yahoo."

Interviewer: "Why is that important to you?"

Respondent: "It makes it easier to find what I am looking for."

Interviewer: "Why is that important to you?"

Respondent: "It helps me save time."

Interviewer: "Why is that important to you?"

Respondent: "I can incorporate more tasks into my schedule."

Interviewer: "Why is that important to you?"

Respondent: "I feel more in control over my life."

Interviewer: "Why is that important to you?"

Respondent: "It gives me a feeling of self-satisfaction."

Processing and analyzing the responses gathered from laddering interviews involves several distinct steps. The goal of this multi-layered exercise is to produce an accurate depiction of the key concepts connected to the consumer's purchase decision and also of the relationships between associated concepts, thus facilitating inferences and the identification of patterns that might not be evident in the raw data [Gengler, Klenosky, & Mulvey 1995; Gengler et al. 1999]. The two main research issues here, according to Reynolds & Gutman [1988], are the construction of hierarchical value maps (HVMs) – or "consumer decision maps," as Reynolds, Westberg, & Olson [1997] put it – to represent all the respondents' ladders in the aggregate, and to determine the dominant perceptual orientations represented in this overall map of aggregate relations. In fact, Reynolds & Gutman assert that such "crossing over" from the qualitative nature of interviews themselves to a quantitative way of dealing with interview data is one of the unique aspects of laddering that sets it apart from competing methodologies.

If one strictly follows the method laid out by Reynolds & Gutman [1988], then the initial task of the analysis process would be to content-analyze all of the elements from all the ladders, in order to develop and define appropriate categories of meaning. To do this, the entire set of ladders across respondents is recorded on a coding form, after which a set of summary codes is developed to reflect everything that was mentioned. Once these codes are finalized, numbers are assigned to each of them. These numbers are then used to score each element in each ladder, thus producing a matrix whose rows represent individual respondents' ladders and whose columns correspond to the sequential elements within each of the ladders. From this "raw" matrix, a more complex "implication" matrix is constructed, which displays the aggregate number of times each element leads to each other element across all ladders. Finally an HVM is gradually built up, by connecting all the chains that are formed as a result of considering the linkages suggested by the implication matrix.

The goal of mapping such hierarchical relations, according to Reynolds & Gutman [1988] is to interconnect all the meaningful chains unearthed by the numerous laddering interviews in a single map that describes all relevant relations and is yet easy to read and interpret. Once an HVM is constructed, one typically considers any pathway from bottom to top as a potential chain representing a perceptual orientation that warrants consideration. After having plotted all relations, it is then desirable to look at all the elements in the map in terms of the numbers of direct and indirect relations they have with other elements, both in terms of other elements leading into them and in

terms of their connections to higher-order elements. Also, to more fully understand the strength of individual chains, intra-chain relations can subsequently be summarized and evaluated as well.

5. Method

5.1 Interviewing

As part of the study, 50 in-depth laddering interviews were conducted. Through these interviews, an attempt was made to examine two different kinds of Web site use by respondents: use for primarily entertainment purposes; and use for primarily information gathering purposes. These distinctions were made on the basis of 12 preliminary interviews with random Web users, which suggested that they generally browsed the Web either to gather information relevant to their professional lives, or to access content that contributed to their personal lives by entertaining them. To operationalize the distinctions for the purpose of this study, a particular Web site was deemed an "entertainment" site if the respondent described his/her use of the site as primarily entertainment-oriented; and was deemed an "information" site, if the respondent described his/her use of the site as for primarily information gathering purposes. Of the 50 laddering interviews, 25 concentrated on entertainment Web sites and the other 25 on information Web sites.

Of course, this could raise the question of whether the users might have been "forced" to classify their favorite Web sites as an information or entertainment site arbitrarily. After all, there is always an inherent "artificiality" in most scientific classification schemes (human attempts to bring some order into a chaotic universe). But, at least as far as the respondents of this study were concerned, they did not seem to suffer any duress when asked to describe whether their site of choice was an entertainment site or an information site. All sites mentioned led themselves to be classified into one of these two categories in a simple and logical manner.

Meanwhile, there had been an earlier attempt to classify Web sites as "commercial" (where goods or services are bought or sold) vs. "non-commercial" (where no such transactions take place), but preliminary interviews revealed that very few respondents had sufficient experience with e-commerce to have strong preferences regarding commercial sites. This was indeed a surprising finding, given that e-commerce has been a subject of so much media hype in recent years. Oh the other hand, such a phenomenon – that people do not seem to be shopping online as much as the e-merchants and industry analysts had hoped they would – might also be a root cause for the current dot-com meltdown. Most respondents interviewed tended to use the Web predominantly for information gathering or for entertainment, with few e-commerce transactions. Thus a commercial vs. non-commercial classification was abandoned as impracticable, and replaced with information vs. entertainment. Naturally, this might raise questions such as "What if the interviewee chose 'Amazon.com' or 'Priceline.com'?" Such questions are very valid indeed, but in this particular study they were not relevant because none of the respondents mentioned a commercial site as their favorite. Future studies may want to look into this issue in more detail.

The laddering interviews were conducted over the first four months of 2001. Respondents for the interviews were chosen on a non-random basis, depending mainly upon the fact that they were regular users of the Web, were available at the time the study was being conducted, and were willing to submit to a laddering interview about their Web site preferences. In an introductory pilot study, sampling issues not so vital as the issue of demonstrating the application of an established methodology within a new substantive context, which is why not much effort was spent at this juncture to collect a random (or representative) sample of Web users. The respondents were of diverse ages and ethnicities, came from varied walks of life, and were distributed across three U.S. states - Minnesota, Illinois and Connecticut. In each interview, the respondent was first asked to name his/her most favorite Web site, and to subsequently define whether s/he considered it to be an entertainment Web site or an information site. Once the particular genre of the Web site (within the broader entertainment/information category) was established (e.g. News, Astrology, Sport, Cooking, Music, Motorcycles, Chat, Search Engine, etc.), Reynolds & Gutman [1988]'s "preference-consumption difference" technique was used to elicit attribute distinctions. The respondent was asked to name two other competing Web sites of the same genre as his/her favorite site, and was then asked why s/he favored this particular site over the other two. However, only the highest-rated attribute was used as the basis for building an attribute-consequence-value ladder during the remaining part of the interview. This was done in the interests of consistency and clarity (because such attributes would logically stand a higher chance of eliciting meaningful attribute-consequence-value chains than weaker attributes). 5.2 Data Processing

Once all 50 laddering interviews were concluded, the data gathered using the interviews was processed strictly following the guidelines established by Reynolds & Gutman in their seminal [1988] work. The first step was to develop a set of summary codes that reflected every attribute, consequence, and value mentioned by the respondents. These codes/labels were not constructed arbitrarily but were devised based on the actual responses of the interviewees. The codes finally chosen were the ones that best described the individual responses. For instance,

responses like "It gives me such happiness and joy to witness this wonderful miracle of nature" were coded under the label "Happiness," whereas responses like "It gives me emotional security ... makes me feel warm, loved, and cherished" were coded under the label "Emotional Security." Meanwhile, responses like "It gives me the satisfaction of being a successful professional" were coded under the label "Satisfaction," whereas responses like "It helps me relax and relieve the tensions of daily life" were coded under the label "Relaxation." On the superficial level, abstract labels like these might appear to be mutually overlapping, but in reality they reflect subtle but crucial distinctions of feeling contained in the interviewees' responses.

When devising these codes, one is walking a tightrope between having so many categories so as to make the data unmanageable, and having so few that much valuable data gets obscured. One wants to achieve broad enough categories of meaning to be able to get replications (i.e. to have more than one respondent saying that one element leads to another) and yet, if the coding is too broad, too much meaning is lost. The codes featured in this study were developed keeping these issues in mind. To establish the reliability of the coding, 20 per cent of the interviews were coded by two independent analysts, and the resulting figure for inter-coder reliability (using Holsti's Percentage of Agreement measure) was 94 per cent. Then followed the assignment of numbers to each code. Tables 1A and 1B display the master codes developed to describe the attributes, consequences, and values mentioned by the respondents regarding entertainment Web sites and information Web sites respectively:

Table 1A: Content Codes for Entertainment Web Sites

ATTRIBUTES

- 1) Personality-Specific Content
- Medium- Specific Content
- 3) Location/Community- Specific Content
- 4) Larger Ouantity of Content
- 5) Wider Variety of Content
- 6) Higher Quality of Content

CONSEQUENCES

- 7) Foster Ties with Community
- 8) Achieve Positive Mental/Emotional States

- 9) Enjoy Desired Activities
- 10) Fulfill Specific Aspirations
- 11) Perform Actions Beneficial to Self
- 12) Achieve Positive Physical States of Being
- 13) Save Time and Energy
- 14) More Time for Other Activities
- 15) Find Other People
- 16) Avoid Unwanted Mental States
- 17) Avoid Unwanted Efforts
- 18) Success
- 19) Build New Friendships/Relationships

- 20) Relate Better with Other People
- 21) Keep Up with Trends

VALUES

- 22) Satisfaction
- 23) Relaxation
- 24) Happiness
- 25) Emotional Security

Table 1B: Content Codes for Information Web Sites

ATTRIBUTES

- _____
- 1) Larger Quantity of Content
- 2) Higher Quality of Content
- 3) Better Site Design
- 4) Location-Specific Content
- 5) Subject-Specific Content
- 6) Familiarity of Site

CONSEQUENCES

- 7) Keep Track of Events/Trends
- 8) Avoid Negative Mental/Physical States
- 9) Achieve Positive States of Being
- 10) Improve Performance
- 11) Recognition from Other People
- 12) Get Information Quickly
- 13) Save Time
- 14) More Time for Other People
- 15) More Time for Other Activities
- 16) Contribute to Other People's Lives
- 17) Interact with Other People
- 18) Success

VALUES

- 19) Satisfaction
- 20) Happiness
- 21) Emotional Security
- 22) Relaxation

Once these summary codes were established and numbered, their numbers were then used to score each element in each ladder, consequently producing a "raw" matrix with rows representing individual respondents' ladders and columns corresponding to sequential elements within individual ladders. Thus the number of rows corresponded to the number of respondents interviewed, and the number of columns corresponded to the number of elements in the longest ladder. Tables 2A and 2B are respectively the coded "raw" matrices representing all the individual respondents' ladders for entertainment Web sites and for information Web sites:

Respondent #			Conte	ent Codes				
1	1	10	9	8	11	12	22	
2	5	13	14	11	18	22		
3	2	17	21	12	23			
4	4	21	10	16	22			
5	6	9	17	12	23			
6	5	13	14	12	18	22		
7	3	17	11	8	20	19	16	24
8	5	17	13	14	11	24		
9	6	8	12	10	11	24		
10	4	17	13	14	24			
11	3	15	11	19	20	25		

Table 2A: Raw Matrix of Individual Respondents' Ladders for Entertainment Web Sites

Respondent #			Conte	ent Codes	 }			
12	3	15	20	19	7	25		
13	3	15	20	19	7	25		
14	5	17	13	14	11	22		
15	5	20	7	16	24			
16	3	9	20	7	16	11	18	25
17	6	8	11	16	23			
18	2	8	16	12	22			
19	4	8	20	11	18	22		
20	2	9	21	20	19	25		
21	6	8	10	11	12	22		
22	4	9	12	11	18	22		
23	1	11	8	12	18	22		
24	4	17	13	14	23			
25	6	9	8	16	24			

Table 2A (Continued)

Table 2B: Raw Matrix of Individual Respondents' Ladders for Information Web Sites

Respondent #			Conte	nt Codes				
1	2	7	9	11	19			
2	3	12	13	15	20			
3	2	12	13	15	9	11	19	
4	3	13	14	16	19			
5	4	17	8	9	21			
6	5	12	13	15	22			
7	6	12	13	14	22			
8	2	17	7	9	11	19		
9	4	7	17	8	21			
10	6	12	13	15	10	19		
11	3	12	13	14	22			
12	2	12	9	10	22			
13	2	9	10	11	18	19		
14	2	8	12	13	14	16	21	
15	4	7	10	8	21			
16	4	7	9	10	16	21		
17	2	9	16	21				
18	5	7	9	10	18	16	19	
19	5	9	10	16	19			
20	4	7	17	10	8	18	19	
21	1	12	13	14	16	20		
22	1	9	10	18	19			
23	6	12	13	14	20			
24	1	12	13	15	20			
25	1	9	10	18	21			

With these coded "raw" matrices compiled, a second set of matrices, the "implication" matrices, were constructed, in order to display the aggregate number of times each element leads to each other element, both directly and indirectly, across all the interviews conducted (in the opinion of Reynolds and Gutman [1988], it is useful to examine both types of relations in determining what paths are dominant in an aggregate map of relationships among elements, because, without examining indirect relations, a situation might exist where there are

many paths by which two elements may be indirectly connected but where none of the paths are represented enough times to represent a significant connection). In these matrices, the numbers are expressed in fractional form, with direct relations to the left of the decimal point and indirect relations to the right. Logically speaking, it might seem that a slash or hyphen might be more suitable than a decimal point to separate the direct and indirect relations (after all, it is hard to see a decimal point and to not interpret it as one), however the use of a decimal point in such a manner has become standard for this methodology and has therefore been continued in this paper. Tables 3A and 3B are the implication matrices for entertainment Web Sites and for information Web sites respectively (the explanatory legends below the tables show how these tables are to be interpreted):

	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1		0.02	0.01	1.00	1.01	0.02						0.01				0.02			
2		1.00	1.00			0.02				0.01	1.00		0.01	0.01	0.02	0.01	0.01		0.01
3	0.03	0.01	1.00		0.03				3.00	0.02	1.00	0.01	0.04	0.05				0.01	0.01
4		1.00	1.00	0.01	0.02		0.02	0.02		0.01	2.00	0.02		0.01	1.00	0.03	0.01	0.01	
5	0.01				0.03	0.01	2.02	0.04		0.01	2.00	0.02		1.00		0.03		0.02	
6		3.01	2.00	0.02	0.03	0.03				0.02	0.01					0.01	0.02	0.02	
7					0.01					2.00		0.01						0.01	2.01
8				1.01	2.03	2.03				2.02		0.02	0.01	2.00		0.05	0.01	0.03	
9	0.01	2.00			0.03	1.02				0.02	1.00	0.02	0.01	1.01	1.00	0.02	0.01	0.01	0.02
10		0.01	1.00		2.01	0.02				1.00						0.03		0.01	
11		2.00				2.01				1.01		4.01	1.01	0.02		1.07	0.01	2.01	0.02
12				1.00	1.01							2.01				3.03	2.00	0.01	
13					0.03			6.00				0.02				0.03	0.01	0.02	
14					3.00	1.00						0.02				0.02	1.00	1.01	
15	0.02				1.00								0.03	2.01					0.03
16					1.00	1.00						0.01				1.01	1.00	3.00	0.01
17		0.01			1.02	1.01	4.00	0.04		0.01			0.01	0.01	1.00	0.01	0.03	0.03	
18																5.00			1.00
19	2.00													1.00					1.03
20	2.02				1.01					0.03		0.02	4.00			0.01		0.02	1.04
21				1.00		1.00				0.01			0.01	1.00		0.01	0.01		0.01
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Table 3A: Implication Matrix for Entertainment Web Sites

Legend: This table shows the number of direct and indirect linkages from the codes on the vertical axis to the codes on the horizontal axis (i.e. from attributes to consequences to values). The vertical axis is made up of the 21 attribute/consequence codes obtained, while the horizontal axis is made up of the 19 consequence/value codes obtained. For instance, attribute 1 (Personality-Specific Content) is linked once directly and once indirectly to consequence 11 (Perform Actions Beneficial to Self) and twice indirectly to value 22 (Satisfaction).

	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1			2.00	0.02		2.00	0.02	0.01		0.01		0.02	0.01	0.02	0.01	
2	1.01	1.00	1.04	0.02	0.04	2.01	0.02	0.01	0.01	0.01	1.00	0.01	0.04		0.01	0.01
3						2.00	1.02	0.02	0.01	0.01			0.01	0.01		0.01
4	4.00	0.04	0.02	0.03						0.01	1.02	0.01	0.01		0.04	
5	1.00		1.01	0.02		1.00	0.01		0.01	0.02		0.01	0.02			0.01
6				0.01		3.00	0.03	0.02	0.01				0.01	0.01		0.01
7		0.03	4.00	1.03	0.02					0.02	2.00	0.02	0.04		0.03	
8			1.00			1.00	00.1	00.1		00.1		1.00	00.1		2.02	
9				7.00	3.01					1.03		0.04	0.07		1.03	0.01
10		2.00			1.00					2.01		3.02	1.05		0.03	1.00
11											1.00	3.01				
12			1.01	0.02	0.01		10.00	0.05	0.05	0.02			0.02	0.04	0.01	0.04
13			0.01	0.01	0.01			6.00	5.00	0.03			0.03	0.04	0.01	0.03
14										3.00			0.01	1.01	0.01	2.00
15			1.00	1.00	0.01								0.02	2.00		1.00
16													3.00	1.00	3.00	
17	1.00	1.01	00.1	1.00	0.01							0.01	0.02		0.01	
18										1.00			3.01		1.00	
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

 Table 3B: Implication Matrix for Information Web Sites

Legend: This table shows the number of direct and indirect linkages from the codes on the vertical axis to the codes on the horizontal axis (i.e. from attributes to consequences to values). The vertical axis is made up of the 18 attribute/consequence codes obtained, while the horizontal axis is made up of the 16 consequence/value codes obtained. For instance, attribute 2 (Higher Quality of Content) is linked once directly and four times indirectly to consequence 11 (Recognition from Other People) and four times indirectly to value 19 (Satisfaction).

Once the implication matrices were prepared, work started on the construction of the respective hierarchical value maps, or HVMs, for entertainment and information Web sites. The HVMs were gradually built up by connecting all the chains formed by considering the linkages in the implication matrices, with a cut-off level of two direct relations established for the purpose of plotting the HVMs. Reynolds and Gutman [1988] had originally suggested a cut-off level of four direct relations for a sample of 50 respondents, and since the sample size here was 25 respondents it was decided to accordingly halve the cut-off level also, which is how a threshold figure of two direct relations was arrived at.

Figures 1A and 1B are the respective HVMs for entertainment Web Sites and for information Web sites, created using the information provided by Tables 3A and 3B (the implication matrices). HVMs like these clearly show at a single glance how the respective attributes of the Web sites lead to various consequences for their users and thus lead to the satisfaction of distinct end-values held dearly by the latter:





Having plotted the two HVMs, it is now desirable to look at all elements within the HVMs in terms of the numbers of direct and indirect relations they have with other elements, both in terms of other elements leading into them and in terms of their connections to higher-order elements. Tables 4A and 4B summarize the direct and indirect relations of each element for entertainment Web Sites and for information Web sites respectively. They show how many times other elements lead from and to each element, both directly (before the decimal point) and indirectly (after the decimal point).

Meanwhile, according to Reynolds & Gutman [1988], once an HVM is constructed, one can consider any pathway from bottom to top as a potential chain representing a perceptual orientation meriting consideration. For instance, the HVM for entertainment Web Sites (Figure 1A) incorporates as many as 30 possible attribute-consequence-value

chains, while the HVM for information Web Sites (Figure 1B) incorporates 31 possible chains. To more fully understand the relative strength of these potential chains, Reynolds & Gutman suggest the subsequent summarization and evaluation of intra-chain relations. Tables 5A and 5B provide examples of the summarization of intra-chain relations for two selected chains from within each of the HVMs in Figures 1A and 1B respectively.



Table 4A: Entertainment Web Sites – Direct and Indirect Relations for Each Element

Code	Label	From	То
1	Personality-Specific Content	2.09	
2	Medium- Specific Content	3.10	
3	Location/Community- Specific Content	5.21	
4	Larger Quantity of Content	5.16	
5	Wider Variety of Content	5.19	
6	Higher Quality of Content	5.17	
7	Foster Ties with Community	4.04	4.09
8	Achieve Positive Mental/Emotional States	9.21	9.06
9	Enjoy Desired Activities	6.18	6.01
10	Fulfill Specific Aspirations	4.08	4.04
11	Perform Actions Beneficial to Self	13.17	13.26
12	Achieve Positive Physical States of Being	9.06	9.17
13	Save Time and Energy	6.11	6.04
14	More Time for Other Activities	6.05	6.10
15	Find Other People	3.09	3.00

From	То
7.03 7.18 6.00 4.03 8.15 3.05	6.17 7.01 6.20 5.13 8.12 3.02 10.39 4.12 6.22 5.19
	7.03 7.18 6.00 4.03 8.15 3.05

Table 4A (Continued)

Table 4B: Information Web Sites - Direct and Indirect Relations for Each Element

Code	Label	From	То
1	Larger Quantity of Content	4.12	
2	Higher Quality of Content	6.24	
3	Better Site Design	3.09	
4	Location-Specific Content	5.18	
5	Subject-Specific Content	3.11	
6	Familiarity of Site	3.10	
7	Keep Track of Events/Trends	7.19	7.01
8	Avoid Negative Mental/Physical States	5.06	4.08
9	Achieve Positive States of Being	12.19	11.10
10	Improve Performance	10.11	10.16
11	Recognition from Other People	4.01	4.11
12	Get Information Quickly	11.27	11.01
13	Save Time	11.17	11.11
14	More Time for Other People	6.03	6.12
15	More Time for Other Activities	5.03	5.09
16	Contribute to Other People's Lives	7.00	6.18
17	Interact with Other People	3.07	5.02
18	Success	5.01	7.15
19	Satisfaction		7.38
20	Happiness		4.13
21	Emotional Security		7.21
22	Relaxation		4.12

 Table 5A: Entertainment Web Sites – Two Examples of Partition of Chains by Relations

<u>Chain #1</u>: Location/Community-Specific Content \rightarrow Find Other People \rightarrow Relate Better With Other People \rightarrow Build New Friendships/Relationships \rightarrow Foster Ties With Community \rightarrow Emotional Security

	Location/	Find Other	Relate Better	Build New	Foster Ties With	Emotional	Total
	Community-	People	With Other	Friendships/	Community	Security	
	Specific	-	People	Relationships	-	-	
	Content		_	_			
Location/	0.00	3.00	0.05	0.04	0.03	0.01	3.13
Community-Specific							
Content							

	Location/	Find Other	Relate Better	Build New	Foster Ties With	Emotional	Total
	Community-	People	With Other	Friendships/	Community	Security	
	Specific		People	Relationships			
	Content						
Find Other People	0.00	0.00	2.01	0.03	0.02	0.03	2.09
Relate Better With	0.00	0.00	0.00	4.00	2.02	1.04	7.06
Other People							
Build New	0.00	0.00	1.00	0.00	2.00	1.03	4.03
Friendships/							
Relationships							
Foster Ties With	0.00	0.00	0.00	0.00	0.00	2.01	2.01
Community							
Emotional Security	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	3.00	3.06	4.07	4.07	4.12	18.32

<u>Chain #2</u>: Higher Quality of Content \rightarrow Enjoy Desired Activities \rightarrow Achieve Positive Mental/Emotional States \rightarrow Achieve Positive Physical States of Being \rightarrow Relaxation

	Higher Quality	Enjoy Desired	Achieve Positive	Achieve Positive	Relaxation	Total
	of Content	Activities	Mental/	Physical States of		
			Emotional States	Being		
Higher Quality of	0.00	2.00	3.01	0.03	0.02	5.06
Content						
Enjoy Desired Activities	0.00	0.00	2.00	1.02	0.01	3.03
Achieve Positive	0.00	0.00	0.00	2.03	0.01	2.04
Mental/						
Emotional States						
Achieve Positive	0.00	0.00	0.00	0.00	2.00	2.00
Physical States of Being						
Relaxation	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	2.00	5.01	3.08	2.04	12.13

 Table 5B: Information Web Sites – Two Examples of Partition of Chains by Relations

<u>Chain #1</u>: Larger Quantity of Content \rightarrow Achieve Positive States of Being \rightarrow Improve Performance \rightarrow Avoid Negative Mental/Physical States \rightarrow Emotional Security

	Larger Quantity	Achieve Positive	Improve Performance	Avoid Negative	Emotional	lTotal
Larger Quantity	0.00	2.00	0.02	0.00	0.01	2.03
of Content						
Achieve Positive	0.00	0.00	7.00	0.00	1.03	8.03
States of Being						
Improve	0.00	0.00	0.00	2.00	0.03	2.03
Performance						
Avoid Negative	0.00	1.00	0.00	0.00	2.02	3.02
Mental						
Physical States						
Emotional	0.00	0.00	0.00	0.00	0.00	0.00
Security						
Total	0.00	3.00	7.02	2.00	3.09	15.11

	Higher Quality of	Get Information	Save	More Time	Happiness	Total
	Content	Quickly	Time	for Other		
				Activities		
Higher Quality of Content	0.00	2.01	0.02	0.01	0.00	2.04
Get Information Quickly	0.00	0.00	10.00	0.05	0.04	10.09
Save Time	0.00	0.00	0.00	5.00	0.04	5.04
More Time for Other	0.00	0.00	0.00	0.00	2.00	2.00
Activities						
Happiness	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	2.01	10.02	5.06	2.08	19.17

<u>Chain #2</u>: Higher Quality of Content \rightarrow Get Information Quickly \rightarrow Save Time \rightarrow More Time for Other Activities \rightarrow Happiness

6. Data Analysis

As can be seen from an examination of Tables 1A and 1B, both sets of interviews – concerning entertainment Web Sites and for information Web sites respectively – raised six attribute codes each. It is noteworthy that 10 out of 12 attribute codes (barring "Better Site Design" and "Familiarity of Site") deal with content issues. From this data, it appears that content has been a very important factor in the choice of Web sites for the respondents in this study. Meanwhile, it is also interesting to note that both sets of ladders elicited exactly the same value codes – Satisfaction, Relaxation, Happiness, and Emotional Security. This indicates that both sets of respondents were essentially motivated by the same set of values in their choice of Web sites, whether for entertainment or for information.

Furthermore, among the consequence codes, some are reasonably similar to each other, while others are unique to entertainment Web Sites or to information Web sites, e.g. Save Time/Energy, Find/Interact with Other People, More Time for Other Activities; Success; etc. Meanwhile, some consequences are unique to entertainment Web Sites, such as Foster Ties with Community, Build New Friendships/Relationships, Relate Better with Other People, etc. At the same time, the following consequences are unique to information Web Sites, e.g. Improve Performance, Get Information Quickly, Contribute to Other People's Lives, and so on. There could possibly be some valuable aspects of Web site usage indicated by the above differences also.

Meanwhile, from the "implication" matrices shown in Tables 3A and 3B, it is possible to calculate the total number of direct and indirect relations for each element, as has been done in Tables 4A and 4B. From Table 4A, it is seen that, for entertainment Web sites, "Location/Community-Specific Content" is the attribute that has the highest number of relations leading from it, while "Personality-Specific Content" has the lowest number of relations leading to it, while "Relaxation" has the minimum. Among the consequences, "Perform Actions Beneficial to Self" has the most number of elements leading from it as well as to it, while "Keep Up with Trends" and "Find Other People" have the least.

Similarly, from Table 4B, it can be seen that, for information Web sites, "Higher Quality of Content" is the attribute that has the highest number of relations leading from it, while "Better Site Design" has the lowest number of relations leading from it. Meanwhile, "Satisfaction" is again the value that has the maximum number of relations leading to it, while "Relaxation" again has the minimum. Among the consequences, "Achieve Positive States of Being" has the most number of elements leading from it as well as to it, while "Recognition from Other People" and "Interact with Other People" have the least.

Thus, it might be seen that "Location/Community-Specific Content," "Perform Actions Beneficial to Self," and "Satisfaction" are the core attribute, consequence and value respectively in terms of importance to the product class (i.e. entertainment Web sites). Similarly, "Higher Quality of Content," "Achieve Positive States of Being," and "Satisfaction" can be seen as the core attribute, consequence and value respectively in terms of importance to information Web sites. Indeed, the Location/Community-Specific Content \rightarrow Perform Actions Beneficial to Self \rightarrow Satisfaction and Higher Quality of Content \rightarrow Achieve Positive States of Being \rightarrow Satisfaction chains can be seen to have a high number of relations among its respective elements.

In this vein, the intra-chain relations can be summarized and evaluated to more fully understand the relative strengths of the chains, by partitioning the chains by relations, as has been done in Tables 5A and 5B. As has been emphasized earlier, once HVMs such as those in Figures 1A and 1B have been constructed, any pathway from bottom to top can be considered as a potential chain representing a perceptual orientation. The HVM for

entertainment Web Sites (Figure 1A) incorporates 30 such chains, while the HVM for information Web Sites (Figure 1B) incorporates 31 chains. Tables 5A and 5B give examples of two chains each from the HVMs for entertainment Web Sites and information Web Sites respectively.

As can be seen from Table 5A, the Location/Community-Specific Content \rightarrow Find Other People \rightarrow Relate Better With Other People \rightarrow Build New Friendships/ Relationships \rightarrow Foster Ties With Community \rightarrow Emotional Security chain is stronger than the Higher Quality of Content \rightarrow Enjoy Desired Activities \rightarrow Achieve Positive Mental/Emotional States \rightarrow Achieve Positive Physical States of Being \rightarrow Relaxation chain, because the former accounts for more relations than the latter (18 direct and 32 indirect relations as opposed to 12 direct and 13 indirect relations). Similarly, it can be seen from Table 5B that the Higher Quality of Content \rightarrow Get Information Quickly \rightarrow Save Time \rightarrow More Time for Other Activities \rightarrow Happiness chain is stronger than the Larger Quantity of Content \rightarrow Achieve Positive States of Being \rightarrow Improve Performance \rightarrow Avoid Negative Mental/Physical States \rightarrow Emotional Security chain, with the former accounting for 19 direct and 17 indirect relations as opposed to the latter's 15 direct and 11 indirect relations.

Partitioning exercises of this kind can be done for each of the 30 possible chains in the entertainment Web sites' HVM and the 31 chains in the information sites' HVM, but that is beyond the scope of the current study. Such a laborious undertaking is worthwhile only if we are working with a sufficiently large and representative data set, which is currently not the case. Nevertheless, partitioning the individual chains within HVMs in this manner would greatly help to researchers seeking to discover which pathways better describe the manner by which the majority of Web users relate to their favorite sites.

7. Implications

Therefore, can means-end theory, and its concomitant laddering methodology, be successfully applied in the context of HCI research, specifically to help understand the relationship between Web sites and their users? To begin with, the very fact that all of the 50 respondents who participated in the laddering interviews, as well as the 23 respondents who participated in the focus group sessions conducted as part of this study, were able to name distinct site-attributes, articulate the consequences of these attributes, and identify the end-values served by these consequences, suggests that means-end chains do undeniably characterize the basic pattern of relationships by which the physical attributes of Web sites gain personal relevance or meaning for their users. It can thus be proposed that means-end theory can indeed be applied in the context of new media research, to help understand the relationships between Web sites and their users.

Meanwhile, it was also possible to successfully perform all the analysis techniques detailed by Reynolds & Gutman [1988] on the data gathered by the laddering interviews conducted as part of this study. This included formulation of meaningful content codes; compiling the matrix with coded rows representing individual respondents' ladders; preparing the implication matrix from the above coded data; plotting the hierarchical value map from the implication matrix; summarizing the direct and indirect relations for each element; and partitioning of chains by relations as a means of determining dominant perceptual orientations. If means-end chains could not be used to describe the relationships between Web sites and their users, it can be argued that it might not have been possible to perform all of the above operations and obtain consistently meaningful results. For instance, the fact that all the 30 potential perceptual orientation chains in the HVM for entertainment Web Sites (Figure 1A) and the 31 chains in the HVM for information Web Sites (Figure 1B) make logical sense is an example of the results' meaningfulness.

Besides, the fact that a majority of the respondents named content-related site-attributes as most relevant to them is in congruence with the opinion of many leading webmasters that good content is what motivates users to visit a Web site more than any other site attribute. To quote Silverio (1995, section 4, para. 2), "You can make your pages look absolutely fabulous but if they don't say anything, nobody's going to care. The rest of it is window-dressing." Meanwhile, according to Nelson (2000, para. 7), "Content is everything," and it encourages repeat visits by users. This coincidence also seems to support the theoretical soundness of the current study.

Finally, there is the question of "How can such data be used by academic researchers of HCI or professionals in the Web industry to advance their knowledge and practice?" Well, as mentioned earlier, Reynolds & Gutman [1988] suggest that the HVMs obtained through laddering procedures can serve as a basis for segmenting consumers with respect to their value orientations for a product class or brand; assessing brands or products in a fashion similar to the use of more traditional ratings; evaluating competitive advertising; and developing advertising strategies. Of these, only the first can be demonstrated at this time, because the others require the collection of additional information regarding respondents views about specific products/brands and advertisements.

According to Reynolds & Gutman [1988], the goal of segmentation schemes is to classify respondents with respect to some aspect of their behavior, attitudes, or dispositions in a way that helps us to understand them as

consumers. The value orientations in a person's ladder – in our case, satisfaction/ happiness/ security/ relaxation – may serve as the basis for classification. One can also include attribute-value connections in the segmentation scheme. Once the latter has been developed, respondents' brand-consumption behavior or reactions to advertising may be assessed.

Table 6A: Entertainment	Web Sites - Ladde	er Frequencies for	Attribute-Value Linkages
	Lie Siles Baaa		i ittille ate i alle Billinges

		-		-
	Satisfaction (10)	Relaxation (04)	Happiness (06)	Emotional Security (05)
Larger Quantity of Content	03	01	01	
Higher Quality of Content	01	02	02	
Loc./CommSpecific Content			01	04
Personality-Specific Content	02			
Medium-Specific Content	01	01		01
Wider Variety of Content	03		02	

 Table 6B: Information Web Sites – Ladder Frequencies for Attribute-Value Linkages

		1		<u> </u>
	Satisfaction (10)	Relaxation (03)	Happiness (04)	Emotional Security (08)
Larger Quantity of Content	01		02	01
Higher Quality of Content	04	01		02
Location-Specific Content	01			04
Better Site Design	01	01	01	
Subject-Specific Content	02			01
Familiarity of Site	01	01	01	

Tables 6A and 6B show a summary by attribute and value for the users of entertainment and information Web sites respectively. Satisfaction was included in the most ladders in both cases, and Relaxation was included in the fewest ladders. One could also include the attribute-value connections in the segmentation scheme, grouping them as shown in Tables 6A and 6B into marketing-mix components. For entertainment Web sites, the attributes Larger Quantity of Content and Wider Variety of Content are linked to Satisfaction, while for information Web sites, it is Higher Quality of Content that is strongly connected with Satisfaction. Meanwhile, Location/ Community-Specific Content is clearly linked with Emotional Security for both entertainment and information Web sites.

Meanwhile, simply looking at the HVMs themselves can reveal certain interesting segmentations in the manner by which attributes are linked to particular consequences and values. For instance, in Figure 1B, a clear division can be made down the center of the map, between the linkages leading to Positive States of Being and on to Satisfaction/ Emotional Security on the one hand, and the linkages leading to Get Information Quickly/ Save Time and on to Relaxation/ Happiness on the other. Similarly, in Figure 1A, the path leading from Location/Community-Specific Content to Emotional Security/ Happiness is fundamentally different from that leading from, say, Larger Quantity of Content to Satisfaction/ Relaxation.

Thus, a marketer attempting to segment the different kinds of potential users of his/her information Web site could reason along these lines: "There are basically two types of users of information sites like mine. On the one hand, there are those that visit these sites in order to achieve certain positive states of being, which leads to improved performance/recognition, which in turn helps them to succeed and to avoid negative states. A successful, positive state of being helps them contribute to other people's lives, thus achieving emotional security and satisfaction. These users seem to be attracted to location and subject-specific content. On the other hand, there are those busy people that visit sites like mine solely to get information quickly, which helps them save their precious time. Saving time gives them more time to devote to other people/activities, which brings them relaxation and happiness. Such users look for site attributes such as familiarity, high-quality content, and good design."

Similarly, the marketer for an entertainment Web site could reason as follows: "There are two distinct types of users for entertainment sites like mine. There are those that use the sites to interface/network with other users, relate with them, build relationships, foster community ties, and thus achieve emotional security, happiness, and avoid unwanted states of mind. These "people-minded" users are attracted primarily to location-specific content. At the same time, there are those who use these sites as a means of avoiding unnecessary efforts. With the time they save online, they perform activities that helps them achieve positive goals. This helps them to relax, and to succeed, which in turn bring them satisfaction. It looks like these "success-minded" users desire access to large, varied quantities of content through the site."

8. Discussions

Questions may be raised about the cost-effectiveness of the laddering methodology. For instance, it might appear that traditional interview techniques might be quicker and cheaper to perform. However, comparing the cost-effectiveness of the laddering methodology with that of unstructured interviews followed by standard content analysis may be done by referring to the analogy in instructional design and development of comparing the cost-effectiveness of the ADDIE (Analysis-Design-Development-Implementation-Evaluation) model with that of an unstructured, ad-hoc process. While on the surface the ADDIE model may seem more laborious and time-consuming, in the long run it actually shortens development time because it provides a much more structured and accountable system within which to work. The same can be said of laddering.

Meanwhile, the fact that leading advertising and marketing firms routinely use laddering interviews to segment their consumers and create blockbuster ad-campaigns suggests that this methodology is indeed practicable as long as sufficient funding and expertise is available. Furthermore, Reynolds and Gutman [1988] claim that the "crossing over" from the qualitative nature of the interviews to the quantitative way of dealing with the information obtained (developing summary codes, matrices, hierarchical value maps) is one of the unique aspects of laddering and sets it clearly apart from other qualitative methods. They cite several particularly valuable types of information afforded by HVMs obtained through laddering procedures, which can serve as a basis for segmenting consumers with respect to their value orientations for a product class or brand; assessing brands or products in a fashion similar to the use of more traditional ratings; evaluating competitive advertising; and developing advertising strategies.

Questions may also be asked whether laddering interviews might be guilty of "leading" respondents to provide answers that they really do not believe in ... to make connections that might not really be there. However, it must be understood that leading of respondents can take place in any given interview (or questionnaire), whether it involves laddering or not. Leading is more closely related to the skills and ethics of the researcher than to the methodology followed. A skilled and conscientious interviewer will try his or her best to ensure that leading of respondents does not take place. Nevertheless, regarding the limitations of the laddering process, Reynolds and Gutman [1988] do point out some procedural and interpretational difficulties that might come in the way of the successful use of this method. Two basic problems commonly encountered during laddering interviews are when the respondent really does not "know" the answer, and when issues become too sensitive. However, they do suggest specific techniques that can be used to overcome these problems. Researchers who wish to familiarize themselves with these techniques are encouraged to read Reynolds & Gutman's pioneering [1988] work in this area.

9. Conclusions

The most important contribution of this study, in the researcher's opinion, is its successful demonstration of the applicability of Gutman's means-end theory – an important part of marketing research literature – in the context of human-computer interaction research (or more specifically, Web usage research). By describing the relationships of 50 Web users with their favorite Web sites in terms of attribute-consequence-value linkages, the study indicates that means-end chains definitely characterize the basic pattern of relationships by which the physical attributes of Web sites gain personal relevance or meaning for their users.

The chief limitation of this study is that the current findings may not be generalizable to the whole universe of Web users, since the study only involves 50 respondents selected on a non-random basis. In other words, it cannot be determined at this stage if specific findings resulting from the current study would be sustained in then event of an expansion of the respondent base or in future replications of the study. It is unwise to extrapolate or generalize from a single qualitative study performed using a convenience sample of respondents. But then, the object of this study was simply to be an introductory demonstration of the use of a new theoretical and methodological framework within the substantive context of Web usage research, and not the formulation of meaningful hypotheses about the characteristics of Web users.

The latter could be the goal of a future study, or meta-analysis, that enjoys access to a much more extensive set of interview data. This might actually permit the drawing of generalizable inferences, which would be of great significance to academic researchers of HCI as well as to professionals in the Web industry. Indeed, a logical step towards further understanding and application of means-end theory in the context of the relationships between Web sites and their users would be to replicate this pilot study using a sufficiently large, scientifically selected sample of respondents. Thus would result in the collection of a body of data that might permit the drawing of generalizable inferences to describe and delineate the characteristics of distinct Web user segments, through the use of techniques such as consumer prototyping. Information of this nature would be of great significance to academic researchers of new media as well as to professionals in the Web industry, as it would permit them to perform tasks such as assessing Web sites' effectiveness, evaluating past/current advertising for Web sites, and developing future advertising strategies.

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