5

Structuring Virtuality

A User-Based Example for E-Commerce

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Abstract. The purpose of this paper is to provide an example of an empirical procedure for generating user-based cognitive and social cognitive models of tasks/problems/contexts that can be employed to create readily navigable link structures for virtuality-mediated communication and collaboration purposes. Employing a natural language, user-based method, this study describes patterns found across 128 interviews where respondents were describing their cognitive movement in the form of steps taken during an interactive E-Commerce situation. Employing these patterns, we analytically develop a model of E-Commerce as a series of logically necessary steps over time. The resulting model illustrates the utility of individual cognitive and social cognitive patterns to structure virtuality as a series of interactive links associated with particular tasks/problems/ contexts. Logical structures derived in this manner have the additional strength of requiring no "training" of users because they already recognize the inherent linguistic, temporal and functional relationships. As an added benefit, the model of E-Commerce generated in this study has concrete practical implications for web site design and evaluation.

1 Introduction

Over the last decade or so the Web has become a significant hub of communication and collaboration activities. We know from past research on the diffusion of innovations [25] that there is a tendency to use new technology the same way we use the technology it is replacing until we figure out what the capabilities of the new technology are so we can take full advantage of it. This would lead us to

suspect that virtual activities on the Web, like E-Commerce, are being structured by their technological predecessors. To a large extent, we can see that E-Commerce entrepreneurs have adopted structures like printed catalogs and shopping carts to structure the interaction between purveyors of goods and services and their customers [17]. This seems like a mixed metaphor with virtual catalogs coming from their print technology predecessors but shopping carts coming from in-person shopping behavior. In this paper, we raise the question of whether it might be possible to employ structures derived from sources other than immediate technological predecessors in order to take better advantage of the Web's *tabula rasa* hyperspace potential for virtual communication and collaboration. There have been calls for structuring virtuality according to human cognitive and social cognitive perspectives [6] where constraints for structuring the Web's hyperspace are derived from actual human behavior associated with specific tasks/problems/contexts rather than from the technology itself or from managerial logic practiced in non-virtual contexts [15, 1, 28, 19]. Following D'Eredita & Nilan [6], we believe that natural, ubiquitous collaborative processes exist and suggest that it is upon these processes that the design or "structuring," of new technological environments should be centered. This paper reports on one such effort focusing on E-Commerce interactions as a context to illustrate this approach.

2 Conceptual Framework

First we need to define the notion of "structure." Here we intend structure to indicate constraints to random human action that *facilitate* movement in a direction appropriate for a given task/context while, at the same time, *inhibiting* movement in an inappropriate direction. Constraints to human behavior/action/movement come from a range of sources including: genetic inheritance (the "nature" side in the long running nature vs. nurture debate); culture, (beliefs and value systems); society (laws); organizations (policies, reward structures); technology, (interfaces, telecommunications protocol); etc. Some of these constraints or structures are the result of survival pressures that represent lessons learned across centuries and millennia; some are more temporary, almost ephemeral. Some of these structures are almost Darwinian in their appropriateness for human survival [5] while many associated with virtuality are the well-intentioned products of software programmers that rely more on technological constraints, which are often alien to users. Some of these constraints are learned without conscious effort and some of these constraints are imposed by man-made caprice. Much of the design of current systems requires users to read a manual or to pursue training in order to take full advantage of the system/software/technology. This illustrates how far designed solutions to human problems have strayed from the human baseline. From a practical point of view, we can't get users to read the manuals anyway

To clarify what we mean by "structuring virtuality," we begin by defining a "system" as 'a series of steps designed to help solve a human problem.' Thus, man-made structures (the designing referred to above) constrain (either facilitate *or* hinder) people's movement through time and space as people move to address situations, make decisions, solve problems, etc. based on the selection of steps

(which steps out of all possible steps) and sequencing of specific steps (what order if any, are optimum for success).[1] Structuring virtuality then refers to collections of hyperspace links that function as constraints to guide human activity on the Web in a particular context.[2]

We chose E-Commerce to illustrate this conceptual approach to structuring virtuality because of its pervasiveness on the Web today. Existing E-Commerce structures are clearly intended to facilitate purchasing behavior. We searched the literature in a number of fields to try to find out what models of purchasing behavior have been employed in state-of-the-art E-Commerce sites. A very useful review [16] developed a taxonomy for consumer characteristics and their online shopping behavior. This classification reveals that thus far empirical studies have focused on:

- *Demographics*–Despite evidence that across time/space variables (specifically, characteristics of the individual that don't change or change too gradually) are poor predictors of behavior [9, 20], a large number of studies have tried to explain online shopping behavior in terms of demographics. For example, one study found that demographics might influence whether or not people are online in the first place; however, once people are online whether they buy or not and how much they spend cannot be explained by demographics. Even life style characteristics explain only a small proportion of online shopping behavior [2].
- *Personal characteristics and attitudes towards online shopping*–Similar to demographics, some studies emphasized other across/time space predictors such as Internet knowledge and acceptance of the Internet as a shopping channel, need specificity, disposition to trust, the extent to which they would like to share values and information with others, the extent to which they like being first to use new technologies, and tendency to spend money on shopping, cultural environment and perceived risk, as influencing online shopping attitudes and behaviors [16]. However, like demographics, these characteristics are known to be poor predictors of behavior [9, 20].
- *Hypothetical behaviors*–These studies looked at customers' willingness to buy and to return for additional purchases and customer loyalty. This willingness is judged on answers to questions covering likelihood of returning to a store's website, the likelihood of purchasing from the store within the next three months, the likelihood of purchasing within the next year, and in general the likelihood of ever purchasing from a particular store again [13]. However, intentions are hypothetical behaviors that are also known as poor predictors of actual behavior.

Together the above studies describe consumers as persons rather than our desired focus on purchasing behavior. While these studies are no doubt valuable to

[1] "Technology" is seen as comparable to "system" although it is often employed as sub-routines in a larger system logic. However, the essential intent is, like "system," to facilitate realization of human goals through imposition of constraint.

[2] The notion of context is essential here because all steps are for a purpose or are taken to reach a goal—even seemingly trivial steps have a goal of reducing boredom. Likewise, design constraints are "for" some purpose. The extent to which design constraint purposes and human goals align is the issue.

expanding our understanding of people who shop online, they do not describe actual purchasing behavior and provide little direction for improving the design of E-Commerce websites.

Other studies have focused on extremely narrow factors outside the control of the consumer such as:

- *External environment*–This is often understood as the influence of contextual factors such as legal framework, third party certification bodies and numbers of competitors. These studies found that the existing legal framework and third party certification bodies are positively associated with consumers trusting online stores [16].
- *Vender/Service/Product Characteristics*–These studies look at the products these stores sell and the service they provide to support the transactions [16].
- *Website Quality*–These studies have largely focused on impact of perceived ease of use and perceived usefulness [10]; user satisfaction and dissatisfaction with a website [34] and transaction support [17].

These studies provide us with valuable insight into how the market works and the economics of E-Commerce. However, they once again fail to provide us with insights into actual user purchasing behavior that we can use to generate requirements for E-Commerce website design.

Our perspective on human behavior, specifically, step taking, demands that information systems not be seen as problem solvers but rather as providing users with a means to manage their own problems—a support mechanism [1]. Thus, we need to pay attention to why users have entered the system, how and what kind of step taking they employ. Therefore, for studying step taking per se, the unit of analysis should be the problem rather than the individual user. The user is central to the information situation—influenced by not just the system but also the state the user is in, how the user understands his/her purpose, the nature of the resource needed which is dependent on the use to which the information will be put. These foci will help generate a system that will respond to the user's actual situation or problem as opposed to the user needing to be taught to better adapt to a system [33].

Existing virtuality structures seem to be following the default described by Diffusion of Innovation researchers [25] or else seem to have been deliberately carried forward from earlier communication and collaboration technologies. Most design is currently dominated by aesthetic expert logic derived from the capabilities of technology itself or simply carried over from expertise developed in the Industrial Age of manufacturing and marketing (as opposed to deriving from Information Age conditions). In spite of "user-friendly" rhetoric, users are seldom substantively involved in design. We set out to see if we could identify structural features, specifically steps and sequences of steps that derive from human purchasing behaviors as opposed to those that currently dominate E-Commerce design.

We employed Dervin's notion of cognitive movement from her Sense-Making approach [7, 8] to conceptualize the dynamic process of purchasing. Cognitive movement is a metaphor for how people experience life—as if they are moving through time and space—as a series of events or steps over time. A central aspect of life is that we are constantly faced with uncertainty or gaps in our understanding of our environment. Dervin [7] employed a "situation → gaps → uses" model to

describe sense making where a person focuses on a context or situation, which has a goal or desired end state, and takes steps to reach that goal. Along the way the person inevitably encounters aspects of the environment and/or his/her movement that are not clear (being beyond existing experience, uncertain or undetermined). The term "cognitive" refers to perceptions associated with the context/situation/environment as well as the person's movement through space and time.

It is important to note that this method explicitly elicits respondents' step taking descriptions in natural language in the form of open-ended responses, following the respondents' time order. Subsequent content analytic procedures and descriptive data analyses preserve as much of the natural language features as possible. Thus, even the appellation of steps and step sequences are user-based as opposed to technology- or aesthetic-based.

Dervin's approach has been successfully employed to describe a wide range of behaviors from a user perspective, for example, public spheres [27] media systems [29], public information campaigns [4], and nursing practice [30].[3] Other recent work in virtual communities [23, 24] that employed similar conceptual frameworks have provided insight into other dynamic sequences of behavior associated with Web-based collaborative phenomena. In the context of E-Commerce, we see purchasing as collaboration between consumer and vendor through the medium of a web site where the web site "stands in" for the vendor's side of the collaborative interaction. An ideal E-Commerce web site would address the range of step taking needs of the customer in an effective AND timely fashion. This is our rationale for wanting a complete description of purchasing behaviors.

Our goal was to elicit a series of descriptions of consumers' cognitive behaviors associated with purchasing on the web in order to look for patterns in those behaviors across a wide range of E-Commerce situations—we were looking for similarities in steps and similarities in the sequencing of those steps. If there are patterns in what people do then we can be confident that web site design features based on those patterns will likely be useful to consumers. Further, since these patterns represent similarities of user descriptions of step taking, consumers will need little, if any, "training" to navigate structures designed according to these patterns. If a web site has a complete set of features associated with purchasing that are perceived as useful by consumers, then we may be able to increase the likelihood that the consumer will not only purchase from that site, but that he/she will say good things about the site to others and will return in the future, because, for example, they will develop loyalty.

Our research questions for this study were quite modest: What are the cognitive behaviors (steps) that consumers articulate when they describe online purchasing experiences? Are there any patterns of behavior in their descriptions? Are there any patterns in the sequences of behaviors over time in their descriptions?

[3] See Dervin & Frenett [8] for a range of examples of the application of this approach.

3 Methods

We chose face-to-face interviews for an elicitation technique because we were describing a relatively common yet unknown sequence of behaviors. We chose an adaptation of Dervin's [7] TimeLine method where respondents described a recent online purchasing experience as a series of events or "steps" (operationalized as "something that you did, someone else did, or things that just happened"). "Step" is our operationalization of cognitive behaviors that represent the respondent's experience where each "step" is associated with a unique point in time and space such that steps are time/space specific, and is preceded or followed by other steps in the respondent's experience. Note that most accounts of experience recounted between people take this same form given the linear nature of language—we start at the beginning and unfold our description in temporal order until we get to the end (often called a "story"). The set of steps (recorded on 3" by 5" index cards) was taken as a respondent's account of one E-Commerce interaction. Finally, demographic information was collected from the respondents in order to describe the study sample.

We conducted 128 interviews where respondents described two online purchasing situations which produced a total of 1526 steps articulating behaviors describing online purchasing experiences as a series of respondents' cognitive movements or steps. We employed a randomizing sampling strategy geared towards getting as wide a range of descriptions of online purchasing as possible. Most of our respondents were students (graduate and undergraduate) at a medium-sized Eastern university. We believe that students are an appropriate population for this study because they are familiar with Web technology, have ready access to it, have disposable income to spend—in short, they are the E-Commerce consumers of the immediate future. The average age of the respondents was 27 years. Most of the respondents were in the age group of 21-30 years (78.13%). Of the respondents, 55.47% were Caucasian, 21.09% were Asian, and the rest were African American, Native American, or Hispanic/Latino. In terms of gender we had almost an equal number of males and females.

4 Data Analysis and Results

Given the descriptive nature of our data (mostly open-ended responses), we employed standard inductive content analytic procedures, the most complex of which (described in more detail in [21]) was employed to search for patterns in the steps describing purchasing behaviors. We (literally) laid out the 3" by 5" index cards for each respondent's purchasing description in a horizontal line, one description below the next, one respondent below the next. Then, by sliding the index cards left or right (always maintaining the respondent's time order), we attempted to align similar behaviors or steps in vertical columns. There were certainly differences in the amount of detail articulated between different respondents, however, we were able to document two distinct types of patterns: first there were several types of step that virtually all respondents mentioned; and second these steps were mentioned in the same time order.

Table 1. Frequency and percentage of events described by respondents maintaining respondent articulation order (n = 1526)*

Description of events*	n	%
Realization of want/visiting a website	313	20.54
Browsing/Searching – online and offline	246	16.14
Comparing products/prices/website features	72	4.72
Researching/observing/finding information general	220	14.44
Selecting products/links/features/vendors	270	17.72
Purchase/no purchase/complete purchase/purchase offline/order confirm	247	16.21
Enter information general	109	7.15
Stop	33	2.17
Save data	12	0.79
Other (not related to purchasing)	2	0.13
Grand Total	1524	100.00

* Missing data = 2

** Inter-judge coding reliability coefficient (Percentage Agreement Index) equals .9235 or 92.35% agreement between two coders.

Table 1 describes the results of this process, listing eight types of step in time order. This is a model of the specific E-Commerce behavior synthesized from respondents' natural language descriptions. The most common first event articulated by respondents was categorized synthetically as "Realization of want/visiting a website," which represents both serendipitous and known-item search as an initiation of an E-Commerce interaction. Of the 1524 valid responses (two responses were missing), 313 (20.54%) described this as their first step. For instance, we were told, "I knew I needed more memory and speed on my computer," or "I saw this interesting DVD on the web site," or "I wanted to buy a gift." Other common events included browsing (as a search strategy in a less directed context) and searching (both online and offline) (n = 246, 16.14%); researching/ observing/finding information (n = 220, 14.44%); selecting products/links/features/ vendors (n = 270, 17.72%) and making/not making the purchase (n = 247, 16.21%). Table 1 summarizes the frequency and percentages of how respondents described the steps when they went online to engage in E-Commerce. Note that we maintained the time order of respondents' articulations with two exceptions described next.

Steps that individual respondents mentioned in between "Realization of want/visiting a website" and "Browsing" (for example) were virtually always elaborations of the same movement although at a higher level of detail. Such "detail" steps were incorporated into the immediately subsequent step. Using this same example, detail steps between "Realization of want/visiting a website" and "Browsing/Searching" were incorporated into "Browsing/Searching." Note that there was another pattern in the steps that respondents articulated that did NOT follow a time order: "Stop" and "Save data." We found that many respondents described this kind of step but it was reported at many different points in the sequence of steps

describing purchasing. This is logical given the computer's role in web-based phenomena.

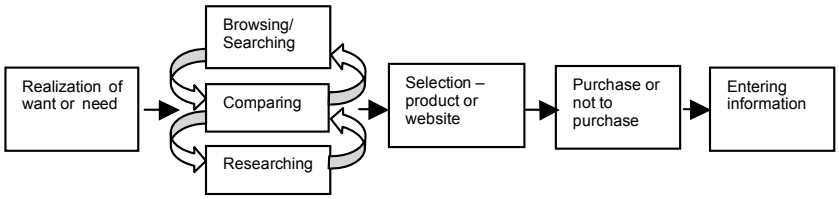

Figure 1. Graphic depiction of user-based "model" of purchasing behaviors.

This "model" of the patterns in respondents' descriptions of their purchasing situations had one other feature that is extremely noteworthy: A "loop" of behaviors (indicated by brackets in Table 1) that were often repeated by respondents (including "Browsing/Searching", "Comparing", and "Researching" steps), once for type of product, again for color of product (for example), then for other specific features of the product, service, warranty details, etc. By including this as an iterative loop, we were able to significantly simplify the complexity of our description of respondents' purchasing behaviors and still retain the overall time order of respondents' articulations.

Figure 1 shows a conceptual, time-sequential "schematic" of the cognitive steps describing purchasing behaviors presented in Table 1 with the iterative loop that dramatically simplified our representation of the patterns associated with "purchasing" for our sample. The loop is basically a pre-selection product/service feature information seeking sequence. The loop was evident in respondent's descriptions anywhere from once to several times depending on the complexity of the feature set that the respondent wanted to address before he/she felt confident in selecting or deciding on a particular product (regardless of whether the respondent subsequently purchased from the same website/vendor where he/she was looking) OR selection of a website (if s/he subsequently purchased on another website/vendor).

5 Summary and conclusions

One reliable empirical generalization we can make from thirty five-plus years of eliciting respondents' descriptions of their situations/problems is that researchers have ALWAYS found three types of patterns [7, 8, 21]:

- Respondents' descriptions are characterized by similar behaviors (including similar perceptions and feelings);
- Respondents do these things in a similar time order; and
- There is a finite range in resources respondents need to "move" through their situations/problems.

Our use of a content free method[4] for respondents' descriptions of their perceptions of a meaningful behavioral sequence as a series of steps provided us with a coherent and reliable basis for describing purchasing experiences across respondents. We argue that the pattern in the functional types of steps and the sequence of steps represents a recurring aspect of life, in essence a structure known to/recognized by everyone, about which people collaborate and about which they talk and refer to as "purchasing." We think that "purchasing", or more generally, "trading" represents a very basic and embedded behavioral sequence in human nature - probably developed socially over the last two hundred thousand years. This is clearly a more enduring structure than those ephemeral structures somewhat arbitrarily "designed" into many existing systems, including the vast majority of sites engaging in E-Commerce as currently practiced. The socio-cognitive structure reported here is a generalization across 128 people about the similarities in how people think and talk about purchasing online. We believe that if the functional and temporal relationships found here were employed to structure Web-based E-Commerce design it would improve the utility to both customers and vendors who collaborate around or through E-Commerce web sites. Our socio-cognitive model can be employed to facilitate or structure and inform interaction. Although we looked at B2C (business to consumer) experiences, we feel that the embedded nature of the perceptions modeled here would be helpful for Web-based B2B (business to business) interactions as well.

The model presented in Table 1 and in Figure 1 represents a sequence of logically necessary behaviors that customers expect from E-Commerce web sites literally in spite of the well meaning aesthetic design constraints currently employed to structure those sites. The observed patterns in steps were evident regardless of the specific E-Commerce context. That we found such patterns in respondents' descriptions strongly suggests that web sites which are designed to constrain user movement which accommodate these expectations will be both more "successful" with regards to purchases but will also likely be perceived as more useful by customers—a "win-win" situation.

Nilan and D'Eredita [22, 6] have argued for a social cognitive perspective [32] to be applied to the communicative and collaborative vision of structuring virtuality beyond this individual cognitive perspective. The implications of this move are that the passive roles associated with human beings having only "receiver" roles in "top down" mass communication media (publishing and broadcasting) have inhibited our ability to see that people have many other roles vis-à-vis those media—people are also conversants in a communication context even though the "other" does not listen very well nor respond appropriately—so far. The Web is a horizontal, small group to small group medium where the conversant role is (or should be) MUCH more evident. Our data would suggest that the effectiveness of the "other" in our professional design efforts could be much more natural and responsive to users'

[4] By "content free" here refers to the manner in which the conversation between the researcher and respondent unfolds. The researcher's structure is steps over time, similar to how people tell each other stories and according to Dervin's [7, 8] cognitive movement metaphor. However, the types of steps, their temporal order, etc. are details supplied by the respondents.

natural movements. While we know from the research into diffusion of innovations [25] that people tend to 'do what we are used to doing but on the new technology' when we are initially dealing with new technology like the Web (and it has been just over eleven years since the Web's introduction to the public in April, 1995) it should be obvious to us that enduring human cognitive structures like the patterns presented here will be effective on the Web in spite of still unknown or arbitrary technological constraints.

We believe that our model illustrates that there are readily observable human structures that will allow designers to take better advantage of the unique aspects of the Web. These approaches require the researcher or professional to learn to listen to the user/customer more effectively and to cast the users/customers in a more responsible and natural interactive role [22]. This will facilitate the design of true "interactive" web sites appropriate for global electronic network environments.

As an example of the utility we see in this study for improving the design of E-Commerce web sites, the iterative resource seeking loop indicates that users invariably seek insight into product features salient to them, yet most existing sites do not provide information about competing products. If users are leaving an E-Commerce site to access this kind of resource, you are increasing the chances that the user will purchase elsewhere. This is somewhat ironic since the Web is so well suited to providing information resources. Haubl and Trifts [12], even though they are clearly within a "rational" model of consumer behavior, noted that customers routinely make product feature comparisons across web sites. However, it appears that because E-Commerce web site designers have carried over traditional marketing logic (which says you don't talk about competitors' products except to criticize them) onto the Web, they "build in" encouragement for users to go elsewhere and potentially lose the customer in the process. Our model clearly shows that web sites *should* address customers' natural predilection to get information about competing products/services BEFORE they actually reach a product selection step. For the most part, price as a feature that distinguishes one web site from another would seem to be an Industrial Age logic while how a site treats a customer by providing what the customer needs, for example, would seem to be a viable Information Age logic. It seems clear to us that giving customers what they clearly say they want is a viable strategy for getting customers to not only stay at your E-Commerce site but to return in the future.

Current E-Commerce web site design really only addresses the last two steps in the model presented here. Attention to potential customers' needs and predilections in the antecedent steps would seem to be a powerful strategy for keeping a customer at a site and encouraging that customer to return next time s/he has a desire for a similar product. Although we can envision E-Commerce web sites that are markedly different from the current catalog-plus-shopping-cart variety, we believe our purchasing model provides insight into other aspects of a human-to-human purchasing interaction that could be acknowledged and addressed in web site design. If the resources at E-Commerce websites are sending customers elsewhere to get their questions answered, this only increases the chances that customers will buy elsewhere. Customer loyalty is likely to be related to how easy the E-Commerce website makes the purchasing process.

The web interface is a way of organizing resources (computing functionalities and links or referrals [21]). There are two approaches to designing interfaces. Researchers who studied text-editing systems concluded that users needed training to enhance their understanding of the editor [11]. Other researchers emphasized understanding user behavior rather than attempting to change it through training, for example [18] and demonstrated how user suggestions were utilized in the development of the Apple Lisa interface [31]. Further, a recent survey by Zona Research found that 33% of the people surveyed indicated having difficulty locating products and 62% indicated giving up looking for merchandise items because they could not find them [3]. The importance of designing an interface that mirrors patterns of user behavior (including resource use) can be seen from the assertion that interface limitation is seen as one of the top six key obstacles to E-Commerce [26].

Table 1 and Figure 1 suggest one way in which information can be organized and sequenced on an E-Commerce website that follows what human beings already expect. Web designers can use the abstract model of E-Commerce developed by our study (which is based upon the way that people perceive and talk about their experiences of going through an E-Commerce purchasing problem) as way to organize information on their websites. Thus, using the abstract model as a base on which to build the website design will help customers to navigate to the point in the E-Commerce process where they want to be without any training at all! They already "know" this process. Further, if the appropriate resources are organized in accordance with the model, then not only will people be able to find what they need but they could also bring new resources to the website and "place" them in the logical location. Note that this would facilitate keeping the site up-to-date at little or no expense to the vendor! The first level of the interface could be a representation of the steps (in time order) in the user-based purchasing model. This would enable customers to immediately locate where they are with their own purchasing situation at the present moment and where they want to go. The second level of the interface would present the resources needed in order to navigate though a specific event or step. As Nilan [21] suggested, "The relationship between the first and second levels is that the first level allows for a crude orientation to the system but on user terms, and the second level allows users to cognitively navigate through the problem space to more specifically define their functional needs."

We believe that the study reported here provides a good first example of employing cognitive and social cognitive approaches to deriving insight for structuring virutality which in turn can provide valuable practical insights for website designers. By illustrating the not-so-complex cognitive process involved in E-Commerce purchasing, this study can lead E-Commerce web site designers to reexamine the current two-step model of E-Commerce on which their designs are based (basically an online catalog and a shopping cart). At a higher level of abstraction, we believe this study supports a shift from controlling users (characteristic of Industrial Age marketing logic, for example) through a methodological focus on individual differences to collaborating with users through a methodological focus on shared similarities in cognitive orientation to specific tasks/problems/contexts. In other words, we believe that researchers and designers should shift from aesthetical and/or technological constraints to functional constraints associated with a specific task/problem/context [6].

One of the weaknesses of the study lies in the inductively developed coding schemes, which could have been tighter. This especially true for the schemes developed for describing events mentioned by the respondents and the types of questions they had. However, we would argue that a user's interpretation of the steps is served by this over-generalization in much the same way that the flexibility of language allows for myriad ways of constructing utterances/ sentences. Individual terms in the model presented here are not interpreted in isolation but rather in terms of the entire model, so the generalized terms chosen for representing the different steps in the model would seem to be adequate for communication and navigation purposes. The biggest strength of the current study is that, by focusing on what the user does rather who the user is, it provides web designers with rich data on cognitive process involved in E-Commerce as well as an understanding of the kinds of resources needed to navigate through the process.[5]

One final note: The approach illustrated here employed a strategy based upon empirical research. However, the current Web technology suggests that the kind of data collected here could be done quite economically in real time, all the time (rather than every now and then through expensive research). An example would be the use of discussion group type functionality that is designed deliberately to facilitate user/vendor communication as opposed to an add-on feature. Not only is the global economy being changed by this technology, relationships between vendors and their customers are changing as well. This approach provides a way of thinking about and employing virtual relationships to mutual advantage through respectful interaction with both "sides" contributing valuable insights to further communication and collaboration [22].

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[5] In this study we also elicited respondents' information needs at each step but due to space limitations, we were not able to include these results in this report.

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