

CHAPTER V. CONCLUSIONS AND DISCUSSIONS

5.1 Conclusion

This study used an online trip planning exercise to examine the structure of travel information search on the Internet and information searchers' satisfaction. Two central constructs, the concepts of the semantic mental model of a travel information searcher and the semantic model of the travel information space, were introduced in order to explain a travel information searcher's navigation behavior and her/his satisfaction with online travel information search. Three major conclusions are presented here.

Structure of Travel Information Search and Other Findings

The results of this study confirmed that travel information search and trip planning on the Internet is a complex, dynamic and contingent process (Jeng, 1999). Information searchers used a large number of travel related web sites, not only including web sites provided by tourism marketers but also general web sites including media and sport web sites. Each of the subjects has a distinct semantic mental model regarding the designated destination (See Appendix I); each subject navigates through the travel information space according to her/his idiosyncratic semantic mental model and each of them encountered different sub-information space. Furthermore, the research showed that the trip planning on the Internet can be broken up into different episodes, in which each episode is defined by an evaluation on an alternative targeting at solving a sub-problem. Several episodes comprise a "chapter", which is one facet of travel plan and also a solution set for a sub-problem in the trip planning task, including

accommodations, attractions, activities, or transportation. Though each subject demonstrated idiosyncratic information search behavior, commonalities were also found. Eight of the 15 subjects made accommodation choices first, indicating that the accommodation choice is the most central sub-decision in a trip plan. The travel information searchers' online behavior is also more complicated than originated expected; they performed search, navigation and information organization (e.g. printing out web pages and writing on a sheet of paper) to facilitate their trip planning. Additionally, geographical and time information are not well-represented in the travel information space. The travel information searchers were forced to switch between destination web sites and online map web sites for location information. Research results also showed that information searchers are always looking for "information hubs", which are web pages with many links to other pages containing travel information regarding the designated destination.

Comparison of Two Semantic Models

The comparison between the aggregated semantic mental model of information searchers and the semantic model of the travel information space indicated that travelers have intrinsically different semantic models as compared with the semantic model of the tourism information space. The travel information space contains a large amount of marketing-oriented information emphasizing selling. It contains keywords like "price", "ticket", and "free", whereby traveler's semantic mental models are more subjective and experiential, which include keywords like "big", "walk", "city" and "music". Among the top 25 most frequently used keywords, only 8 of them appeared in both semantic

models, and these 8 keywords are general information keywords such as “San Diego”, “information”, “city”, “attraction” and etc. Furthermore, there are more diverse keywords in the travel information space compared with those in the information searchers’ verbalization. These findings indicate different languages and lexicons the tourism information providers and the travel information searchers are using and they have very few overlaps.

Examination of Satisfaction of Travel Information Search

In this study, the subjects generally showed high levels of satisfaction, including both outcome satisfaction and process satisfaction as indicated by the average value of satisfaction measurements. Against the initial expectations, the satisfaction of travel information search is not positively correlated with the congruence between the two semantic models. On the contrary, the less congruent semantic mental model will lead to higher level of satisfaction. Furthermore, results also showed that a semantic mental model was able to capture information searchers’ travel experience. Travel experience is positively correlated with the congruence of two semantic models but negatively correlated with satisfaction of travel information search. Computer and Internet use experience is negatively correlated with satisfaction of information search. Expectation may be an intermediate variable which negatively contributes to satisfaction, since frequent computer and Internet users may have higher expectation of the information space and accordingly the high expectation may result in lower levels of satisfaction. Travel-related Internet use experience is negatively correlated with congruence of two semantic models. Since the travel-related Internet use experience was measured by

whether or not the information searchers have checked airline information online or rented a car online, which are functional uses of the Internet. The results indicated that semantic mental models are more related with hedonic aspects of the subjects' travel experience but less with their functional use of the Internet.

5.2 Implications

5.2.1 Theoretical Implications

The contributions of this research are discussed in details regarding the three major findings.

Implications of the Structure of Travel Information search

Information searchers used different information organization tools to facilitate their decision-making, for example, printing out web pages or organizing information in word processing programs. The results indicated that trip planning on the Internet is an information-intensive task which is often beyond information searchers' information processing capability, at least in the context of trip planning tasks framed in the study (Payne, Bettman & Johnson, 1993). This research confirmed adaptive decision-making process in a great detail in the context of trip planning on the Internet (Payne, Bettman & Johnson, 1993); it demonstrated that trip planning is a contingent and dynamic process (Jeng, 1999). The information searchers navigate through the travel information space according to their idiosyncratic mental models. Every click on a web page reflected a unique choice of the next information node. The resultant sub-information space is the end result of the interaction between an information searcher's mental model and the information structure and content provided by tourism information

providers. The online travel information search experience is co-constructed by the information searchers and the travel information space.

The research results of this study also confirmed information foraging theory (Pirulli & Card, 1999) in that people search for information according to the significant concepts in their mental models. They tend to search for “information hubs” (information clusters), which is a web page with links to many attractions or accommodations of one destination, in order to minimize inter-cluster search cost. Information hubs could be local convention and visitor’s bureau web site, commercial web sites regarding San Diego, or even a list of attractions on a local hotel web page.

Furthermore, research results showed that the complex “trip-planning problem” was solved in different “chapters” whereby each chapter is targeting at one facet (or sub-problem) of a trip plan. Each chapter can be further divided into individual “episodes” in which each episode is an evaluation process of an alternative. Each subject has distinctive episodes in terms of different alternatives checked; however, on the “chapter” level, there are more commonalities, for example 8 of the 15 subjects made accommodation decision first. A specific chapter appeared in almost all of the navigation graphs which is a re-evaluation of some/all of the considered attractions/accommodations/ restaurants on their geographical locations. This chapter indicates a “leeway” from the usual problem solving process of each facet of trip planning and it is an evaluation on all the alternatives on geographical frame. It represents the unique characteristics of trip planning on the Internet.

Most importantly, this research provided a framework for exploring information search behavior through a general information search protocol using triangulation of different data sets. The research used the following methods to collect data: a clickstream capturing software, a screen capturing software, a camcorder and a collection of information search artifacts. The matching and the triangulation of these data sets provides a comprehensive view of online information search behavior. Furthermore, concept mapping method, which maps link anchors which the users clicked into directed or undirected maps, was a novel approach to reduce the amount of data and provide a more intuitive representation of online behavior. These original research methods can be used extensively on research on online behavior which is beyond tourism research.

Implications of the Comparison of Two Semantic Models

The comparison between two semantic models showed that the travel information searchers are using a different language to describe their experience compared with the travel information space. Storytelling is a powerful way to represent information and convey meaning (Douglas, 2002). Two descriptions can be generated using the top 25 words from the two semantic models by organizing those top 25 keywords into texts using as few keywords as possible.

The travel information providers are saying:

San Diego City is Located in **California**. Here we provide **information** on **hotels** and **parks**. You can also find **maps** of **San Diego**. Here you can find **best discount tickets** with the **best price** on **cruises**, **tours** of **harbor**, and the **Sea World** in **bay** area. You can go to various **attractions** and **services**, including **shopping centers**, **museums**, **restaurants** or **free events**. We also have **best art museums**.

On the other hand, the travelers are saying:

We know **San Diego** is a **tourist city** located in **California**. If I go there, I'd like to **walk** around on a lot of **beaches** and **look** around the **city** in the **day**. I'd like to **watch people**, and see **live shows**. I'd like to **stay** at **good hotels** and **places**, **dining** at **restaurants** with **good food**. I'd like to **look** for **information** on **good** and **different museums**. I also like to visit the **big attractions**, like the **zoo** and **music clubs**.

The travelers used more subjective and experiential keywords to describe their background knowledge and their information needs; on the other hand, online travel information is dominated by a marketing and promotion language, which focuses on profitable attractions and price information. Their points of interests are also different as shown in the descriptions. It is reasonable to assume that each party of information producers and information searchers is learning and guessing the other one's language. The information searchers would guess the keywords/concepts when s/he input the search terms into a search box to search for travel information; the tourism marketers would guess the travelers' language in order to entice them and market their destination. The results showed that there are still great discrepancies between these two languages.

The keywords in the travel information searchers' semantic mental model represent their connections with designated destination. They are also the concepts/keywords associated with the destination as a brand. In tourism marketers' effort to promote their destinations, using the concepts in the travelers' semantic mental model will be destined to achieve better results.

Implications of the Satisfaction Model

The research results showed that on average the travel information searchers are generally satisfied with their online trip planning process. Specifically, process satisfaction is higher than outcome satisfaction and both of them are not correlated with the congruence of two semantic models. From the trip planning exercise, it is also found out that the information searchers were highly adaptive; when they encountered navigation problems, for example, broken links, they simply ignored them and took them as granted. These findings indicated that navigation is not usually a major usability problem which may lead to dissatisfaction compared with actual alternative evaluation on a certain web page. In other words, the content of the web sites is more important than the structure in terms of determining the levels of satisfaction of travel information search. It may indicate that with development of technology and standardization of web interfaces (for example, top and left side menu bars became a standard in current commercial web interfaces), the information content plays a more important role in determining information searcher's satisfaction.

Mandler (1975) indicated that novel and incongruent information leads to arousal. When the arousal happens in a positive and pleasant context, positive feeling will occur. Trip planning happens in a positive context since traveling is a leisure activity. When novel and incongruent information encountered, the subjects will achieve a more positive feeling. Similarly, flow theory (Csikszentmihalyi, 1990) claimed that the optimal experience can only be achieved when the skill of the subject matches the challenge of the task, in other words, relative new and novel information is needed. The total match of semantic models implies minimal challenge which will lead to boredom. These theories explained the enjoyable experience in the travel information search. The research results indicate that the satisfaction of travel information search may be determined by two factors, hygiene factor and motivator (Zhang & von Dran, 2000). Satisfying the functional needs of travelers is the hygiene factor, without which the information searcher will feel frustrated and unsatisfied; on the other hand, novel and exciting information they encountered which is beyond the travel information searcher's semantic models is the motivator, which satisfies the information searcher's hedonic needs. Only when both the functional and hedonic information need is satisfied, can the travel information searcher achieve higher level of satisfaction.

The proposed conceptual framework is based on research on HCI and information retrieval, which focuses on functional information search, in other words, how to accomplish a well-defined task. On the other hand, travel information search and trip planning are more experiential and hedonic. The results from correlation of individual characteristics with congruence of two semantic models showed that self-evaluated

travel experience contributed to the congruence while using the Internet as functional information source did not. It implies two sources of satisfaction, meeting functional needs as trip planning as well as meeting hedonic needs as creating excitement. Travelers are looking for both facts about attractions and accommodations for trip planning and also novel, exciting and enjoyable information during information search. Intrinsic limitations were found in these areas when the focus is on functional information search. Fulfillment of functional needs is not sufficient for higher levels of satisfaction. Travel information search experience can be seen as an extension of actual travel experience. A travel information searcher enjoys online information the same way as enjoying the trip itself. Trip planning on the Internet is one part of whole traveling experience. The previous discussions indicate that with co-evolution of information technology and the users, users' satisfaction with information systems has surpassed traditional view of functional needs in terms of finding relevant information but is moving toward fulfillment of hedonic needs. It poses important implications for the research and design of information technology since the focus should be switched more on providing exciting and novel content besides fitting the users' mental models to satisfy their functional needs.

5.2.2 Technological development and Managerial Implications

This study revealed important insights on how travelers search travel related information on the Internet and thus provide important implications for future technology design and management.

1. The results of this study showed some commonalities of information searchers' navigation behavior. Eight of the 15 subjects chose hotel as the first sub-decision to be made. Thus it is important to arrange the layout of destination marketer's homepage to make sure hotel links are in the obvious position. Information hubs were accessed by most of the subjects and they were not selective in terms of using authoritative information hubs. Therefore, the marketers should take advantage of the design of information sources and also ensure the correct information were shown on different information hubs on the Internet.
2. Apparent limitations were found in the design of travel-related web sites. This research showed that geographical and time information is not well represented in the travel information space. Future development of travel information systems should provide more decision aids along geographical and time frames.
3. Customization and personalization is widely promoted in recent years in order to design better interface for information systems. The underlying assumption is that when we can get a better knowledge of the individual characteristics of each user, we can customize the interface according to their preference and mental models. However, this research showed that the total match of two models is not necessarily leading to higher level of satisfaction. Pleasant surprise which is beyond the user's mental model is necessary. Hence, for hedonic information search, the interface design shall focus more on providing the pleasant, exciting and unexpected interface and information content besides satisfying user's functional needs. It is important to provide enjoyable "surprises" which the

travel information searchers did not anticipate. Beyond finding the perfect mental model of information users, more focus can be put on producing novel and exciting information which represents the characteristics of the destination. From the results of this study, narrative design appears to be a good alternative besides simplistic design principles of web sites (Nielsen, 1999). By using a storytelling style, travel information providers can incorporate travelers' language and concepts to provide a more powerful persuasive marketing language.

4. The research results demonstrated that the travel information searchers used a variety of web sites in their travel information search, which greatly influence the decisions the travel information searchers may make. They are not selective in terms of which information hub to visit. Therefore, more cooperation is needed between different online travel information providers in order to ensure most of online travel information is correct and undistorted.
5. Since every click in the navigation process is a decision-making regarding the relevance of information, each individual's semantic mental model can be inferred through their click streams on a single session of information search. The web interface can be improved using the language and vocabulary of the information searchers instead of the designer's language (Furnas, Landauer, Gomez & Dumais, 1987). The link anchors can be improved according to the information searcher's semantic mental model to provide more meaningful proximal cues. Semantic network analysis can also be used to explore tourism web sites in order to explore the appropriateness of its content.

6. The semantic web is the next generation of web technology. Maedche and Staab (2002) proposed to apply semantic web technology to design more useful travel information system. However, the generation of ontologies of tourism should consider the travel information searcher's semantic mental model as well as the semantic model of the tourism industry. This research also demonstrated that tourism ontologies in the form of semantic network may be a better alternative than a hierarchical one.

5.3 Limitations of the Study

Although this study provides significant insights into the process of travel information search on the Internet and the factors affecting the levels of satisfaction of travel information search, given the exploratory nature of the study, it has many limitations related to the state of methodological development in the area under investigation. Thus, the results must be interpreted cautiously. The followings are the major limitations of this study:

1. *Sampling.* This research drew the sample from a student body in a mid-western university in the United States, and the subjects were recruited by posting advertising messages on the newsgroups in the university. This sampling method determined that the subjects are not a representative sample of the population of all travelers in the United States. They are at a younger age, more technology-savvy, and may have a limited travel experience. The subjects are biased towards the travel information searchers of college student groups.

Furthermore, there are only 15 subjects recruited for this travel exercise; therefore the correlation analysis in the study doesn't have enough power to ensure the results to be generalizable to the whole population. Therefore, the results of this research should be interpreted cautiously.

2. *Semantic Network Analysis.* As a new type of content analysis, there are many options to choose when conducting semantic network analysis, for example, the number of keywords to be picked in the analysis and the list of stop words used in CATPACII. The choices of these options largely depend on the goal of the research and the understanding of the analysis and there is no standard guideline to follow. Even though great efforts have been made to ensure the unbiased analysis and meaningful results, the outcomes are not guaranteed to be completely impartial.
3. *Choice of Destination.* San Diego, California was given to the participants as the designated destination for trip planning purpose. However, every destination is unique. The size, characteristics, and management of the city will affect its online information space. The number and groups of concepts will be unique for each destination. Again, the generalizability of the results of the study is limited.
4. *Coding.* Because of the limited time and budget, the qualitative data was coded by the author alone. The generation of navigation maps and the differentiation of episodes were conducted by the author without further validation from the second coder. Therefore, reliability remains an issue in this research.

In general, the nature and methods of this research determined that the generalizability of the results of this research is limited. Exploratory in nature, this research is intended to provide insights in the travel information search on the Internet and the results are difficult to generalize to a larger population beyond the college student group.

5.4 Future Research

This research described the process of travel information search on the Internet and explored the satisfaction of travel information search through the congruence and discrepancies of semantic models of two parties: the travel information searchers and the travel information space. Because of the nature of the study and the sample, the results from correlation analysis are not conclusive. Further research can use a large sample size to focus on extensive testing of the relationship between (1) the congruence of the semantic model of travelers with the semantic model of the travel information space and, (2) the satisfaction of travel information search to validate propositions in this study. The results will be essential to provide guidance for designing better travel information systems.

This research used keywords as analysis units. However, individual users utilize different keywords but they may be expressing the same ideas or concepts. Different layers of meaning could be examined in the future research. Higher levels of analysis of meaning/themes may reveal important commonalities and differences between users and provide guidance for future design. It is hard to incorporate each individual user's keywords when designing an information system but it may be possible to include the

common concepts/themes in the information content. The research on the ontology of languages between different information providers and information searchers will be a fruitful area of research.

This research explored the subjective experience of travel information search. No objective measurement of travel information search was proposed. Objective measurements of travel information search, for example, time spent on an information search task (efficiency) is more crucial in a goal-oriented information search. In the future study, a revised and more limited trip planning task can be used in the trip planning exercise, so that measure of efficiency can be compared with satisfaction measure of travel information search. The subjects could be asked to find certain travel related information on the Internet by using as little time as possible (for example, find the cheapest motel in San Diego area within 50 miles of San Diego Zoo). The satisfaction of travel information search can be compared with measurement of efficiency. From the results from this study, it is expected that these two are not necessarily consistent. Further research can focus on distinguish those separate elements in the travel information space which contribute to the hygiene factor and motivator as discussed before.

This research aggregated all travel web sites related with San Diego and analyzed them using semantic network analysis. The results represent the semantic model of the travel information space as a whole. Aggregated semantic model of tourism information space ignored the differences of different parties inside tourism industry. However, different

parties in tourism industry have different marketing styles and languages. Therefore, the analysis of languages of different groups of tourism parties can be performed using semantic network analysis of their web sites. The different languages can be analyzed to determine if a better match can lead to more satisfactory travel information search experience.

Quantitative measurement of search sequence is not explored in this study. However, exploring how different users access and navigate through the travel information space is illuminating to the usability of the travel information space. The sequence could be represented by either web pages or keywords. Using Hidden Markov Model (HMM) (MacDonald, Zucchini & Zucchini, 1997) or genetic algorithm (Michell, 1998), we might be able to identify the common paths of user's navigation and explore the efficiencies of travel information search through numbers of nodes navigated compared with different sub-decisions being made.