

# A Comparative study of protocol analysis for Spatiality of a Text-based Cyberspace

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**Abstract.** The adaptation of the word cyberspace (Gibson, 1984) following the emergence of the World Wide Web Internet not only succinctly revolutionized the correlation of time and space but also poised to challenge how we view the existing spatial concept. This research tries to use protocol analysis to examine text-based cyberspace, such as bulletin board, chat rooms and so forth, and the objective of this research is to realize the spatiality of cyberspace through the cognitive point of view, and to compare the differences of the definitions and perception ways of spatiality between people with general domain and in design fields. Finally, we validate the existence of cyberspace, where the process not only allows further categorization of spatial elements concluded from the earlier study, but discover that varied backgrounds can affect how a user defines and perceives cyberspace (Strate, 1999).

**Keywords.** Cyberspace; sense of space; protocol analysis

## Introduction

The adoption of the word cyberspace (Gibson, 1984) following the emergence of the World Wide Web Internet not only revolutionized the correlation of time and space but also urged us to challenge the existing concept of space (Cicognani, 1998; Mitchell, 1999; Anders, 1999). Some researchers described cyberspace as illusion, others thought that cyberspace was an incomprehensible and continual-evolving environment (Benedikt, 1991), and the others even wondered that cyberspace might really existed (Markoff, 1992). Until now the definition of cyberspace is still so confused and varied that keep us from coming up with a clearly defined term. Among related studies, Strate (1999), attempting to divide cyberspace into three stages of investigation with whose background as a scholar of communication, indicated that the first stage was to investigate the existence of cyberspace and its reality. The result he proposed was that cyberspace is fictitious, unreal and imaginary. The contradictive definition revealed that the experience of cyberspace was totally different from that of previous conventional spaces. Moreover, Novak (1999), examining it from an abstract perspective of architectural field, reckoned cyberspace as a habitat of imagination and indicate cyberspace as a liquid architecture. All of which not only pointed to the fact that how researchers are increasingly turning to focus on issues related to cyberspace in recent years, but its virtual and far-flung characteristics have triggered a series of explorations and discussions trying to validate its existence (Cicognani, 1998). On the contrary, from the viewpoint of the human mind, the emergence of cyberspace, made possible through a new digital media and new interface, also brought human's cognitive behavior with a drastically differed spatial experience (Anders, 1999). All these have compelled studies to further examine the existence and definition of cyberspace.

Based on these background reviews, Liu (2001) had had a cognitive experiment through interview and observation. Eight students of varied backgrounds in linguistics, architecture, industrial design and visual design were invited as subjects of the experiment. After they browsed the target website, including text-based chat rooms and graph-oriented web sites, the researcher conducted in-depth analysis by observation and interview during the experiment. Preliminary findings of the study did support that the cyberspace participants could indeed perceive a sense of space in

cyberspace, while whose varied backgrounds would also affect their perception of space, i.e. one with an architectural background tended to define whose sense of space through spatial correlations, while another one came from an industrial design background needed to rely on interactions between user and website to experience spatiality. Also proposed in the study were seven elements making up a text-based cyberspace, including spatial description – the naming process; movement description – shifting and participant interaction; spatial relationship – concerning here and there; spatial mode; participant's naming; graphic representation and voice description. Elements making up a visual oriented website consisted of shifting; sound effects; animations – static vs. dynamic; representation of volume – 3D objects, perspectives, light and depth; motional perception; indicative presentation and so forth. Among them, noteworthy is why shifting, interaction and sound are highly regarded as significant elements but have been neglected by most people for a long time.

### **Problem and Objective**

In conclusion, we have already assumed the existence of cyberspace preliminarily. However, in order to obtain more systematic and validated findings, we use validate means to further examine findings concluded from previous studies (Liu, 2001), and to further realize how subjects of varied backgrounds define and perceive cyberspace. This paper takes text-based cyberspace, such as bulletin board, chat rooms and so forth, as the prime targets of investigation. The objective of this research is to realize the spatiality of cyberspace through the cognitive point of view, and to compare the differences of the definitions and perception ways of spatiality between people with general domain and in design fields.

### **Methodology and Steps**

The methodology of the study is a general cognitive experiment, primarily led by online real-time interviews (Liu, 2001). The research has thus been divided into two steps. Step one is to choose four target websites based on the findings of previous study to cover the bulletin board service, chat rooms, and Windows-based chat rooms, and to plan main questions for the interview designed as follows,

1. Do you feel the website where you are a place, and why?
2. Do you feel the website where you are a space, and why?
3. If yes, please describe the characteristics of such a space?
4. (At the presences of spatial changes or the emergence of spatial elements) Does the subject experience any particular feelings?

Step two is going to conduct the cognitive experiment, and in which nine subjects of varied backgrounds, 3 with design backgrounds, 3 with linguistic backgrounds, and 3 in engineering backgrounds, are chosen to conduct the online real-time interview. In other words, the subjects browse the text-based website stated above step by step and be interviewed basing on the previous questions at the same time. Meanwhile, the subjects will be asked to provide his/her overall perspectives on the target websites once they go offline. The entire process is recorded to obtain the verbal data of the subjects and interviewer during the whole experiment, and these recorded data will be further analyzed.

## Results and discussion

A comparative analysis taken on verbal data derived from interviews with the subjects had concluded the following phenomena: First, being acquired from the text-based websites, elements that made the browser more likely to perceive cyberspace as a tangible place or a sense of space can be divided into four categories, which are naming, number of browsers, content and interaction. The naming refers to how a web site is named, and in the case of the experiment the chat rooms are named as Coconut Grove and Sina. The category of number of browsers mentioned in terms of text-based chat rooms refers to numbers that are determined by four factors, namely the volume of text in a page, interval of text updates, type of colors of the text, and browser dossiers. In addition, the content referred pertains to the content of text dialogs, which consist of discussion themes and some of the non-text symbols. Lastly is interaction, which consists of interaction between the user and a page layout, and that among the browsers. The table below depicts some of the spatial elements and their correlated factors, as well as some of the actual dialogs, as shown in Table 1.

Table 1. The categories, factors and actual dialogs of cyberspace in the experiment

| Categories         | Factors                        | Protocol data  |
|--------------------|--------------------------------|--|
| Naming             | Name of the web site           | Coconut Grove, Sina  |
| Number of browsers | The volume of text in a page   | The texts in a page are so few. I can't feel anyone here.                                    |
|                    | The interval of text update    | The interval of text update is too fast. The place is clouded.                               |
|                    | The types of color of the text | The types of color of the text are rich. It made me feel there are many people in this room. |
|                    | Browser dossier                | I know there are 32 people in this chat room.  |
| Content            | Discussion themes              | Is there anybody from Taipei? I would like to know which theatre is the best in Taipei.      |
|                    | The non-text symbols           | ^^ >< ~~~~   |
| Interaction        | With page layout               | After putting the bottom "enter", my words are on the screen immediately.                    |
|                    | With browsers                  | He answered my question so fast.   |

Under this framework, we further compare how subjects of varied background perceive and define cyberspace as recapped below. Those with a design background tend to reckon that although a website name or domain name can help people perceive a sense place but not necessarily a sense of space, but that a sense of space is formed according to the number of browsers, contents and interaction. Whereas those with a linguistic background tend to reckon that a place is largely consisted of web site name, number of web site browsers, and contents presented on the web site. However the sense of space is hinged on the interaction between the user and the web site. The subjects with an engineering background tend to reckon elements such as a web site name, number of the browser, web site contents and interaction as four factors that make up a place, but neither of them can provide a sense of space. The only way can make them feel sense of space is the text descriptions of a space; such as there is a chair, desk and four walls within a place.

Table 1. The result of subjects with design background

|               | Naming | Number of browser | Content | Interaction |
|---------------|--------|-------------------|---------|-------------|
| Being a place | ✓      |                   |         |             |
| Being a space |        | ✓                 | ✓       | ✓           |

Table 2. The result of subjects with linguistic background

|               | Naming | Number of browser | Content | Interaction |
|---------------|--------|-------------------|---------|-------------|
| Being a place | ✓      | ✓                 | ✓       |             |
| Being a space |        |                   |         | ✓           |

Table 2. The result of subjects with engineering background

|               | Naming | Number of browser | Content | Interaction |
|---------------|--------|-------------------|---------|-------------|
| Being a place | ✓      | ✓                 | ✓       | ✓           |
| Being a space |        |                   |         |             |

The results revealed that differences of the cognitive perception of cyberspace really existed among the subjects of varied backgrounds. A probable cause of speculations can be that people with a design background tend to exhibit aptitude of a strong spatial imagery for having been trained in graphic and spatial applications for a long time. They are able to better perceive a sense of spatial density, caused by the people in the space, through the volume of wording and update interval than other subjects, and to map out an imaginary space. Furthermore, by further reading into the content of the text, the subjects would be able to define areas in the space, and clearly indicate which area he or she is at through differentiating the theme of a text dialog. A spatial atmosphere was also formed through text symbols, and by which you can get feels of relax, serious, happy and sad. Through text dialogs, interacting with the interface of the chat room or browsers, rather than a bystander caused a sense of being in the space.

Because of the volume, form, and contents showcased in the text dialogs, the subjects of non-design backgrounds, noted for a weaker ability in imagination of space, tended to perceive the place where events happened, but feel the absence of a sense of space. Interestingly the subjects with a linguistic background, who are more skilled in text writing, can feel sense of space and blending into cyberspace by instantly prompting and perceiving the responses of the other users through the real-time interactive messaging. Whereas the subjects with an engineering background, for who are more sensitive to numeral and ability of calculation, tended not able to perceive any sense of space even at the presence of text interaction. The only way they can confirm cyberspace a space is detail descriptions of spatial elements especially scales and measurements of them. According to these descriptions, they can associate cyberspace with a perceived space, but still lack sense of being in.

## Conclusion

With the analysis and discussion mention above, we have validated the existence of cyberspace. We not only reveal further categorization of spatial elements concluded from the earlier study, but also discover that the subjects in the design domain tended to perceive the existence of the space through imagination, rather than those with a

non-design domain feel only looking at a space without involving in. The varied backgrounds can affect how a user defines and perceives cyberspace (Strate, 1999). Although the study has delve further in understanding the nature of cyberspace, there are still many unavoidable limitations in it; for instance, how the target websites tested are subjectively selected by the research team, and how the size of the subjects may affect the results of the study. Moreover, how best to apply the findings in design, and even to expand them to cover a spatial framework in the real world and cyberspace remains critical directions for further studies.

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