

**‘THE IMAGE OF PLAZA’ - An Analysis of an Academic
Community Web Space Using Kevin Lynch’s Approach for
*‘The Image of the City’***

by

Jaechol Kim

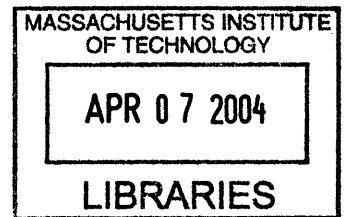
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By

Jaecheol Kim

Submitted to the
Department of Urban Studies and Planning

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Abstract

This thesis is a case study of how the design issues of a community web space can be approached from the viewpoint of urban design not in terms of appearance but in terms of its functionality. An urban public place like a plaza and a community web space both serve their residents’ social lives whether real or virtual. There have been many efforts to replicate public spaces into the virtual world. However, considering the completely different materials that compose both spaces, it may be not proper to duplicate just the visual appearance of a city in the virtual world. Therefore, in this thesis, using not the literal adoption of but the functional analogy of urban design, I analyze the legibility of a community web space, ‘PLAZA’. This analogy can be divided into two parts. The first part utilizes Kevin Lynch’s methodology for the analysis of “the Image of City”. I examine the design of PLAZA using the public’s mental image of PLAZA, as he used the citizens’ image of cities to analyze city spaces. The second part uses physical urban space to interpret the relation between users’ mental image of PLAZA and its design. Spatial concepts that are familiar in designing physical spaces are used for this analysis; Graphic, Location, Vitality of a place, and Accessibility. The result of this case study shows both similarities and dissimilarities between an urban public space and DUSP PLAZA for each spatial concept.

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CHAPTER I

**AN APPLICATION OF URBAN DESIGN
TO CYBERSPACE DESIGN**

- I-1. Introduction: Design for Sociable Web Space**
- I-2. Cyberspace vs. Urban Public Space**
- I-3. Kevin Lynch's Approach to City Image**
- I-4. Application to Web Space**
- I-5. Hypotheses for Analysis**

Chapter I: Application of Urban Design to Cyberspace Design

I-1. Introduction: Design for Sociable Web Space

This thesis is about the application of an Urban Design methodology and the use of an analogy between physical urban space and virtual space for the design analysis of a community web space, DUSP Plaza. In this introductory section, I describe the necessity for adopting an Urban Design viewpoint in designing Cyberspace and also define the range, the practical research questions, and the structure of my thesis.

I-1.1. Urban Design in Cyberspace

Cyberspace is social in that it is based on communication between people. Diverse social interactions occur in Cyberspace just as they do in the public spaces of cities. On web spaces, people hang (or surf) around here and there, sometimes encountering others and talking with them synchronously (in chat rooms) or asynchronously (on electronic bulletin boards) as they do in the real world.

Successful Cyberspace, then, requires proper design as much as successful urban places, such as squares and streets, do. There have been many previous academic efforts on the area of Cyberspace Design from various fields, such as computer science, cognitive psychology and architecture. However, in many cases, it has been dealt with from the viewpoints of technology, individual behaviors, or visual aspects rather than from a collective user perspective. Given that Cyberspace is social and it is an environment in which people interact with each other, a unified approach that considers people and their environment together may be required.

Urban Design, which should take as much as possible into consideration in composing physical environments that accommodate people's everyday lives, might be close to this kind of approach. Applying Urban Design to Cyberspace Design might be meaningful in that both real public spaces and Cyberspace should be designed not for the individual but for the public, although they are quite different in the aspect of materials with which they are composed, one with bricks and the other one with bits.

I-1.2. Range of Research

The term "Cyberspace" actually has too broad a meaning. It may include various formats, such as email, web, VR (Virtual Reality), and so on. Therefore, it may not be very useful to deal with Cyberspace as a single entity. My research is focused on the web format of Cyberspace. I investigate Cyberspace not with respect to a technology but with respect to a design for a place that contains social activities. Therefore, I deal with the most popular format, that is, current web spaces rather than with those which require cutting edge technology.

In addition, I focus on community web spaces rather than other kinds of web spaces, although I also investigate users' general web behaviors for comparative analysis. As diverse as web spaces are, design for these spaces also should be diverse. Therefore, here, I focus on one of them. In this thesis, I study an academic community's web space, DUSP Plaza¹.

Because community web space is originally intended to support social interaction, it may have most in common with urban public space and that is what I propose to uncover.

¹ An internal web site for the Department of Urban Studies and Planning at MIT. To see details, refer to Appendix I.

I-1.3. Research Questions

The main goal of my research is to understand which elements are important for a sociable web space image as seen from the viewpoint of urban design. Many qualities must be essential for sociable web space design. However, in this thesis, I focus on the legibility of the Web Space. A clear image of a community web space may increase the participation of users in that space. Therefore, it will also be important to know how design can support users to have clear mental images of their community web spaces. With these assumptions in mind, I will address the following questions.

- What images of Cyberspace, especially a community web space, do its residents have?
How do they differ from their images of physical urban space?
- What elements are important for the legibility of community web space?
- How is the legibility of a web space related to users' behavior?

I-1.4. Structure of Thesis

In Chapter I, I look at Cyberspace from the viewpoint of urban design and examine the possibility and limitation of using an analogy between urban public space and Cyberspace. Then, I propose an urban design methodology which I apply to studying Cyberspace design in more detail. In addition, I develop several hypotheses for the analysis of web space design through the analogy of urban spaces.

In Chapter II, I first classify web spaces from the viewpoint of users to clarify the range of community web space which I address in this thesis. Then, I describe the characteristics and functions of community web space.

In Chapter III, I describe, in detail, the methodology that I used in my study to analyze community web interface design. In addition, I provide the details of the academic community web space that is the focus of my analysis.

In Chapter IV, I analyze users' visual imagery of DUSP Plaza through the analogy of urban design by looking at interview and system log data.

Finally, in Chapter V, I summarize the results and examine the contributions and limitations of this thesis.

I-2. Cyberspace vs. Urban Public Space

I-2.1. Common Features

“Are these digital worlds public places?” Anne Beamish suggest that Cyberspace can be said as public place from diverse definitions for a public place in urban design fields². I have combined those definitions for a public place into one; a public space is a place that promotes communal life and it is freely accessible and shaped by its inhabitants.

Certainly, it is difficult to apply this definition for urban design to all digital spaces because the area that is labeled “Cyberspace” is too broad. Some portion of Cyberspace is just media tools to deliver information like online news services and some of them are just personal communication tools like email and instant messenger. It does not seem appropriate to see these kinds of web space in the same way as we see a city. However, in the case of Cyberspaces whose major purpose is supporting social interaction like community web spaces, it might make sense regardless of their appearance. That is, regardless of whether they are 3D virtual spaces or just

² Anne Beamish, “The City in Cyberspace,” in Imaging the City: continuing struggles and new directions, ed. Lawrence J. Vale and Sam Bass Warner Jr. (New Brunswick, N.J.: Center for Urban Policy Research, 2001), 297.

text-based web spaces, community web spaces and urban public spaces can be seen as environments that accommodate social activities and, thus, they are public spaces that are open to their residents.

I-2.2. Problems with the Literal Adoption of City Images to Study Cyberspace

As to why digital worlds have frequently failed to reproduce the vitality and excitement of downtown, Anne Beamish has identified two problems of current Cyberspace design. First, the creators of the digital world do not take the spatial aspect very seriously. This may be because, in many cases, they are computer programmers rather than urban designers and architects. Their technology oriented approach might make the city just a trivial backdrop. Second, she suggested that with very real and legitimate technical limitations, extreme simplification is necessary in the digital world and one cannot duplicate the physical world in all its richness with present-day technology³.

However, even if we could duplicate the real world as it is, why should we? Or would the completely duplicated digital world work in the same way as the real physical world does? The world of bits may well be different from the world of bricks even though they might operate with the same purpose: supporting social life. What matters is not how the digital world looks but how it functions. As said in the definition of a public place above, how well the digital world supports social encounters and communal life is more important than how much it looks like a real city. If it works well, that's enough. It does not need to be the same as a physical world.

If this is the case, why is urban design important in designing the digital world? It is because the goals of urban design, such as improving visibility and accessibility, and securing privacy or

³ Beamish, 299.

providing public area, may be valid in Cyberspace, even though the ways and materials with which they do this may differ.

In this thesis, I particularly focus on one of the goals which urban design pursues for people's social life; "legibility of a city", which Kevin Lynch also focused on in his studies to improve the city's environment. In addition, I adopt his methodology, which is built on the viewpoint of the public. Although, in the digital world different factors may affect legibility, this approach might still be applicable. In the rest of this chapter, I summarize Kevin's approach and show its application to community web space.

I-3. Kevin Lynch's Approach to City Image

I-3.1. Legibility as a Visual Quality of a City

Emphasizing the contribution of legibility of a city's image to the visual quality of the city,

Kevin Lynch said, "Legibility of a place means the ease with which the place is recognized and organized as a coherent pattern. Just as this printed page, if it is legible, can be visually grasped as a related pattern of recognizable symbols, so a legible city would be one whose districts or landmarks or pathways are easily identifiable and are easily grouped into an over-all pattern"⁴.

For the same quality of city images, he also used the term of 'imageability', by which he meant the quality of physical object which gives it a high probability of evoking a strong image in any given observer. He said "It is that shape, color, or arrangement which facilitates the making of vividly identified, powerfully structured, highly useful mental images of the environment". He

⁴ Kevin Lynch, The Image of the City (Cambridge, MA: MIT Press, 1960), 2-6.

asserted that legibility is crucial in the city in order to orient to one's location and understand one's surroundings in a city for a feeling of safety⁵.

I-3.2. Methodology: Collective City Images of Residents

In his research, Kevin Lynch took much care with the methodology. He described the methods in the following way. "... We have used two principal methods: the interview of a small sample of citizens with regard to their image of the environment, and a systematic examination of the environmental image evoked in trained observers in the field. ... The basic official interview consisted in its essentials of a request for a sketch map of the city, for the detailed description of a number of trips through the city, and for a listening and brief description of the parts felt to be most distinctive or vivid in the subject's mind. ..."

Lynch examined his findings from the field observations by comparing the public city images of citizens who actually lived in three cities⁶. These images were collected through interviews with citizens and their sketches of the cities. From this research, he suggested five elements to analyze the image of cities: path, edge, district, landmark, and node. He emphasized the images of cities in people's

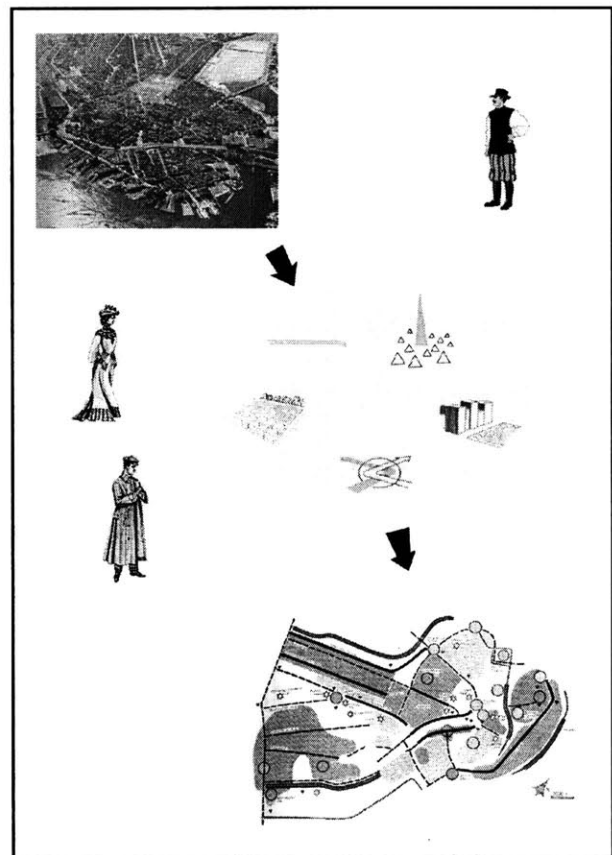


Figure 1. Analyzing the Public Image of Boston

⁵ Lynch, 9.

⁶ Boston, MA / Jersey City, NJ / Los Angeles, LA

everyday lives more than the aesthetic view of professionals (Figure 1). This approach has important meaning, in that cities are not for design professionals but for those who live there.

I-4. Application to Web Space

I-4.1. Legibility of Web Space

In web spaces where users count mostly on visual recognition, legibility may be even more important. Although it would be different from disorientation in urban spaces, disorientation in Cyberspace would also cause serious problems. Web spaces with poor legibility may not allow users to navigate and interact properly and may prevent them from exploring other areas that are not familiar to them. In this case, the websites that you may encounter on the way to the targeted sites may not be places for various social experiences but bothersome and routine paths that you would like to avoid.

I-4.2. Users' Public Image of Web Space

Kevin Lynch's 'five elements' for a legible city

image cannot be applied to Cyberspace as they are.

However, his approach from a citizen's viewpoint

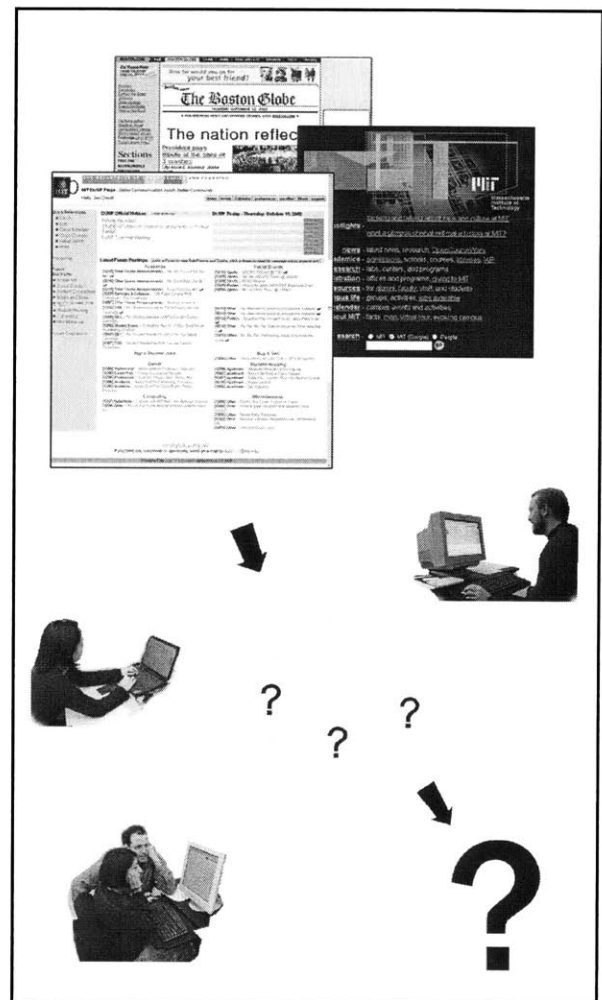


Figure 2. Analyzing the Public Image of Web Space

seems to be appropriate even for research on web space. To examine the legibility of web spaces, I tried to ascertain the collective images of web users through the interview with users and their sketches of web spaces as Kevin Lynch did for city image (Figure 2). In Chapter IV, I deal with the application of this methodology to document users' image of DUSP Plaza in detail.

I-5. Hypotheses for Analysis

Here, I suggest several hypotheses for the second stage of my thesis, the analysis of the web design, using the analogy of Urban Design. I adopt concepts that are familiar in the Urban Design field, such as location, accessibility, population, and clustering.

Graphic elements

How does increasing bandwidth in web spaces affect the social life there? Are 3D web spaces more legible than 2D graphic web spaces or text-based web spaces? In the urban environment, a public place can be improved by a design that is harmonized with the functions or activities of the place. How about in web spaces? A study of 'icons', which are one of the important elements in current web interface design, shows that complete representation (verb + object) of a function works better than representation by either of them⁷. The same thing may happen in general web space design. That is, when an element of web space has practical meaning as well as good visualization, it may be recognized more than when it has either of them.

Personalization

In physical urban spaces, people develop their own images of a city by combining their personal experiences with their surroundings. For example, tourists' visual imagery of Boston may be

⁷ Ravindra S. Goonetillek, Heloisa Martins Shih, "Effects of Training and Representational Characteristics in Icon Design," *Int. J. Human-Computer Studies* 55 (2001): 741-760.

different from that of a Bostonian. The personalization in web spaces may be an important factor to users' public image of the web spaces.

Interface Real Estate

Values of land in a city vary so widely that proper uses for the lands differ from location to location. One of the main reasons for this variation is accessibility of the location to a city center⁸. This may also occur in the small screen of web space. At this point, users' limited attention⁹ may be the reason for the potential variation in values of web interface real estates. With the huge amount of information that current web spaces are delivering, the user's attention may not reach every location of the interface at the same level.

Population and the Vitality of a Place

"What attracts people most, it would appear, is other people", William H. Whyte said in his book, *The Social Life of Small Urban Spaces*¹⁰. In urban public spaces, the activities and vitality that people create in a place are one of the strong magnets that attract other people to the place. The same thing may be applied to community web spaces, especially those the contents of which are generated by users like Usenet. This does not mean the presentation of others' existence but the presentation of others' activities, although there have been studies about the presentation of people's existence¹¹. It is not the number of people who gather in a place but the vitality from their interactions that attracts people to the place.

⁸ Denise DiPasquale and William C. Wheaton. Urban economics and real estate markets (Englewood Cliffs, NJ: Prentice Hall, 1996).

⁹ William J. Mitchell, E-topia "urban life, Jim--but not as we know it" (Cambridge, MA: MIT Press, 1999)

¹⁰ William H. Whyte. 1980. The Social Life of Small Urban Spaces (Washington, D.C.: Conservation Foundation, 1980), 19.

¹¹ Nelson Minar and Judith S. Donath, "Visualizing the Crowds at a Web Site," CHI 99 conference (1999).

Accessibility

The access to targeted information in web spaces is as important as vehicle or pedestrian access to a place in urban design. However, the way to improve the accessibility in Web space may be different from that for a plaza in a city. Design of information structure and navigation tools may be crucial for the accessibility of a web space.

Spatial Clustering

As a district in a city is further sharpened by the clear definiteness and closure of its boundary¹², distinctive spatial clustering of information in web spaces may increase the legibility of the whole web spaces. Clustering related contents properly and reinforcing the characteristics with graphic symbols may promote legibility.

¹² Lynch, 104.

CHAPTER II

COMMUNITY WEB SPACES

II-1. Classification of Current Web Spaces

II-2. Characteristics and Functions of Community Web Spaces

Chapter II: Community Web Spaces

II-1. Classification of Current Web Spaces

II-1.1. Criteria for Web Space Classification: Contents or Purposes?

To classify web spaces is important in studying web space design. There have been many efforts to classify web spaces. However, many of these efforts have been for efficient data mining and the standard for this kind of classification is usually the contents of each web space. In this case, the major goal of web space design is also efficient information delivery.

However, current web spaces are doing more than just delivering information with increasing bandwidth and interactivity of web interfaces. Even information delivery has taken various formats according to users' needs.

In designing a web space, the purpose of the developer and the needs of targeted users is as important as its contents are. For example, we cannot design online news services in the same way we design search engines. The main purpose of online news services is to communicate recent news to users, while that of search engines is to communicate detailed information about which users already know at least the names or keywords. For the same reason, we also cannot design an online library in the same way as we design an online version of New York Times.

Each web space has a different purpose and different target users. In fact, the interviews done for this thesis also show that users have different standards in choosing web sites according to their purposes¹³.

Especially community web spaces, which have different basic purpose of supporting social relationship, may be designed in a different way from other kinds of web spaces. In the following

¹³ See Appendix II.

sections, I classify the entire web spaces according to their purposes to clarify the functions and characteristics of community web spaces that I will focus on in my paper.

II-1.2. Classification by Purposes

Web spaces might be divided into two major groups; that is, web spaces for information delivery and web spaces for interaction. In the former case, the main goal of web design is to help users to access the information that they want more efficiently. According to the way of delivering information, it might have sub-categories of broadcasting web spaces (online new services) and interactive web spaces (online libraries or shopping malls).

The purpose of the second type of web spaces is to support interaction between users. The interactions might be economic or social. Web spaces for economic interactions include online bidding sites like E-bay (www.ebay.com).

Web spaces for social interactions might be farther categorized according to the types of targeted users and their interests. For example, it might be a chatting web site for anonymous users who visit the site just for fun. Or it could be a community web site that serves interaction among given community members. In the latter case, more meaning and continuous social interactions are expected than the former case. DUSP Plaza can be classified in this type of community web space group.

Table 1. Web Classification by Purposes

Purposes		Classification
Delivering information	Broadcasting (host → users)	Online News services
	Interactive way (host ↔ a user)	Online Libraries, Search Engines
Supporting interaction between users	Economic interaction	Online bidding sites (E-bay)
	Social interaction	Community web sites, Chat rooms, messengers

II-2. Characteristics and Functions of Community Web Spaces

II-2.1. Community Web Spaces

Here, I will describe the major characteristics of the specific kind of web space, community web spaces, on which my research is focused. Web spaces that are called ‘Community Web Spaces’ are diverse, according to their users, appearance, exclusivity, and so on. However, they may be similar to one another in the following aspects.

Shared interests

According to the kind of interest community members are sharing, community web spaces can be divided further into smaller categories such as academic, local or professional. In web spaces where there are few spatial limitations like distance, users gather following their interests rather than spatial proximity. However, this does not mean that spatial proximity has no influence.

Locality may be one of the popular interests people are willing to share. Many local community web spaces have developed and have thrived.

Self-generated contents by users

Most content of community web spaces is generated by users. Postings and replies by users cover large portions of the contents though some community information is provided by administrators of the sites. In this kind of web space, the population of users does matter. It may be one of the major magnets that attract people to the place. In this aspect, community web spaces are quite similar to public spaces in the real world. Few people would like to visit a plaza where there is nobody else. In both community web spaces and real public spaces, users' or citizens' participation and interaction is one of the most important factors for the success of the place.

Relatively limited and non-anonymous users

Most community web spaces are not designed for anonymous users but only for those who are within the community boundaries. Some of these are a kind of 'gated community', which restricts their members and does not allow others access, like DUSP Plaza, some are open and anonymous like Craigslist¹⁴ and others are in between.

Relatively constant relationship between users

Frequent encounters in limited web spaces encourage a relatively constant relationship between members. This might not be the case in larger scale community web spaces. However, even in large scale community web spaces, such as Craigslist or Yahoo Group¹⁵, some continuous relationships between members are observed. For example, users who have posted and replied frequently have come to know each other, greet each other, and have a kind of community feeling.

¹⁴ <http://www.craigslist.org>

¹⁵ <http://groups.yahoo.com>

Supporting interaction and relationship between users

This basic purpose is to support the social lives of community members in both virtual and physical communities. It serves this purpose with diverse functions, such as electronic bulletin boards and chat rooms. However, comparing with public spaces in the real world, it takes more direct ways to serve people's needs.

II-2.2. An Academic Community Web Space: DUSP Plaza

Here, I describe the characteristics of DUSP Plaza, which I analyze as a case study in this thesis.

Academic and local community: DUSP Plaza is an academic and local community web space that is based on a real community, DUSP at MIT.

Self-generated contents: It is mainly composed of electronic forums where community members post community information and opinions; this generates the main contents of this web space. Therefore, the participation of users is very important for the vitality of this web space.

Gated community: Only DUSP community members are allowed access. With ID and password, users can access DUSP Plaza. It has a clear boundary that divides the community space and outside. It has a limited number of users, and interactions between users are continuous. Interactions in DUSP Plaza are closely related to the community life in the real world. In DUSP Plaza, users look for jobs, talk about a class assignment, and arrange a meeting in the real world.

Text and 2D based Dynamic Interface: It is a dynamic web spaces composed of text-based electronic bulletin boards and 2D graphics that help users' navigation. The front page of PLAZA is changed by users' postings everyday. However, it does not have 3D or animating elements in its interface.

CHAPTER III

METHODOLOGY

III-1. Qualitative Methods

III-2. Quantitative Analysis

III-3. Case Study: DUSP Community and DUSP Plaza

Chapter III: Methodology

III-1. Qualitative Methods

III-1.1. Interviews and Users' Sketches

How do users “read” the images of web spaces? How do users form their own map of web spaces? Which elements are more helpful for forming users’ mental map than others? For these questions, I tried to find answers through interviews with users and their own sketches about the web spaces that they visited frequently. These two different methods were done at the same time during interviews.

Interview: Interviews are focused on users’ difference in their profiles, activities and purposes of those activities in web spaces. Although the interviews are closer to an open format, for consistent data collecting, I provided interviewees a questionnaire on which they could fill in their answers (See Appendix II).

Users’ sketches: These sketches were drawn by interviewees during the interviews. Interviewees were asked to draw and describe the front pages and their usual navigation in several web spaces including DUSP Plaza. This method was used to get data about the respondents’ recognition of the web spaces. The correlation among users’ differing profiles, behaviors and recognition will be examined.

III-1.2. Immediate Recognition and Memory in the Past

What is the best way to document users’ public image of web spaces? Should it be retrieved from their immediate recognition or from their memory? In the visual cognition field, both instant recognition and visual imagery have been studied as important elements in visual

cognition¹⁶. Therefore, I also adopted both approaches. For this purpose, interviews were done in two different ways. The first type of interview was done focusing on users' instant recognition and usual uses. Here, before starting the interview, interviewees were asked to look over the web sites which they would deal with during the interview and recall their usual behaviors there. The second type of interview was performed only depending on users' memory. Without any internet connection, interviewees were asked to describe what they remembered about some of web sites they had visited. By applying these different approaches, I expected to get a more accurate public image of DUSP Plaza and other web spaces. Also, the comparison between different approaches may provide a clue as to which one is more important in visual cognition of web spaces. Generally, the elements of web interfaces which are recognized easily may be remembered easily. However, for some special elements, this may not be true¹⁷.

For this purpose, questions about the items in the Table 2 were asked during interviews.

Open-ended questions like the sample questions below were asked to interviewees and the answers and responses were recorded, to get unbiased results.

- Sample questions for interview
 - Can you introduce this web space to a new member? What contents and structure does it have?
 - Do you frequently visit any web pages in this web space? If any, how do you get to the pages? Please describe the path to the pages.
 - Can you recall and describe any contents, images or icons that appeared on the path to the designated web page?
 - Among those, is there anything important to you?
- Sketches: the map of the whole web space and the important paths
 - Can you draw the front page of the web site?

¹⁶ Roger N. Shepard, Mind Sight: Original Visual Illusion, Ambiguities, and Other Anomalies, with a Commentary on the Play of Mind in Perception and Art, (New York: W.H. Freeman and CO., 1990)

¹⁷ See Appendix II.

- Can you draw the usual path to a specific web page and important elements on the path?

Table 2. Items in Questionnaire for Interview

Section	Items	Objectives
User's Profile	<ol style="list-style-type: none"> 1. Position in DUSP 2. Design Experience 3. Mode of Internet Access 4. Language 	Understanding user's different conditions that may affect users' web behaviors
General Web Spaces	<ol style="list-style-type: none"> 1. Purposes of Web Use 2. Preferences in web site choices 3. Immediate Recognition and Memorized Image of Web Spaces 4. Frequency of Visiting 	Examining users' public image of general web space for the comparative analysis with their image of DUSP Plaza
DUSP Plaza	<ol style="list-style-type: none"> 1. Purposes of DUSP Plaza Uses 2. User's Navigation Patterns 3. Immediate Recognition and Memorized Image of DUSP Plaza 4. Frequency of Visiting 	Understanding their public image of DUSP Plaza

The questioning process focused mainly on images and contents of the web spaces that were commonly recognized by users. In addition, questions were asked about the differing needs and conditions of Users who belong to diverse groups in the DUSP community. In this analysis, I will examine several hypothetical elements of legible web space.

Interviews were performed from February 28, 2003 to March 24, 2003.

Interview times varied from half an hour to an hour depending on interviewees so that interviewees were not interrupted and were able to describe freely when they spoke.

III-1.3. Sampling

For random sampling, I sent an email asking to interview every third student from the DUSP student list. This list is grouped by degree program and alphabetical order. I sent 53 messages and received 33 responses. There may be important differences between those who responded and those who did not, such as the preference for or frequency of DUSP Plaza access, academic interests, and degree programs. To examine this potential bias, I compare interviewees' demographic profiles including the frequency of DUSP Plaza access with the profiles of those who did not reply to the email asking for an interview and with all DUSP Plaza users from the system data discussed in the later part of this chapter¹⁸.

III-2. Quantitative Analysis

Information about the uses of DUSP Plaza has been recorded from its beginning (September 1, 2001). Data such as each user's login time, date, postings and the location of access point have been kept. The data on students and faculty who have been registered between September 1, 2001 and February 28, 2003 are investigated in this analysis.

I analyze the relationship between different mental maps of users and their uses of DUSP Plaza with these data and support the arguments that I make in the qualitative analysis.

III-3. Case Study: DUSP Community and DUSP Plaza

Here, I describe the details of the DUSP community and its community web space, DUSP Plaza, which are the main subject of this study.

¹⁸ Refer to 3.4 Demographical Profiles of Residents in DUSP Plaza

III-3.1. DUSP Community¹⁹

DUSP is an academic community composed of students (undergraduate, masters, and PhD), faculty and staff of the Department of Urban Studies and Planning at MIT. It has five special programs ‘City Design and development (CDD)’, ‘Environmental Policy Group (EPG)’, ‘Housing, Community and Economic Development (HCED)’, ‘International Development and Regional Planning (IDRP)’, and ‘Planning Support Systems (PSS)’, according to academic interests.

All DUSP community members are included in the investigation. Precisely, students and faculty who belonged to DUSP officially from September 1st 2001 to February 28th 2003 are included. Among this group, 33 MCP students who were selected randomly were interviewed for the qualitative analysis.

III-3.2. DUSP Plaza²⁰

DUSP Plaza was created by the PSS group for departmental communication. It began in earnest from September 1, 2001. Its main format is an electronic bulletin board. It is a communication tool for departmental administrative information from staff and community information from students and faculty, and it also is the forum in which community discussions occur. In addition, it provides other information, such as student and faculty addresses, course information, a calendar and weather. It is a text-based web space rather than a graphic-based one.

¹⁹ <http://dusp.mit.edu>

²⁰ <http://plaza.mit.edu>

III-3.3. Anatomy of DUSP Plaza

a. The front page

To analyze the interface design of DUSP Plaza, I, first, categorize the elements of its front page (Figure 3) into several groups in Table 3.

Among these groups, 'Menu tabs', 'Forum titles', 'Recent Postings' and 'Side Menu lists' provide different navigation tools. Navigation by 'Menu tabs' has the most hierarchical structure. It covers almost every sub page of DUSP Plaza. 'Home' tab is a hyperlink to the front page. It is used frequently while users are navigating in sub sections of Plaza to come back to front page. The 'forum' tab connects to the forum page which contains every posting of each forum since September 1, 2002. The 'Calendar' tab connects to the calendar page which is shared by all DUSPers. That is, you can add your events here and control by whom it can be seen among DUSP members. In the 'preferences' page, you can set up your personal setting, such as ID, password, and display. The 'Weather' tab is linked to the weather page that shows Boston's weather. The 'About' page contains polices and objects of 'PLAZA'.

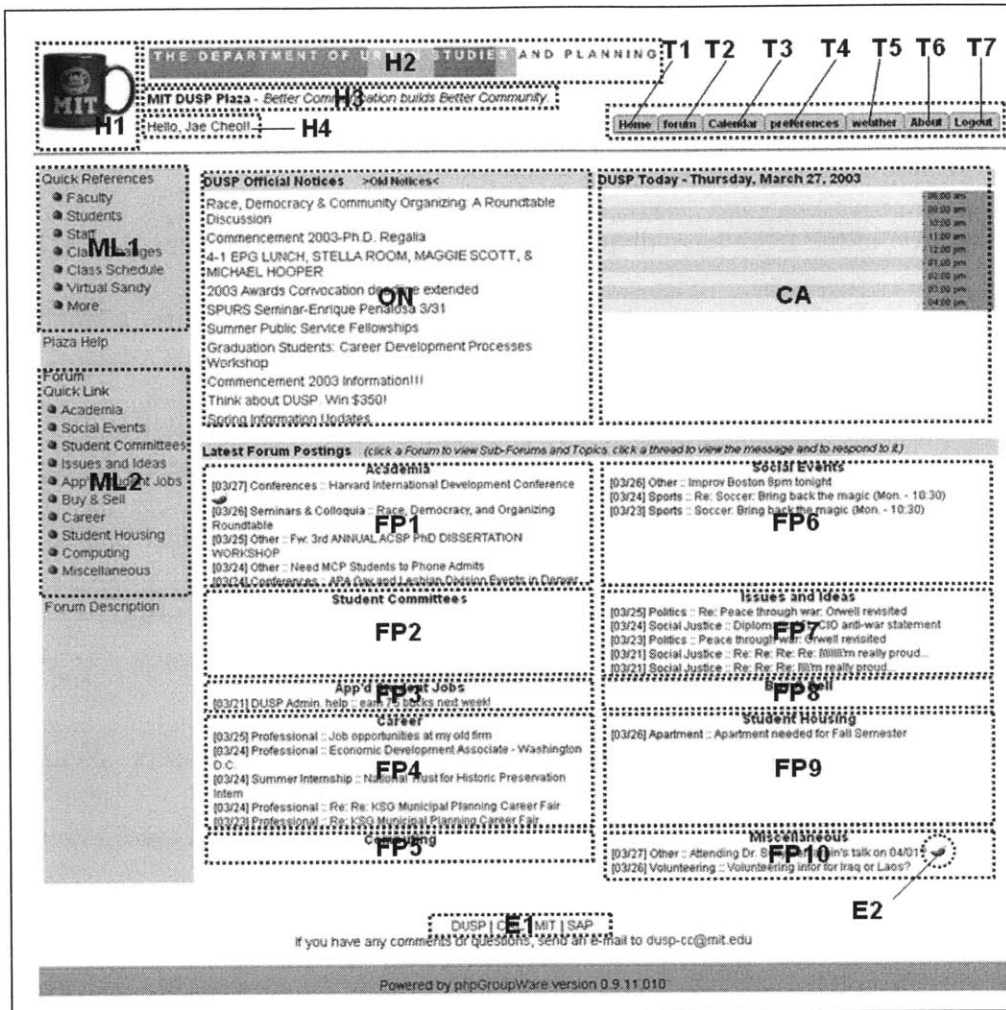


Figure 3. Anatomy of DUSP Plaza

Table 3. Anatomy of DUSP Plaza

Header (Logo and Icon with No links)	Menu Tabs	Recent Postings Grouped by Section	Menu Lists	Etc.
H1: Mug cup H2: DUSP logo H3: Plaza Title H4: Greeting with user's name	T: The whole tabs T1: Home T2: Forum T3: Calendar T4: Preferences T5: weather T6: About T7: Logout	ON: DUSP Official Notice RP1: Academia CA: Calendar RP2: Student Committee RP3: App'd Student Jobs RP4: Career RP5: Computing RP6: Social Events RP7: Issues and Ideas RP8: Buy & Sell RP9: Student Housing RP10: Miscellaneous	ML1: Quick Reference ML2: Quick Links to Forums	E1: Links to other related sites E2: Hot Chili Pepper

'Forum Titles' have hyperlinks to each forum page. Each forum page shows the all postings at one time although postings are classified by sub topics. This makes navigation difficult²¹.

'Recent Postings' are directly connected to recent postings of each forum from the front page. Each forum section of the front page displays 5 recent postings that has been posted between a week ago and today. Each posting that has been posted today is marked with 'a small hot chilly pepper' image.

'Side Menu Lists' are composed of two main parts. One is 'quick references' which provides the directory of community members, class information and schedules. The other one is 'forum quick links' which show sub categories of each forum and connect to the forum page when each forum title in the menu list is clicked (Figure 3 and Table 3).

I examine the interfaces by investigating the parts that are recalled in the users' sketches and descriptions.

b. Site Map of PLAZA

PLAZA provides two kinds of paths to users' targeted information; classified paths and direct paths. First, a user can follow a classified path, for example, 'Home' → 'Forum' →

'Academia' → 'New Courses' → individual postings. This path takes 4 steps before the final destination, but it provides guidance and information about other categories close to the targeted information. Or a user can use the direct path to the destination. The home page of PLAZA has direct hyperlinks to each forum and recent postings, as it is shown in Figure 4. Users who are not familiar with PLAZA may prefer the classified paths to the direct ones.

²¹ Refer to Appendix I.

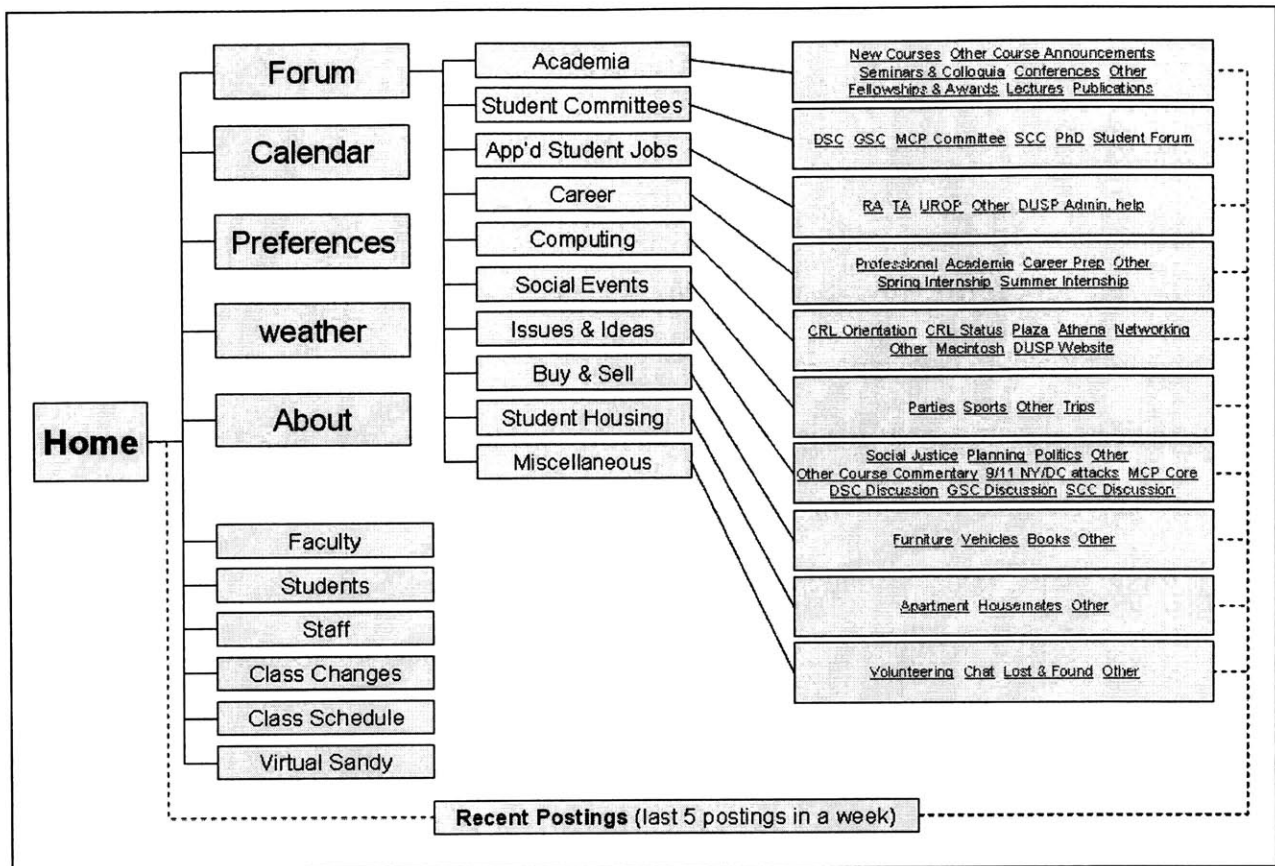


Figure 4. Site Map of PLAZA

III-3.4. Demographic Profiles of Residents in DUSP Plaza

Residents in DUSP Plaza are diverse in their demographic characteristics. Special program groups, frequency of access to DUSP Plaza degree programs and Internet access conditions are major components of those characteristics that may affect their recognition and behavior in DUSP Plaza. It may be helpful to understand these differences between users to interpret the research results. Also, I will compare the demography of interviewees, those who declined or did not response to interview request, and all DUSP Plaza users to ascertain whether the characteristics of the sampled group are different from or similar to the characteristics of the other groups.

a. Comparison of the Demography of Total Users and Interviewees

With respect to program groups, all users and interviewees look very similar. However, in the frequency of DUSP Plaza access, interviewees are much more likely to be everyday users. In the average number of access (

Table 5), interviewees (31.6 times) are also higher than the whole MCP programs (23.3 times).

Second, with respect to degree programs, the ratios of first year MCP students to second year MCP2 students are similar when comparing total users and interviewees, while Ph.D. students showed relatively very low participation rate in the interviews.

Except Ph.D. students, the distribution of interviewees generally coincides with that of the total users in the aspects of special program groups and degree. Therefore, in the analysis, I concentrated on MCP students.

b. Comparison of the Demography of Interviewees and Those Who Declined or Did Not Response to Interview Request

The demographic profile of students who declined or did not respond to interview requests is quite different from all MCP students as well as from interviewees in the frequency of DUSP Plaza access. They show much lower access number (9.3 times) than interviewees or even the whole MCP students. They seem to have less interest in DUSP Plaza and this may lead them to decline interview request.

Two comparisons above show that interviewees represent well most demographic aspects except access frequency. However, the sampling seems to be proper in some way because their frequent access means that the interviewees may represent practical residents of DUSP Plaza excluding those who are only nominal users.

Table 4. Demography of DUPers²²

Unit: persons (percentage)

Classification	Categories	Total	Interviewees	No Response or Decline
Degree Program	MCP1 Students	66 (35%)	14 (42%)	10 (37%)
	MCP2 Students	71 (38%)	17 (52%)	8 (30%)
	Ph.D. Students (Resident)	35 (19%)	2 (6%)	9 (33%)
	Undergraduate Students	14 (8%)	-	-
	Total	186 (100%)	33 (100%)	27 (100%)
Special Program Group / MCP	CDD	52 (38%)	12 (39%)	8 (44%)
	EPG	19 (14%)	3 (10%)	0 (0%)
	HCED	29 (21%)	8 (26%)	5 (28%)
	IDRP	29 (21%)	6 (19%)	3 (17%)
	PSS	8 (6%)	2 (6%)	2 (11%)
	Total	137 (100%)	31 (100%)	18 (100%)
Frequency of DUSP Plaza Access / MCP	Everyday Users	35 (26%)	19 (61%)	2 (11%)
	Non-Everyday Users	102 (74%)	12 (39%)	16 (89%)
	Total	137 (100%)	31 (100%)	18 (100%)
Internet Access Condition / MCP	Laptop Users for Internet Access at School	-	12 (39%)	-
	Non-Laptop Users for Internet Access at School	-	19 (61%)	-

Table 5. Mean Number of Times of Access to Plaza during February 2003

All MCP	Interviewees	No response or Decline
23.3 times	31.6 times	10.3 times

²² The numbers for all DUSPERS come from the system data of PLAZA. Here, I include only the accesses in the month before starting interviews (February 2003), to see their most recent behavior. In addition, only MCP students are included in all classifications except 'Degree Program'. Two Ph.D. students were included in interview. Therefore, the total number of interviewees in 'Degree Program' category, 33, includes these two Ph.D. students and the total number of interviewees in other categories, 31, does not.

III-3.5. Measurement of Recognition from Interviews and Sketches

Interviewees freely recalled and depicted the contents and outlook of Plaza with description and sketches. To measure the legibility of each element (Figure 3), I counted the frequency of recalling each element of the front page by interviewees in their description and sketches, after I extract the elements of PLAZA from each description or sketch as shown in the below example (Figure 5).

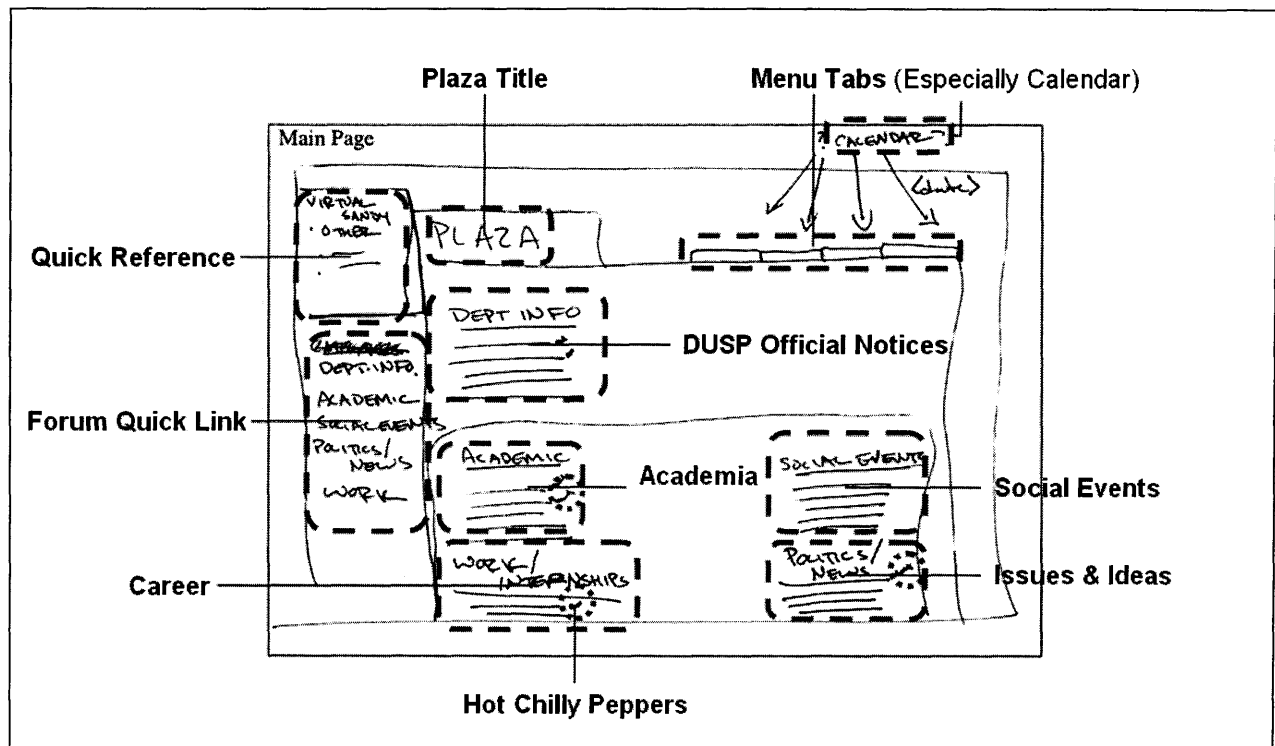


Figure 5. A Example: Extracting Elements from a User's Sketch and Description

CHAPTER IV

THE IMAGE OF DUSP PLAZA

IV-1. Graphic vs. Text

IV-2. Location, Location, Location

IV-3. Vitality of Place

IV-4. Accessibility

IV-5. External Factors

Chapter IV: The Image of DUSP PLAZA

In this chapter, I analyze DUSPers' public image of DUSP Plaza based on the interviews and sketches, all the while drawing an analogy between urban public space and DUSP Plaza. That is, I use spatial concepts from the urban design field, such as graphic factors, location, vitality of place, and accessibility for this analysis.

However, it might be expected that DUSP Plaza would be recognized in ways that are different from those in which physical public spaces would be recognized. Therefore, I try to find out both similarity and dissimilarity in the patterns as to how DUSP Plaza is recognized.

IV-1. Graphic vs. Text

Are graphic elements more recognizable than text? Or is the reverse true? A place in urban environments is recognized not only by its physical shape but also by the activities which it contains. For example, when you recall a scene of a plaza where you often hang around, you will not recall just the appearance of the physical environment without any people or their activities. You may well recall several joggers, businessmen enjoying their lunches, or street stalls selling hot dogs.

Similarly, in DUSP Plaza, the contents and meanings of elements as well as their shapes may also affect users' recognition of elements. For example, things like how often their contents are changed, or what kind of information those elements deliver may matter in users' recognition of the elements. In this section, I analyze how other factors related with contents and users' activities, such as update of contents, penalization degree of information, and frequency of use, act on users' recognition with graphical factors.

IV-1.1. Updated Elements

The front page of DUSP Plaza is mainly composed of two parts. One part is the electronic boards that are updated instantly and the other is the header and navigation tools that are not changed as shown in Figure 6 and Table 6.

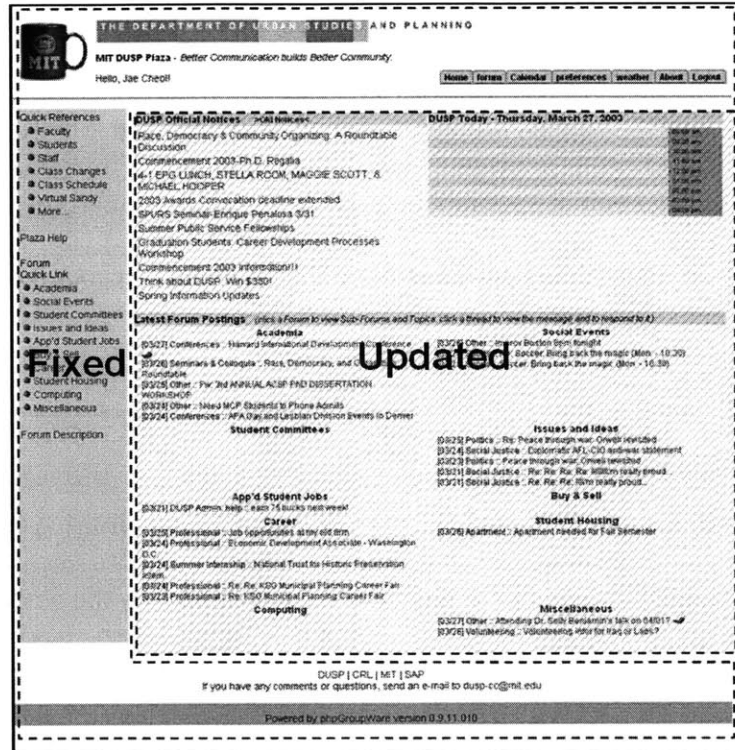


Figure 6. Daily Updated Elements vs. Fixed Elements in PLAZA

Table 6. Daily Updated Elements vs. Fixed Elements²³

Classification	Elements
Updated Elements	Official Notices (RP1), Calendar (CA) and Forums by Themes (RP2, RP3, RP4, RP5, RP6, RP7, RP8, RP9, RP10, RP11)
Fixed Elements	Header (H1, H2, H3, H4), Menu Tabs (MT1, MT2, MT3, MT4, MT5, MT6, MT7), Menu Lists (ML1, ML2) and Links (OL)

²³ Refer to Figure 3.

In the interviews and sketches, the part that is updated instantly is generally recalled more frequently than the fixed part even though updated part has less graphic content than the fixed one. Interviewees' average recognition rate of the elements in the updated part is 52.3% and that of the elements in the fixed part is 23.5% (Figure 7).

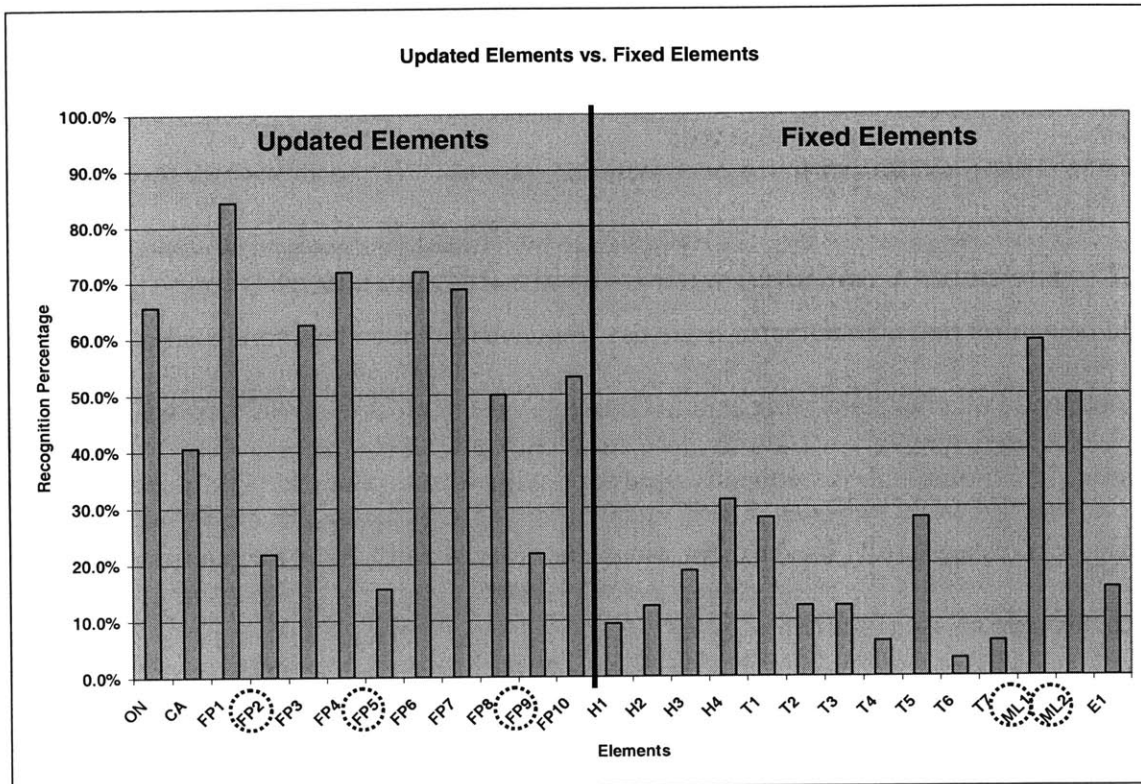


Figure 7. Users' Visual Imagery of Updated Elements and Fixed Elements

However, with respect to recognition level, the recognition rate of a few elements in both updated and fixed parts, which are circled in Figure 7, are far from the other elements in the parts they belong to²⁴. In case of the outlier elements in the updated part - Student Committees (FP2), Computing (FP5), and Student Housing (FP9) -, the amount of updating seems to matter. The

²⁴ The recognition rates of these elements are out of the standard deviation range from the mean.

numbers of postings in these forums are much fewer than in other similar elements. Especially, postings in Computing and Student Housing forums are concentrated on the month just before the beginning of semesters²⁵. I deal with the problem of posting amounts in the later part of this chapter in detail (Ch. V-3. Vitality of Place). With respect to the fixed parts; particularly, Quick References (ML1) and Quick Links (ML2), the user's experience seems to affect the result. Many interviewees said that they mainly use these two menu lists for navigation. Their familiarity with these menu lists increases their recognition of these elements. The user's experience is analyzed further in the next section.

IV-1.2. Elements Combined with Individual Experiences

It might be natural that elements that users use frequently are recalled more easily. Among 7 tabs, the 'home' and 'weather' tabs were said to be used by users most frequently during the interviews. The 'home' tab is frequently used for navigation. In contrast, 'Preference', 'About', and 'Logout' tabs are hardly used except when a user accesses PLAZA for the first time or changes the style of use (Figure 8).

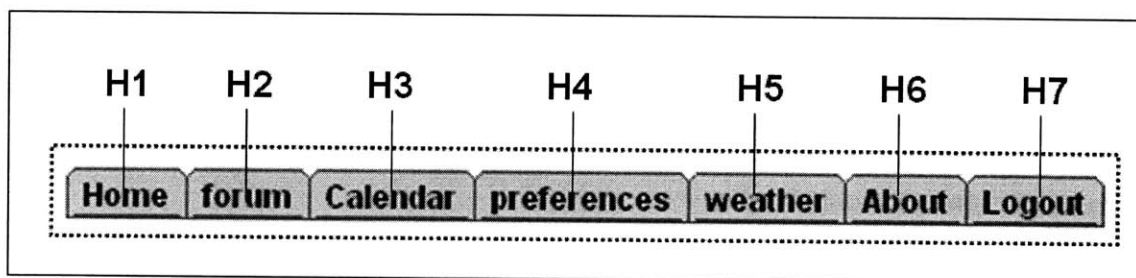


Figure 8. Menu Tabs of DUSP Plaza

²⁵ 'Computing forum' is heavily used during orientation periods, which is usually just before the beginning of semester.

These users' frequencies of using the menu tabs of DUSP Plaza affect their memory of certain menu tabs. As shown in Figure 9, users recalled 'Home' and 'weather' tabs most frequently, while few users recalled 'preferences', 'About', or 'Logout' tabs.

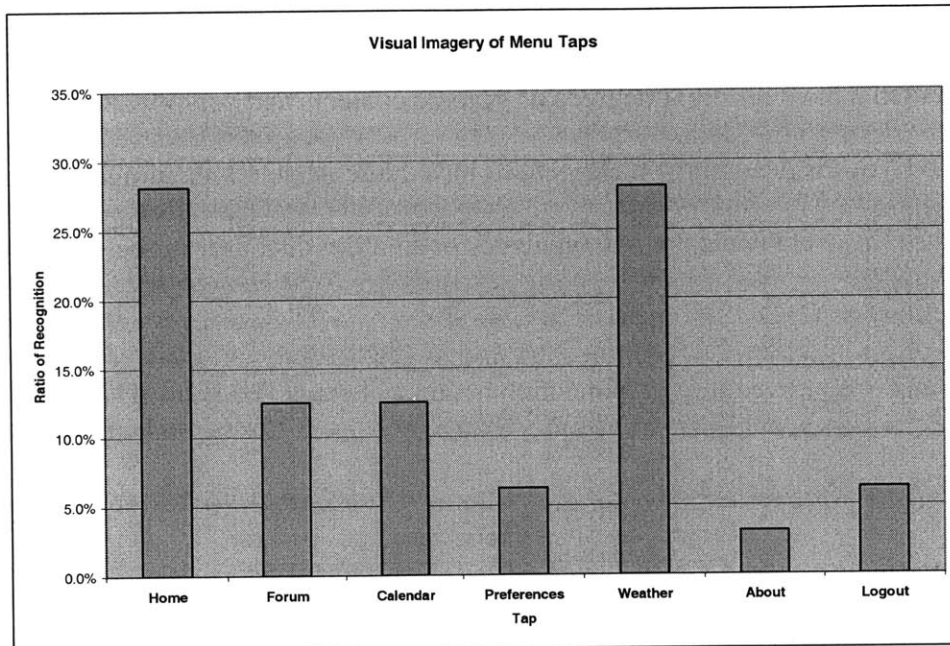


Figure 9. Users' Visual Imagery of Menu Tabs

IV-1.3. Personalized Elements

As mentioned above, elements with personalized and concrete meaning might be more easily recognized than those with public and abstract meaning. The header part of DUSP Plaza is composed of four elements (Figure 10).

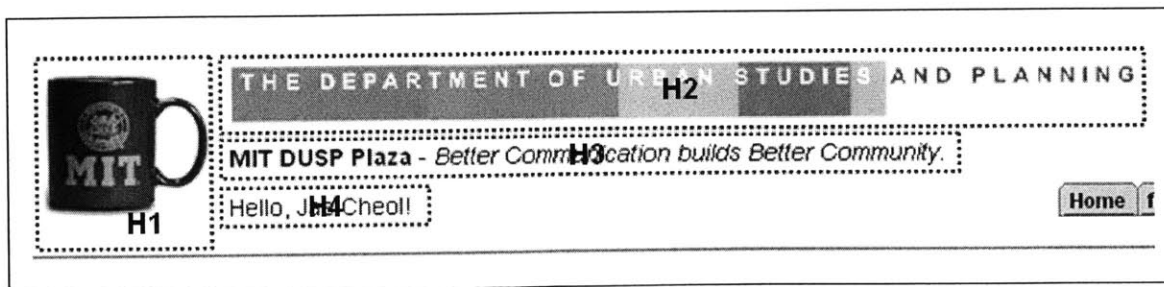


Figure 10. Header of DUSP Plaza

Element (H1) is a picture of a mug with the MIT logo. Here, the cup symbolizes the abstract meaning of ‘conversation’. Element (H2) is the departmental title with the ‘DUSP color pattern’, which is also used for the official DUSP web site. Element (H3) is the title of DUSP Plaza with its own slogan. Element (H4) is the personalized greeting with the user’s name who logged in. These four elements have different degrees of graphic contents and personalization. Here, ‘personalization’ means designing an element to have more personal meaning to users. The meanings of these elements are personalized for an individual user in the order of ‘D (personal greeting) → C (DUSP Plaza) → B (DUSP) → A (MIT & Conversation)’. In contrast, element (H1) and (H2) have more graphic contents than element (H3) and (H4) (Figure 11).

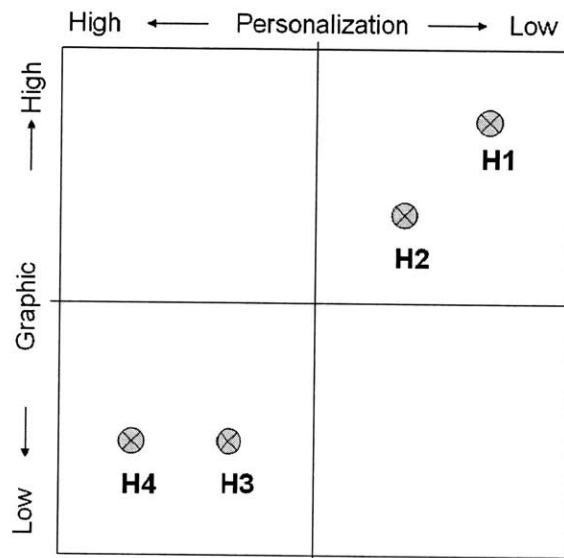


Figure 11. Graphic Contents vs. Personal Meaning²⁶

²⁶ This diagram shows just the relative order of elements. The distances between elements do not have any scale.

Regardless of whether it is graphic or text, the ratio of recognition or recall by users in the header part also seems to have positive correlation with the order of personal meaning as shown in the Figure 12.

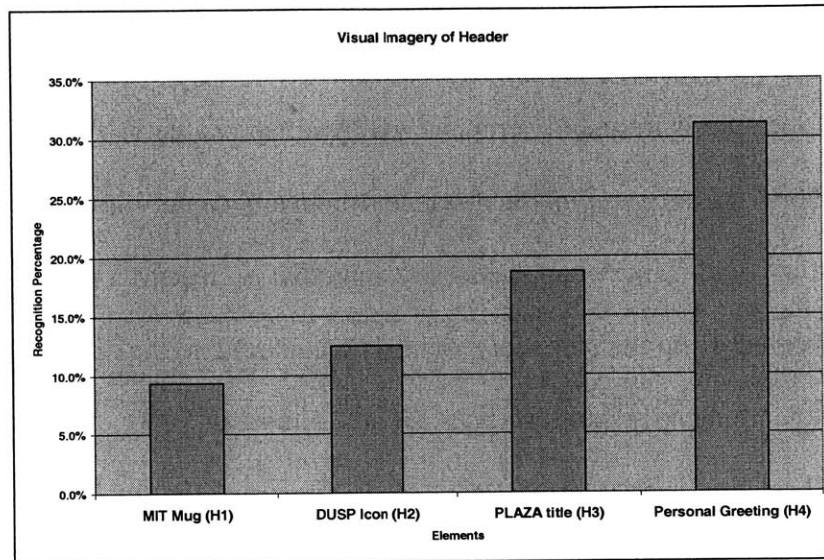


Figure 12. Users' Visual Imagery of Header

IV-1.4. Text or Graphic?

Are graphic elements more recognizable than text? Or is the reverse true? The result from interviews and sketches by users suggest something different from either of these questions. The result suggests that meaningful text is more recognizable and memorable than graphics with less meaning. Here, the meaning of 'meaningful' is how much the information which the element gives is related to the users' interest or concern.

Some elements come to be meaningful by their frequently updated contents, and others come to be meaningful by combining with the user's own experience. Elements where you can expect some new things will happen may attract your attention more than other elements that might be boring. Also, people have personalized 'visual imagery' of DUSP Plaza by combining those elements with their past experiences. It might be expected that personalized elements in DUSP

Plaza would be recognized most easily. Finally, elements that deliver concrete and personalized information may attract users' attention more than those which deliver general and public information.

IV-2. Location, Location, Location

The importance of location is frequently emphasized by urban planners, by urban designers, and especially by developers. For example, the distance from a city center may be one of the most important factors that decide land value. Generally, land that is close to a city center has higher value than land that is far from the city center. This is mainly due to the accessibility to the city center where the economic and social resources are accumulated.

Location in the real estate of web interface may also be important but for different reasons, such as a user's limited attention and the size of a computer screen. Figure 13 shows the differing recognition rates, according to the location of elements in the front page of PLAZA. First, the recognition rate of the center seems to be higher than that of the periphery; also, the recognition rate of the top-left is higher than the bottom-right. In this section, I analyze these two tendencies.

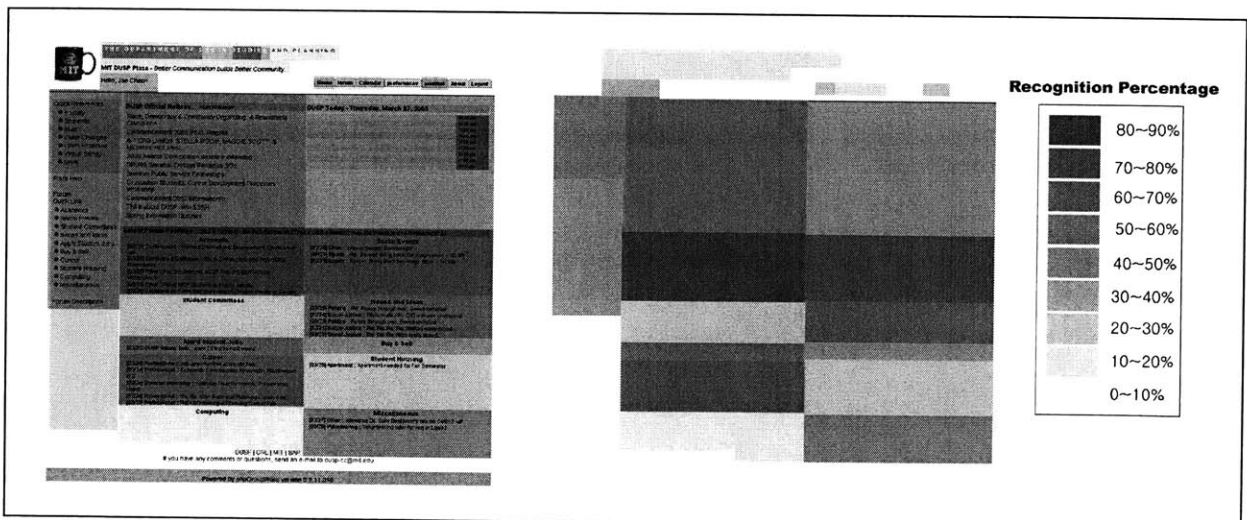


Figure 13. 'Land Value' Distribution in DUSP Plaza

IV-2.1. Center vs. Periphery

Elements in the center of the front pages with bias toward upper-left are recalled more frequently than those in the periphery as shown in Figure 13. Most Interviewees (84.4%) recalled the forum section, 'Academia', which is located at the center.

The user's attention, which is one of limited resources in the 'web real estate', may matter. When a user encounters a web space on his computer screen, some location on the screen, such as the center of the 'small' screen, may be advantageous in attracting the user's attention because it may be difficult for users to focus on more than one place at the same time. Here, the small screen does not mean the whole front page but the part of the front page which is shown for the first time on the limited computer screen.

IV-2.2. Bias toward Top-Left

In Figure 13, we can also see that the top is more frequently recognized than the bottom, and the left is more frequently recognized than the right. This top-left bias seems to be caused by the scrolling problem and users' reading habits.

First, when one logs into PLAZA, one encounters only the top of the front page because the computer screen is usually smaller than the front page of PLAZA, and we should scroll down to see the elements on the bottom.

This scroll down problem seems to affect the different level of recognition between the top and the bottom. This bias toward the top is also frequently observed in interviewees' sketches of online new services, the front pages



Figure 14. The Front Page of NY Times

of which are usually much longer than computer screens (Figure 14).

Second, the bias toward the left may be explained, partially, if not completely, by the general reading and writing habits in English. People generally write and read texts from left to right.

Therefore, when a user comes into PLAZA, the user's viewpoint may start from the left part of the front page.

IV-2.3. Designer's Intention

The high recognition rate of the center is partially due to design, because the designer of PLAZA may have allocated the important section, 'Academia', to the center on purpose. However, considering more users visit PLAZA for 'Social Events' than 'Academia'²⁷, higher recognition of 'Academia' seems to be influenced by its location.

IV-2.4. Other Factors

However, this pattern seems to be blurred a little by other factors, such as contents of the elements and uses of users. For example, the 'Career' forum section on the bottom is recalled more frequently than was expected from its location. It is due to the frequent uses by users, users' purpose²⁸ and frequent postings, which I analyze in the next section.

IV-3. Vitality of Place

The population of a place itself is one of the major attractions that draw other people to the place.

A plaza where people crowd and many activities happen will draw other people and it will consequently be recognized by more people than a plaza where few people visit. This idea can be

²⁷ Refer to Appendix II.

²⁸ 42% of Interviewees mentioned 'job searching' as one of the purposes of PLAZA uses. Refer to Appendix II.

applied to DUSP Plaza, too. A section where many activities occur may be recognized by more users than those where only few activities do. For this analysis, I focus on the ‘Forum’ sections (Figure 15) that are the most active parts in DUSP Plaza. Here, I analyze the relation between users’ recognition and activities, such as posting and reply (Table 7).

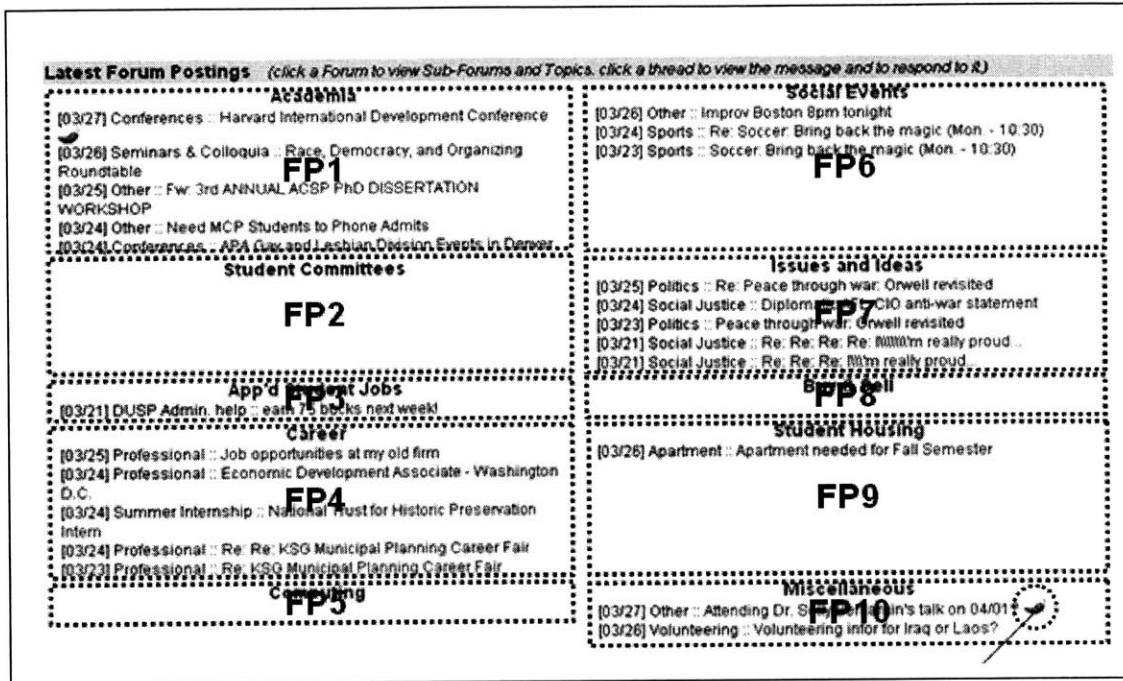


Figure 15. Forums of DUSP Plaza

Table 7. Posting and Reply (09/01/2002~03/31/2003)

Forums	Number of Postings	Number of Replies	Ratio of Replies to Postings	Recognition Percentage
Academia	336	99	0.29	84%
Career	238	6	0.03	72%
Issues & Ideas	197	185	0.94	69%
Social Events	157	191	1.22	72%
Miscellaneous	145	142	0.98	53%
student Committees	86	36	0.42	22%
Computing	47	68	1.45	16%
App'd Students Jobs	36	4	0.11	63%
Student Housing	33	2	0.06	22%
Buy & Sell	27	26	0.96	50%

IV-3.1. Postings

Among forum sections, sections that are posted more frequently seem also to be recognized and recalled by more interviewees than other sections. In fact, the posting amounts in various sections²⁹ may have influence interviewees' recognition³⁰. The 55.18% of recognition rate seems to be explained by postings numbers (Figure 16). However, the 'Appd's Student Jobs' shows high recognition percentage regardless of the small number of postings. It seems to be because 'job searching' is one of the users' important reasons to visit PLAZA, as already indicated in the previous section.

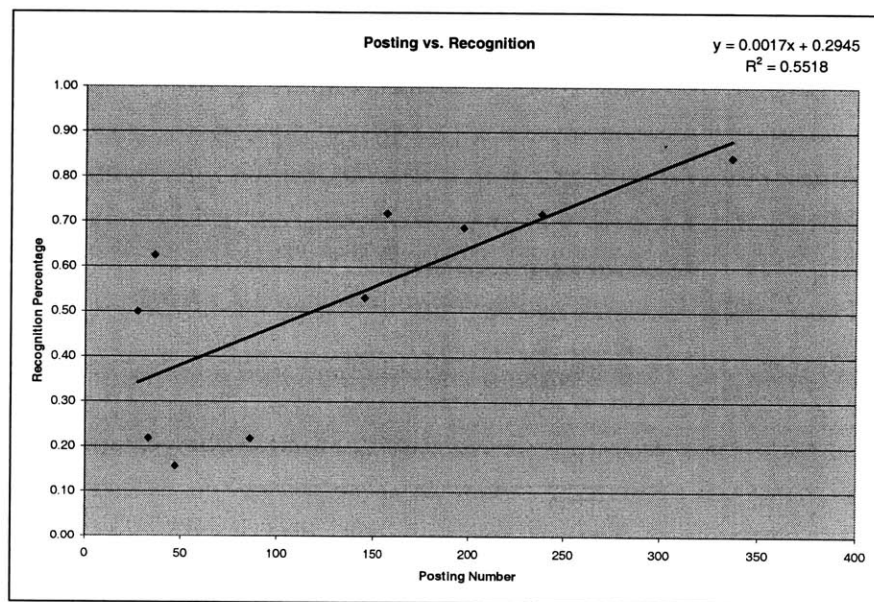


Figure 16. Posting vs. Users' Recognition of Forums

IV-3.2. Replies

However, the number of replies did not show as strong a relationship to recognition as that of postings³¹. Only the 16.35% of recognition rate seems to be explained by the number of replies

²⁹ For this analysis, I counted postings from 09/01/2002 to 03/31/2003.

³⁰ P-value for the slope is 0.052618.

³¹ P-value of the slope is 0.284044.

(Figure 17). First, it may be because the amount of replies is much smaller than that of postings. Small amount of replies may attract less users' attention than postings. Second, the number of replies does not always show the public interest. Sometimes, dozens of replies were posted for a dialogue just between two DUSPers. In this case, these replies usually do not draw many other DUSPers' attentions, though sometimes, they do. 'To read postings' is a more general activity of general users in DUSP Plaza than 'To reply'. Finally, in the front page, the title of a reply does not deliver any meaning but that it is a reply of a posting or reply. It does not give much information about the reply itself. Therefore, the title of a reply is not as interesting as that of a posting(Figure 18).

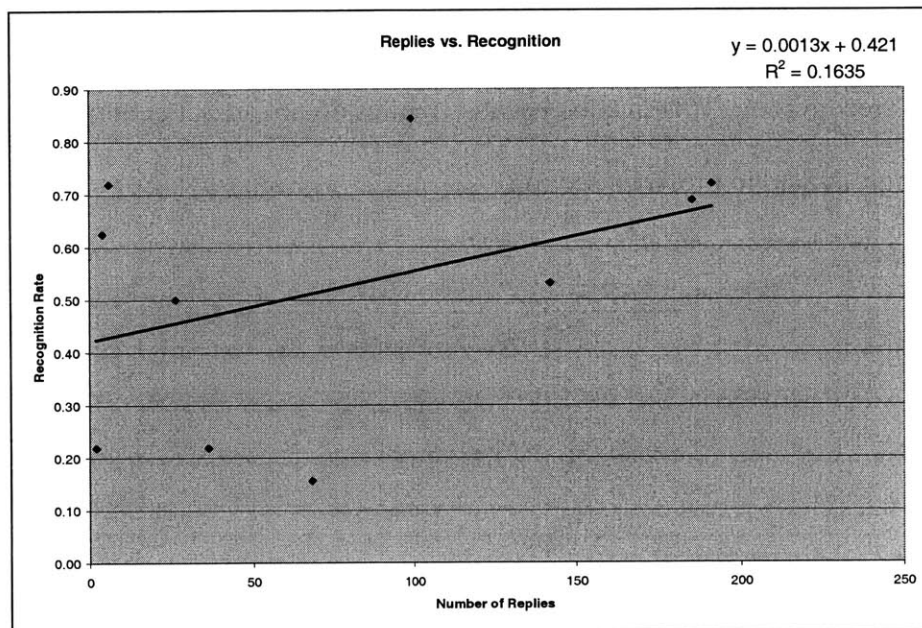


Figure 17. Replies vs. Users' Recognition

Issues and Ideas

[05/13] Other :: Social Action within Academic Practice 🍷

[05/12] Other :: Green Scissors Shows Congress \$58 Billion in Cuts

[05/12] Other :: Re: Re: Re: RE: North End apt for summer suble

[05/12] Social Justice :: Wedding today at noon, Student Center

[05/11] Other :: [No Subject]

Figure 18. Comparison of the titles of a posting and a reply

IV-3.3. The Ratio of Replies to Postings

The ratio of replies to postings may show the degree of users' interests for each section.

However, the result from interviews shows that the ratio of replies to postings does not influence much on users' recognition. This may be because replies do not attract general users' attention as much as postings, as said in previous section.

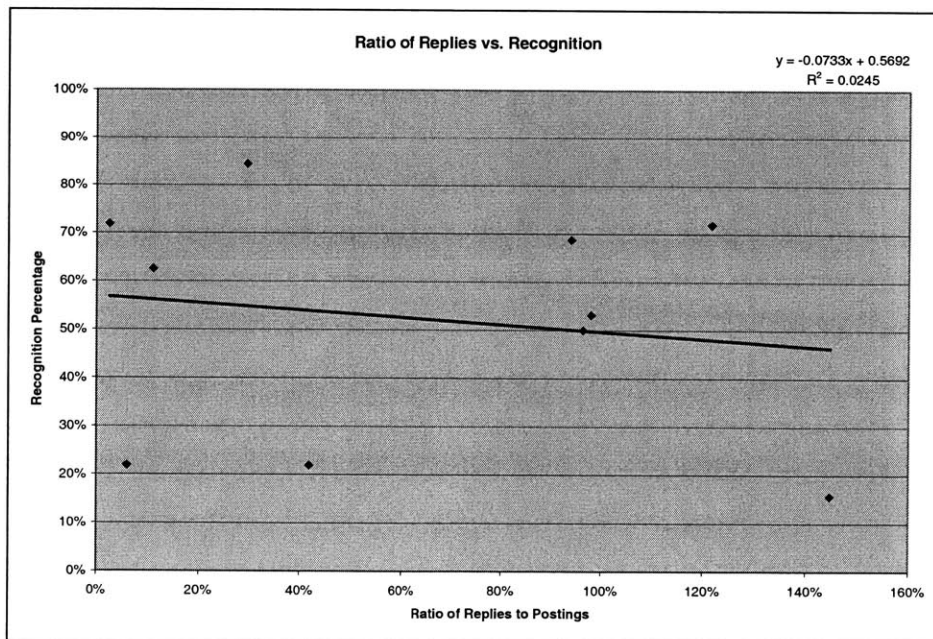


Figure 19. Ratio of Replies to Postings vs. Recognition

IV-4. Accessibility

Accessibility to a place is one of the important elements that decide its fate of a place. In the case of a plaza in a city, it is very important to consider the way to connect the place with pedestrian traffic. Depending on conditions, such as location, users or purpose of the place, sometimes, a plaza is connected to pedestrian traffic physically by arranging a plaza near a pedestrian traffic node and sometimes visually just by securing the visibility between the plaza and pedestrian paths.

It is similarly important to have accessibility to users' targeted information in DUSP PLAZA. Here, I analyze the accessibility and users' recognition of the navigation tools that PLAZA provides for forum navigation.

IV-4.1. Accessibility of PLAZA

For users' access, PLAZA provides three major navigation tools, 'Menu Tabs', 'Menu Lists', and 'Recent Postings', which differ with respect to classification and depth of navigation structure (Table 8 and Figure 20). First, 'Menu Tabs' and 'Menu List' have the same degree of classification. That is, each posting is classified by forums, sub-forums, and topics. Therefore, users can search the targeted information systematically. However, users need to go through several steps to get the targeted information. In contrast, in the case using 'Recent Postings', users need only one step to reach the information. However, the postings are not classified as much as the previous two cases.

Table 8. Navigation Tools of DUSP Plaza

Navigation Tools	Classification	Depth
Menu Tabs	Forums, Sub-Forums and Topics	3~4 steps: Front Page → Forum Page → Sections → Sub topics → Individual Posting Or Front Page → Forum Page → Sections → Individual Posting
Menu List	Forums, Sub-Forums and Topics	2~3 steps: Front Page → Sections → Sub topics → Individual Posting Or Front Page → Sections → Individual Posting
Recent Posting	Forums	1 step: Front Page → Individual Posting

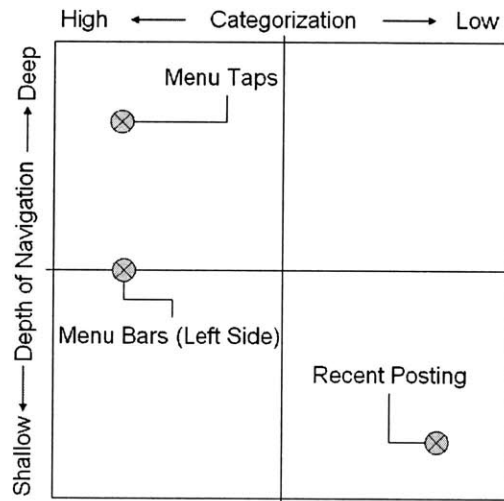


Figure 20. Navigation Tools of DUSP Plaza

In DUSP Plaza, according to their frequency of access, interviewees valued different factors in choosing their navigation tools to access their targeted information and evaluated differently the accessibility of DUSP Plaza. Major factors they considered are the classification and the depth of information.

IV-4.2. Everyday Users vs. Non Everyday Users

Among interviewees, everyday users generally prefer 'Recent Postings' for navigation and recognized them more frequently than non everyday users (Figure 18). Everyday users are those who answered to visit PLAZA more than once a day in the interviews. They usually stop by PLAZA more than once a day and check what is new. Therefore, the 'Hot Chili Peppers' that show today's postings are also recognized more by everyday users than by non everyday users (Figure 21).

Non everyday users prefer more categorized navigation tools such as menu tabs and menu lists. Especially for menu lists, everyday users show a lower recognition rate than non-everyday users though they visit DUSP Plaza more frequently (Figure 22).

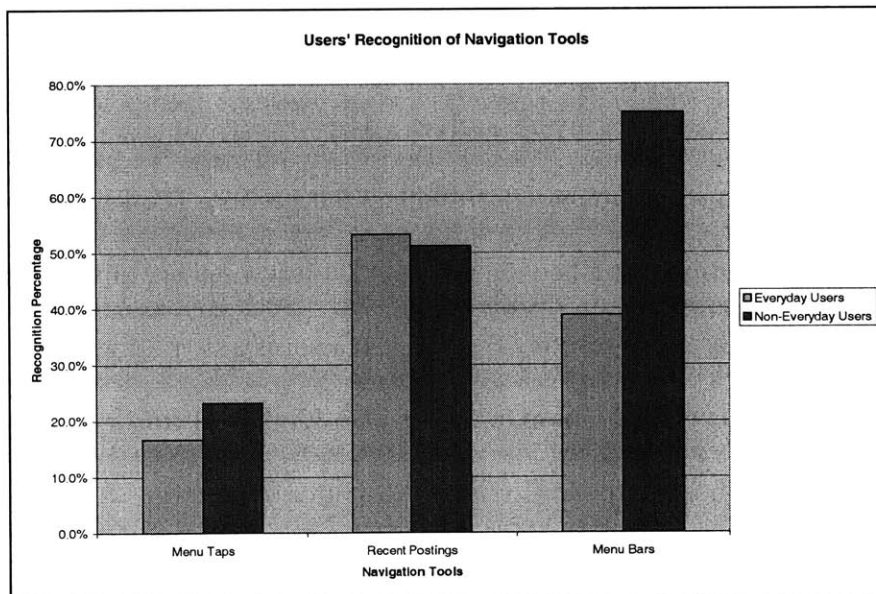


Figure 21. Users' Recognition of navigation tools

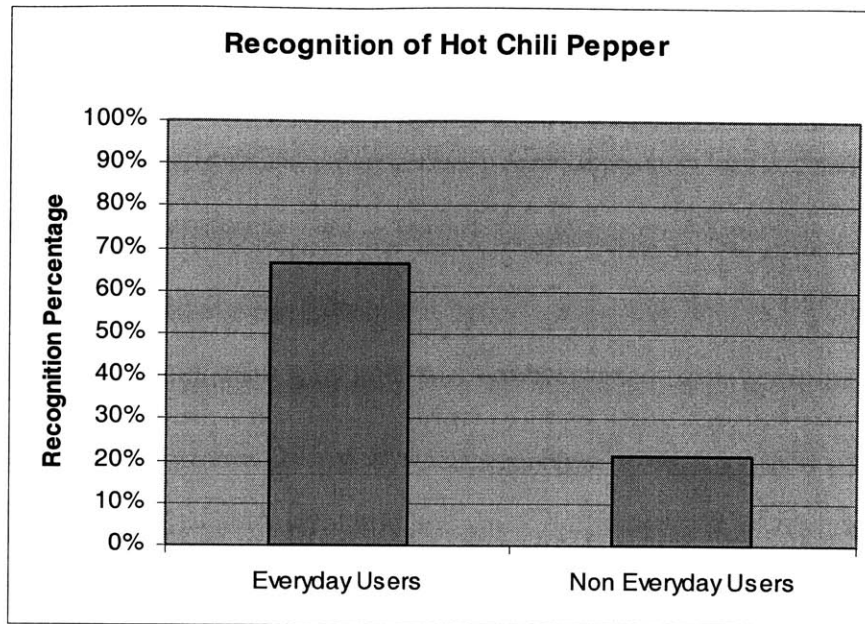


Figure 22. Recognition of Hot Chili Pepper

IV-5.External Factors

Here, I analyze external factors that may also affect a user’s recognition beyond the interface design of PLAZA. Two factors are mainly dealt with in this section. The first factor is the first language of a user. Considering that all content of PLAZA is in English, this may have an important influence to a user’s recognition. The second factor is a user’s Internet Access Condition. A user who uses his own laptop to access PLAZA may visit PLAZA more easily and frequently than those who must go to the Computer Resource Laboratory³² to access PLAZA. In addition, this may also affect the user’s recognition of PLAZA.

³² A computer lab for DUSP students

IV-5.1. Language

Results from the interviews show certain differences between native English speakers and other language speakers. Among the interviewees, there are 23 native English speakers and 9 other language speakers³³. The former group show higher recognition rate than the other for most elements.

In header parts, English speaker group showed higher recognition rate than non English speaker group for all elements. Especially, the former group showed significant difference from the other group for the 'MIT mug' (H1) and the 'PLAZA Title' (H3)³⁴.

In forum parts, English speaker group showed higher recognition rate than the other generally. Especially for community discussion forums, such as 'student committees', 'social events', and 'issues & ideas', they showed significant difference from the other group. However, on the contrary, for the forums for economic interaction, such as 'Buy & Sell' and 'Student Housing', non English speaker group showed higher recognition rate than the other³⁵.

In general, native speakers of English recognize 'Recent Postings' more than other navigation tools using classification. This result is similar to the comparison between everyday users and non everyday users. For those who use other languages, PLAZA in English is not as enjoyable as for the natives. Therefore, they may use it less frequently than natives. They recognize systematic navigation tools ('Menu Tabs' and 'Menu Lists') more than natives (Figure 23).

³³ I used t test for this analysis because of the small sample size.

³⁴ The t scores for these elements showed that the probability that the two groups could be drawn from a single population is less than 0.1. Refer to the Appendix II.

³⁵ The t scores for each exemplified forums showed that the probability that the two groups could be drawn from a single population is less than 0.1. Refer to the Appendix II.

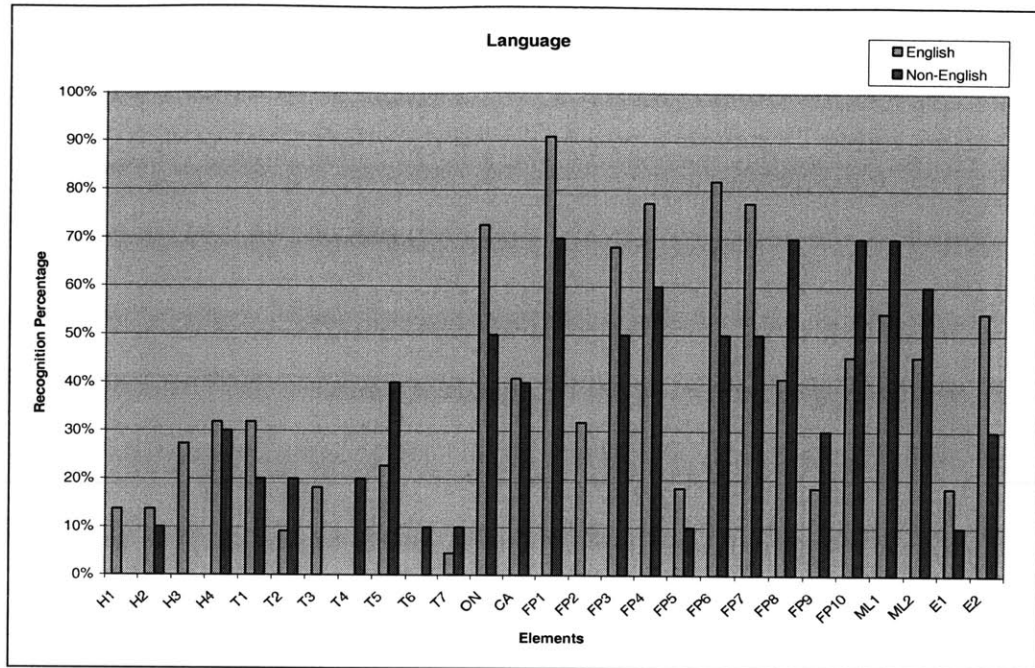


Figure 23. English vs. Non-English

IV-5.2. Laptop Access vs. Non Laptop Access

The graph for the recognition of interviewees who usually use laptops to access PLAZA and those who use public computers to access PLAZA does not show any meaningful pattern (Figure 24), though Laptop users are expected to show higher recognition rate of PLAZA than non laptop users with their ease of Internet access. The t-test about the difference between these two groups also did not show much significant results³⁶. However, it is hard to say that the ease of Internet access may have no relation with the PLAZA access and recognition, because there are other factors that affect the ease of Internet access, like whether one has private access points from home. Also, there may be the sample size problem like the case of language analysis above. Among interviewees, those who use laptop for Internet access are only nine persons. The result could be different with more samples.

³⁶ Refer Appendix II.

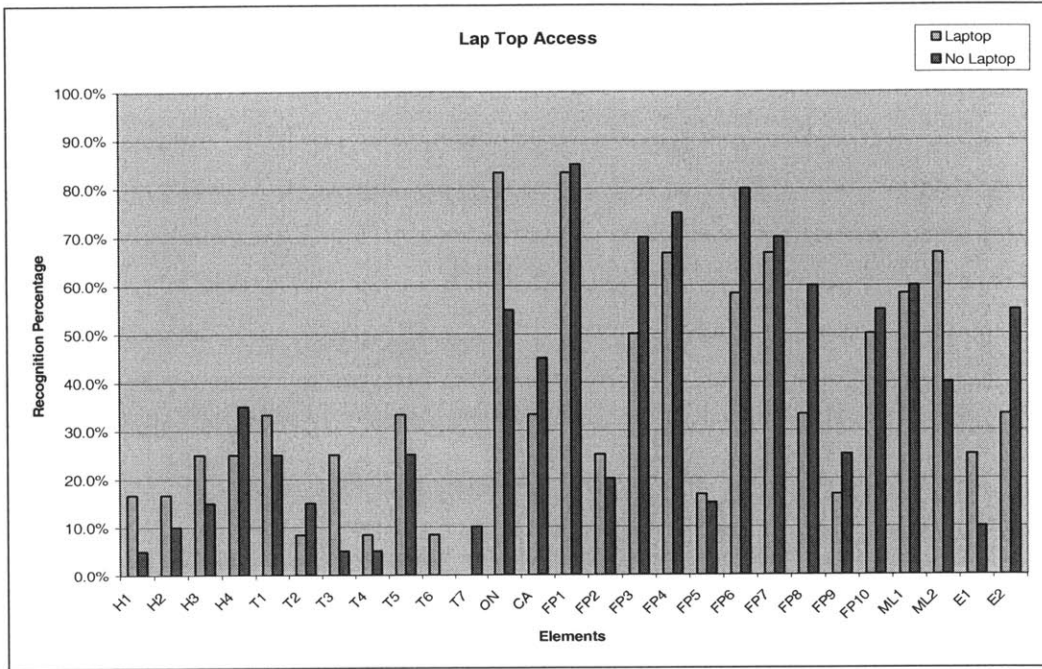


Figure 24. Laptop Access vs. Non Laptop Access

IV-5.3. On Campus vs. Off Campus

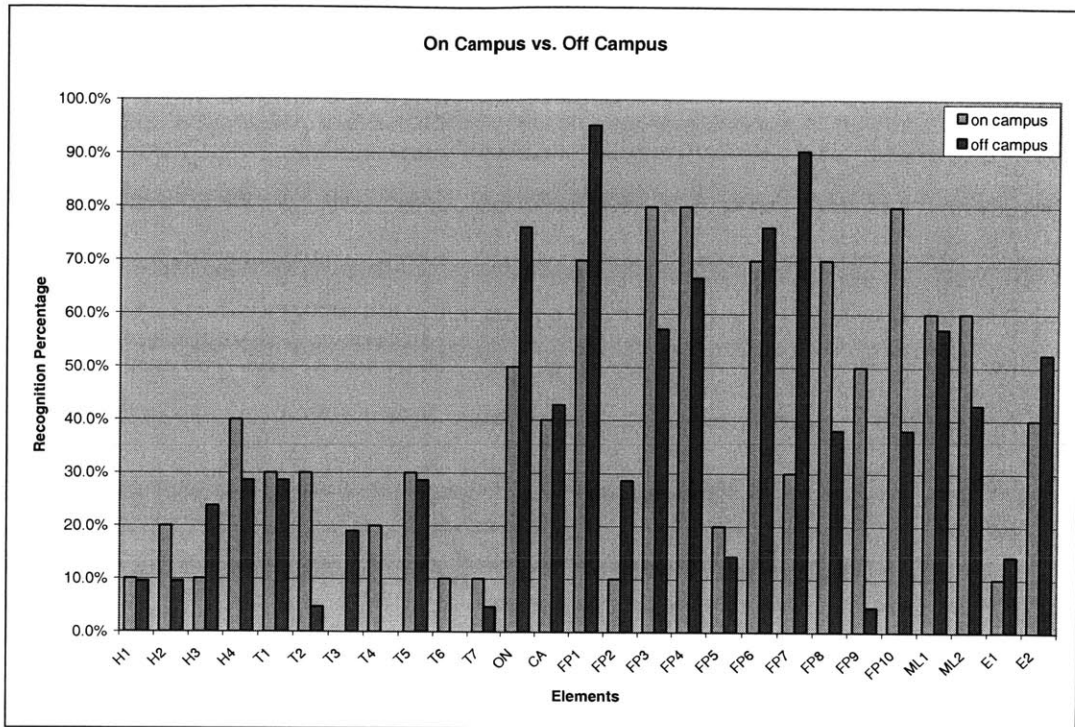
Students who live on campus are provided personal internet access from their home, while students who live off campus do not have personal access from their home or should pay for it.

This different internet access condition may affect their uses and recognition of PLAZA.

The t-test for the recognition of these two groups showed significant difference for two types of elements. First, off campus living students showed higher recognition rate for the elements related with school schedule, such as ‘calendar’ menu tab (T3), ‘Official Notice’, and

‘Academia’ forum. For off campus students who spend much time to commute school, the information about lectures, classes, and events may more important than for on campus students.

Second, on campus living students showed higher recognition rate for the forums for livelihood, such as ‘Buy & Sell’, ‘Student Housing’, and ‘Miscellaneous’.



CHAPTER V

CONCLUSION

- V-1. Analogy between Urban Public Space and DUSP Plaza**
- V-2. Relationship between Web Interface Design and Users' Recognition and Behavior**
- V-3. Recommendations for DUSP PLAZA**
- V-4. Applying to Large Community Web Space**
- V-5. Limitations and Further Studies**

Chapter V: Conclusion

V-1. Analogy between Urban Public Space and DUSP Plaza

In this thesis, I have proposed an analogy between urban public spaces and an electronic public place, DUSP Plaza, particularly with respect to their purpose and functionality.

Urban public places and DUSP PLAZA are quite different environments in terms of external form. We cannot or, even if we can, we do not need to have an electronic plaza looking like a real physical one. For example, what can a bench in an electronic plaza do for users who visit there?

In terms of purpose and functionality, both places support people's social life. Citizens hang along streets watching other people's activity, talk with friends sitting on a bench in a park, and give or listen to speeches in a plaza. Similarly, DUSPers hang around forums looking for new or interesting stories, and communicate with friends or the public by posting or replying. In both physical and electronic spaces function similarly even though their external look and the ways they serve are much different from each other.

In using an analogy of urban design, I have adopted Kevin Lynch's investigation of public image as a methodology, and spatial concepts for an analysis. Lynch's public image of a city from the citizens' viewpoint seems to be proper for investigating the community web space, DUSP Plaza, in that it is also a space for the public. Second, spatial concepts seem to be reasonable for analyzing users' recognition and behavior in DUSP Plaza although the ways which they are interpreted are quite different from the way they are in physical urban space. A detailed interpretation of these spatial factors in DUSP Plaza is offered in the following section.

V-2. Relationship between Web Interface Design and Users' Recognition and Behavior

First, graphic elements do not work by themselves. Frequently, web designers concentrate on the visual effects of the web interface. However, when they combine with users' experiences or they contain interesting information, can graphic elements influence on users' recognition much more than when they are alone. In the case of DUSP Plaza, the elements that deliver personal meaning (greeting) and new information (recent postings) or the elements that are used for navigation (menu lists or menu tabs) show high recognition rates.

Second, the location of each element in the web interface appears to have a relationship with users' recognition. Even with a small screen, a user cannot concentrate on all of it. Therefore, there are some locations that draw users' attention more than other location. In DUSP Plaza, elements that are located on the center of the screen are most frequently recognized.

Third, the vitality of a place is still important even in web spaces. Places where more activities happen draw more attention than others. In DUSP Plaza, among several forums, forums with more postings are recognized more frequently than those with fewer postings.

Finally, frequency of access seems to have a relationship with users' navigation. In the case studies, users showed differing preferences over the navigation tools according to their visiting frequency. Whether they are everyday users or not seems to affect their navigation. Everyday users generally prefer less structured and short navigation tools like recent postings, while non-everyday users prefer more structured navigation tools. This may be because users are interested in different types of information according to their visiting frequency. In many cases, everyday users are interested not in a specific topic but in general new information to see what is going on in the DUSP community. Therefore, prompt access is preferable to systematic and slightly

bothersome access. In contrast, many non-everyday users visit DUSP Plaza to seek specific information. Therefore, they prefer systematic access to prompt access.

V-3. Recommendations for DUSP PLAZA

This thesis does not address all of the design issues for community web space, not even these for DUSP PLAZA. I focus on one quality of DUSP PLAZA interface design. Therefore, at this point, it is difficult to suggest recommendations for the general design of community web space.

However, I might be able to make several suggestions, at least, for the legibility of the PLAZA interface design.

First, graphic elements should deliver practical meaning in order to be recognized easily. The mug cup with MIT and the DUSP icon are hardly recognized by users. The recognition of these elements may be improved by combining them with users' activity or by updating them frequently. If the mug and icon had the hyperlinks to the MIT and DUSP homepages, more users might recognize them by using them than before. In addition, if the graphic contents of the mug and icon were frequently changed, they might be recognized more than before, too.

Second, a change on the location of each element might improve the legibility of the front page of DUSP PLAZA. Considering the limited space on a computer screen, one could rearrange the elements according to users' purposes of visiting PLAZA³⁷. The elements, which are more important to users, may improve their legibility by moving to the center of the small screen. For example, the 'Social Events' forum could be exchanged with 'Academia' to improve the legibility of the front page. In addition, the 'Calendar' section does not need to occupy such a

³⁷ Refer to Appendix II.

large area on the top of the front page, considering its importance. Although the designer of PLAZA already considered this relative importance of elements in arranging them, it might have certain advantage to arrange elements from the viewpoint of users.

Third, the legibility of the front page may be improved by re-clustering sections to reinforce the characteristics of each section. In a city, a district with strong characteristics is clearly recognized by people. In the same way, a section with clear characteristics will be recognized easily.

Interviewees did seem to distinguish clearly between the 'App'd Student Jobs' forum and the 'Career' forum. Many of them mention these forums as places where job opportunities are posted. Grouping these two forums as a forum for job posting may reinforce the image of this part and increase the legibility of this 'place'. The same rule can be applied between the 'Buy & Sell' forum and the 'Student Housing' forum.

However, I stress again that these suggestions are mainly for the legibility. If other factors are considered together, the suggestion might be different.

V-4. Applying to Large Community Web Space

The size of a community web space may change the standard of good design for the web space.

For example, if everyday postings and users of DUSP PLAZA increased ten times as many as it is, would recent postings on the front page still serve everyday users well as a navigation tool?

In a small local community of the country, residents may know everything that happened recently in their village, by hearing from any neighbor whom they encounter on a street.

However, in a city like Boston, it may not possible to know everything that happened recently in

Boston. Citizens get information selectively from diverse media, such as TV, local or national newspapers, and web sites, where they can choose the sections they are interested in.

In the analysis about DUSP PLAZA, I showed that everyday users of PLAZA prefer short but unclassified paths using recent postings of the front page. They encounter every new postings of the day at the front page and choose any of them to know the detail. However, it may differ if it is a larger community web space with more users and postings. In this case, there may be too many recent postings to present together on the front page and a little more classification may be appropriate. For example, the Craigslist web site,³⁸ which is said as a favorite community web site by many interviewees, has two steps of classification, first by cities and second by topics. This classification may help the web site to accommodate many users and postings.

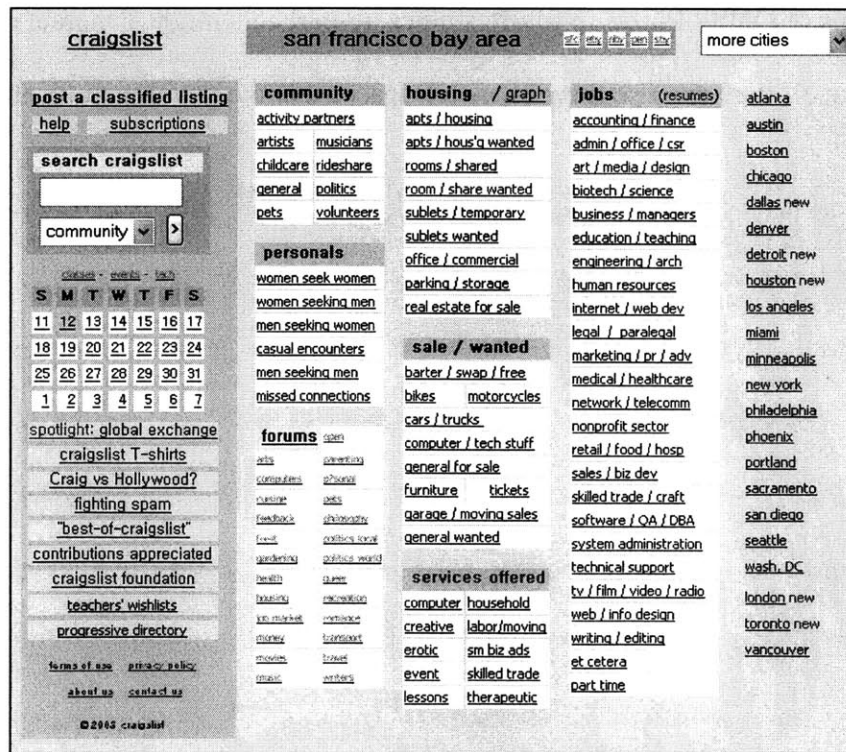


Figure 25. Example of a large local community web space

³⁸ <http://www.craigslist.com>

V-5. Limitations and Further Studies

DUSP Plaza is not the universe and DUSP community members do not represent the general web users. It is a case study about a specific academic community web space. Therefore, the results from this research, as they are, cannot be applied as general principles for web space design or even for community web space design. However, an approach from the viewpoint of urban design seems to be applicable to other web spaces, especially community web spaces. If these similar approaches be done with other types of community web spaces in the future, we could expect more general and meaningful findings for community web space design through comparison with the results of this research.

Second, this research was done with an existing web space that was not designed to conduct research. Therefore, the elements which have been analyzed in this thesis are limited by the existing conditions of DUSP Plaza. In future studies, researchers might generate more diverse and accurate results if they can use their own web spaces that are developed for their researches.

APPENDICE AND BIBLIOGRAPHY

APPENDIX I: Examples of PLAZA Web Space


APPENDIX II: Interviews and Sketches

APPENDIX III: PLAZA System Log Data

BIBLIOGRAPHY

APPENDIX I: Examples of PLAZA Web Space

1. the front page



THE DEPARTMENT OF URBAN STUDIES AND PLANNING

MIT DUSP Plaza - Better Communication builds Better Community.

Hello, Jae Cheoll

[Home](#) |
 [forum](#) |
 [Calendar](#) |
 [preferences](#) |
 [weather](#) |
 [About](#) |
 [Logout](#)

Quick References

- Faculty
- Students
- Staff
- Class Changes
- Class Schedule
- Virtual Sandy
- More...

Plaza Help

Forum

Quick Link

- Academia
- Social Events
- Student Committees
- Issues and Ideas
- App'd Student Jobs
- Buy & Sell
- Career
- Student Housing
- Computing
- Miscellaneous

Forum Description

DUSP Official Notices >Old Notices<

Race, Democracy & Community Organizing: A Roundtable Discussion

Commencement 2003-Ph.D. Regalia

4-1 EPG LUNCH, STELLA ROOM, MAGGIE SCOTT, & MICHAEL HOOPER

2003 Awards Convocation deadline extended

SPURS Seminar-Enrique Penalosa 3/31

Summer Public Service Fellowships

Graduation Students: Career Development Processes Workshop

Commencement 2003 Information!!!

Think about DUSP. Win \$350!

Spring Information Updates

DUSP Today - Thursday, March 27, 2003

	08:00 am
	09:00 am
	10:00 am
	11:00 am
	12:00 pm
	01:00 pm
	02:00 pm
	03:00 pm
	04:00 pm

Latest Forum Postings *(click a Forum to view Sub-Forums and Topics. click a thread to view the message and to respond to it.)*

Academia

[03/27] Conferences :: Harvard International Development Conference

[03/26] Seminars & Colloquia :: Race, Democracy, and Organizing Roundtable

[03/25] Other :: Fw: 3rd ANNUAL ACSP PhD DISSERTATION WORKSHOP

[03/24] Other :: Need MCP Students to Phone Admits

[03/24] Conferences :: APA Gay and Lesbian Division Events in Denver

Student Committees

App'd Student Jobs

[03/21] DUSP Admin. help :: earn 75 bucks next week!

Career

[03/25] Professional :: Job opportunities at my old firm

[03/24] Professional :: Economic Development Associate - Washington D.C.

[03/24] Summer Internship :: National Trust for Historic Preservation Intern

[03/24] Professional :: Re: Re: KSG Municipal Planning Career Fair

[03/23] Professional :: Re: KSG Municipal Planning Career Fair

Computing

Social Events

[03/26] Other :: Improv Boston 8pm tonight

[03/24] Sports :: Re: Soccer: Bring back the magic (Mon. - 10:30)

[03/23] Sports :: Soccer: Bring back the magic (Mon. - 10:30)

Issues and Ideas

[03/25] Politics :: Re: Peace through war: Orwell revisited

[03/24] Social Justice :: Diplomatic AFL-CIO anti-war statement

[03/23] Politics :: Peace through war: Orwell revisited

[03/21] Social Justice :: Re: Re: Re: IWWW'm really proud...

[03/21] Social Justice :: Re: Re: Re: IWWW'm really proud...

Buy & Sell

Student Housing

[03/26] Apartment :: Apartment needed for Fall Semester

Miscellaneous

[03/27] Other :: Attending Dr. Solly Benjamin's talk on 04/01? ☺

[03/26] Volunteering :: Volunteering infor for Iraq or Laos?

DUSP | CRL | MIT | SAP

If you have any comments or questions, send an e-mail to dusp-cc@mit.edu

Powered by phpGroupWare version 0.9.11.010

Figure 26. The Front Page of PLAZA

2. a forum (Front Page → Issues & Ideas)

THE DEPARTMENT OF URBAN STUDIES AND PLANNING
 MIT DUSP Plaza - Better Communication builds Better Community.
 Hello, Jae Cheoll

Home | Forum | Calendar | preferences | weather | About | Logout

You are at the *Issues and Ideas* Forum viewing the list of Sub Forums with Topics.
 To post a new topic, click sub-forum name. To reply, click the topic.

Sub Topics

Social Justice

Vatican: Water a Common Good of Humanity	Ian Finlayson	1	2003-04-25 11:39:17
Poetry, Music and a Report from Palestine	Tracy Sayegh	0	2003-04-24 01:44:17
peace=terrorism	Sunil Tankha	0	2003-04-23 01:37:43
Crazy World	Michael Mendez	0	2003-04-21 14:41:56
for Somerville residents	Jeff Durtiz	0	2003-04-18 17:30:58
Interesting Activism to help Immigrant rights	Marisa Cravens	0	2003-04-17 17:24:09
March on Washington <> Ref	pritz	0	2003-04-15 18:52:56
Environmental Activism arou	Finlayson	4	2003-04-14 23:51:45
hmm.....	Whittemore	0	2003-04-13 13:17:35

Planning

Canada PM Links Sept '11 to 'Arrogant' West	Greg Morrow	0	2002-09-12 21:05:09
FYI: Nat'l People of Color Env'tl Leadership Summ	Boyd Fuller	0	2002-09-12 13:40:23
End Family Homelessness Petition	Laurie Goldman	0	2002-09-12 10:41:56
Justice for Janitors--today at 5:00	Jeff Durtiz	0	2002-09-12 02:54:32
Discussion of 'real world' planning issues.			
HOPE IV and Wal-mart in New Orleans	Alexandra Reitman	0	2003-04-27 09:44:47
Thanks MCP1s	Michael Mendez	2	2003-04-23 10:49:22
"The Day the Traffic Disappeared" -- NY Times Mag	Alexandra Reitman	1	2003-04-21 21:31:46
Larry Vale is on NPR right now...	Meghan Fennelly	0	2003-04-21 11:39:41
Americans' Attitudes Toward Walking and Creating	ERAN BEN-JOSEPH	0	2003-04-02 15:35:04
Walmart Opens Walton Township	Michael Marrella	0	2003-04-01 09:24:54

Politics

Hip-ification and changing neighborhoods	Alexandra Reitman	0	2002-10-09 18:27:29
Cyberhood News listserv	Beatrice Chen	0	2002-10-06 19:44:27
article: Free trade is mythical road to prosperity	Hope Fang	4	2002-09-30 13:49:12
World Bank Africa project-- read all about it	Jean Walsh	0	2002-09-27 10:04:14
Discussion, comments on 'real world' politics.			
The return of mccarthy	Sunil Tankha	0	2003-04-20 23:42:44
Iraq as a precedent ...	Ursula Hester	3	2003-04-11 17:26:54
The Onion.	Diego Valencia	0	2003-04-09 18:37:37
Ten Reasons Why Many Gulf War Veterans Oppose Re-	Shahana Chattaraj	1	2003-04-05 13:38:47
Students for Peace and Social Justice	Diego Valencia	0	2003-04-03 20:48:12
Berkeley Prof. on the attack.	Diego Valencia	0	2003-04-03 19:37:46
Interesting and well written critique of the war	Raja Shankar	3	2003-04-02 18:24:15
NEWS ITEM: INDIA AND PAKISTAN TO REUNITE!	Timothy Reardon	1	2003-04-01 00:12:07
Support our troops	Amelia Ravin	3	2003-03-30 15:12:38
Join a planners' Statement of Conscience	Christopher Hodges	1	2003-03-30 14:33:36

Postings Classified by sub topics from September 2002 till now

Figure 27. Example: A Forum of PLAZA (Issues & Ideas)

All postings to a forum, since September 2002, are listed on one page. Therefore, the user might scroll down to find the posting that he wants. This makes it difficult for users to find targeted information even though postings are divided by sub topics.

Forum pages still keep the left menu lists and the top menu tabs for navigation which were on the front page.

3. Sub Topics

(Front Page → Issues & Ideas → Social Justice)

THE DEPARTMENT OF URBAN STUDIES AND PLANNING
 MIT DUSP Plaza - Better Communication builds Better Community.
 Hello, Jae Cheoll

Home forum Calendar preferences weather About Logout

You are at the Social Justice Sub Forum of the Issues and Ideas Forum viewing the list of Topics with Threads.
 To post a new topic, click "New Topic". To reply, click a topic or thread.

Issues and Ideas :: Social Justice
 [New Topic | Collapse Threads]

Topic	Author	Date
Vatican: Water a Common Good of Humanity	Ian Finlayson	2003-04-25 11:39:17
Re: Vatican: Water a Common Good of Humanity	Diego Valencia	2003-04-25 13:17:15
Poetry, Music and a Report from Palestine	Tracy Sayegh	2003-04-24 01:44:17
peace=terrorism	Sunil Tankha	2003-04-23 01:37:43
Crazy World	Michael Mendez	2003-04-21 14:41:56
for Somerville residents	Jeff Duritz	2003-04-18 17:30:58
Interesting Activism to help Immigrant rights	Marisa Cravens	2003-04-17 17:24:09
March on Washington <> Reflection	Jeff Duritz	2003-04-15 18:52:56
Environmental Activism around the world	Ian Finlayson	2003-04-14 23:51:45
Environmental Activism at home	Meghan Fennelly	2003-04-16 10:32:48
Re: Environmental Activism at home	Jenifer Kaminsky	2003-04-18 19:38:43
Tuesday 22nd is Earth day, anyone doing anything?	Ian Finlayson	2003-04-19 16:37:40
Re: Tuesday 22nd is Earth day, anyone doing anythi	William Bradshaw	2003-04-20 10:08:24
hmmm.....	Andrew Whittemore	2003-04-13 13:17:35
Opposing the war & supporting our troops	Michael Mendez	2003-04-13 10:57:59
The Real Nanny Diaries	Michael Mendez	2003-04-10 16:38:21
Poetry, Education, Censorship, Revolution	Annis Whitlow	2003-04-08 21:07:37
too radical for you--please ignore	Jeff Duritz	2003-04-08 02:18:49
Re: too radical for you--please ignore	George H.W. Bush	2003-04-08 02:23:11
Re: too radical for you--please ignore	Alexander Cohen	2003-04-08 04:09:44

●
●
●

Figure 28. Sub Topic Page of Issues & Ideas

4. Individual Posting

(Front Page → Issues & Ideas → Social Justice → Postings)

THE DEPARTMENT OF URBAN STUDIES AND PLANNING
MIT DUSP Plaza - Better Communication builds Better Community.
Hello, Jae Cheoll

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Quick References

- Faculty
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- More...

Plaza Help

Forum

Quick Link

- Academia
- Social Events
- Student Committees
- Issues and Ideas
- Social Justice
- Planning
- Politics
- Other
- Other Course Commentary
- 9/11 NYDC attacks
- MCP Core
- DSC Discussion
- GSC Discussion
- SCC Discussion
- App'd Student Jobs
- Buy & Sell
- Career
- Student Housing
- Computing
- Miscellaneous

Forum Description

You are at the *Social Justice* Sub Forum of the *Issues and Ideas* Forum viewing the selected message and the related topic and threads. You can reply to this message at the bottom.

Topic	Author	Date
Vatican: Water a Common Good of Humanity	Ian Finlayson	2003-04-25 11:39:17
Re: Vatican: Water a Common Good of Humanity	Diego Valencia	2003-04-25 13:17:15

Author: Ian Finlayson
Date: 2003-04-25 11:39:17
Subject: Vatican: Water a Common Good of Humanity

For the full story go to:
<http://ens-news.com/ens/apr2003/2003-04-24-03.asp>

Vatican: Water a Common Good of Humanity

By Vanya Walker-Leigh

ROME, Italy, April 24, 2003 (ENS) - The Holy See, representing the one billion members of the Roman Catholic Church, has stated its strong support for water as a common good of humanity and the continued public, not private, overall control of water supplies.

Championed by NGOs, trade unions and farmers groups, such concepts are opposed by a number of governments, as seen at last month's Third World Water Forum in Kyoto, Japan.

By contrast, at the G8 environment ministers meeting in Paris starting Friday, G8 president France will be inviting fellow members to endorse measures, such as the Camdessus report on water financing, "Financing Water for All," which failed to gain consensus support under the Third World Water Forum's final ministerial declaration.

Reply to Sender via Web e-mail (without adding to the forum discussion.)

Reply to this message

Your Name:

Your Email:

Subject:

DUSP | CRL | MIT | SAP
If you have any comments or questions, send an e-mail to dusp-cc@mit.edu

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Figure 29. An Example of an Individual Posting

APPENDIX II: Interviews and Sketches

1. Questionnaire for Interview

Interface Design, Collective Images and Activities in an Academic Community Web Space: DUSP PLAZA

Questionnaire for Personal Interview

Jaecheol Kim, MCP2

The Purpose of Survey and Guidelines

- This survey is about the interface design of web spaces and your behavior and recognition in there. The purpose of this survey is to find design elements for community web spaces that support well users' social interaction.
- Most web interface designs about which you will be asked are practical ones rather than those that require cutting edge technology. They will be design concepts which are used in current web design practice.
- This survey will be mainly focused on a specific academic community web space, DSUP plaza. As an academic community, DUSP may have social needs different from those of other general communities.
- Suggested design factors which may be considered when you answer:
 - Contents
 - Icons, Images
 - Network structure
 - Degree of Hierarchy
 - Interface real estate
 - Static vs. Dynamic
 - Permanent vs. Variable
 - Synchronous vs. Asynchronous
 - Any other things which come into your mind.

Part I: Profiles of DUSPers

Here, users are asked their personal position within the DUSP community, their internet skills and conditions. This information will contribute to more accurate analysis of Plaza uses. These external factors are also expected to provide considerable information about social needs of Plaza users.

Status

1. Date of Interview: _____
2. Name: _____ Email: _____
3. Which is your position in DUSP?
 MCP1 MCP2
 PhD Others
4. Which special area are you in?
 CDD EPG HCED
 IDRP PSS
5. Do you have any design experience in academic or professional fields before? If so, please describe the period and the degree of experience.

Internet Access Conditions and Skills

1. Do you have Internet access at home?
 Yes No
2. Do you usually use a laptop for Internet access at school?
 Yes No

3. Do you use wireless Internet access at school?
 Yes No

4. From the following internet tool lists, please choose all that you have used.

- Email
- WWW
- Instant Messenger
- Chatting Room
- Visual Chatting or Visual Conference
- Others _____

Languages

1. Is English your first language?
 Yes No.

2. If not, which language is your first language?

Type B

Part II: Everyday Life on the Web

In this section, I am interested in details about how the design of existing web sites serves the needs of users. Subjects should be interviewed without internet connection.

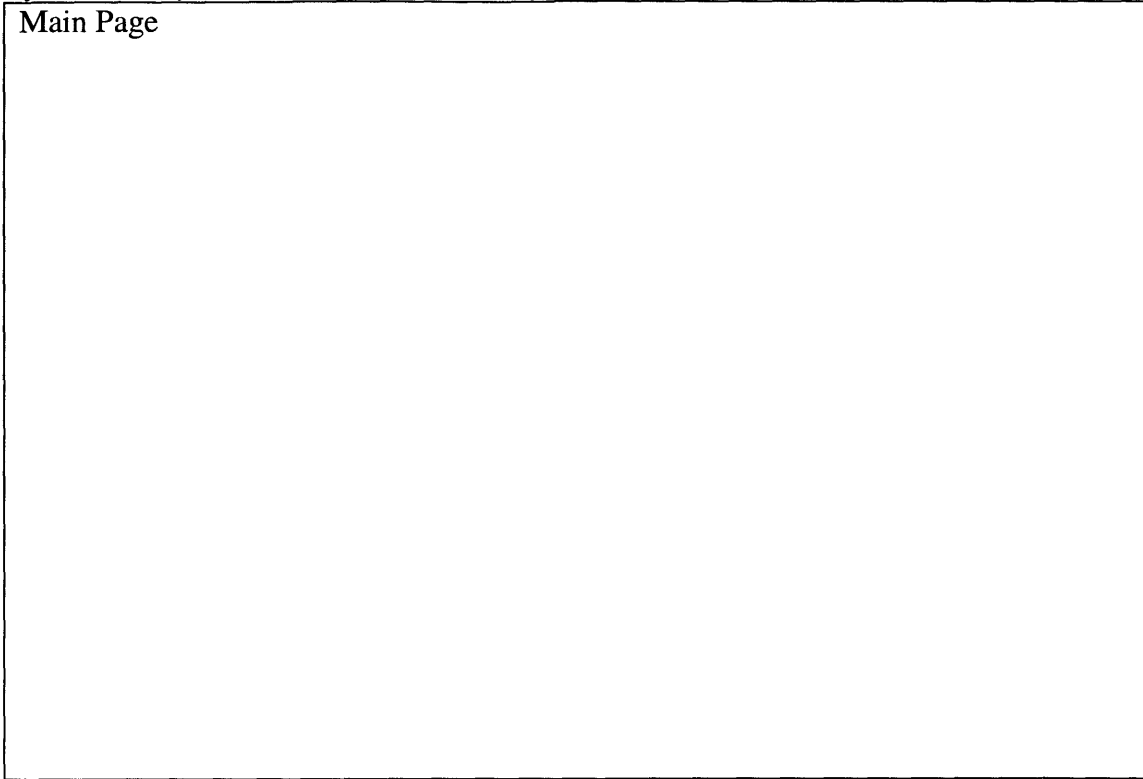
1. For which purpose do you visit web sites? Choose all relevant answers.
 - To learn recent news (ex.: Online news services)
 - To find specific information (ex.: Search engines, Online libraries)
 - To share information (ex.: Usenet)
 - For social interaction (ex.: Local community web services, Group.msn.com)
 - For economic interaction (ex.: Online bidding sites, Online shopping mall)
 - Other purpose: _____

2. For each purpose, which website do you usually visit?(Except Plaza)
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____

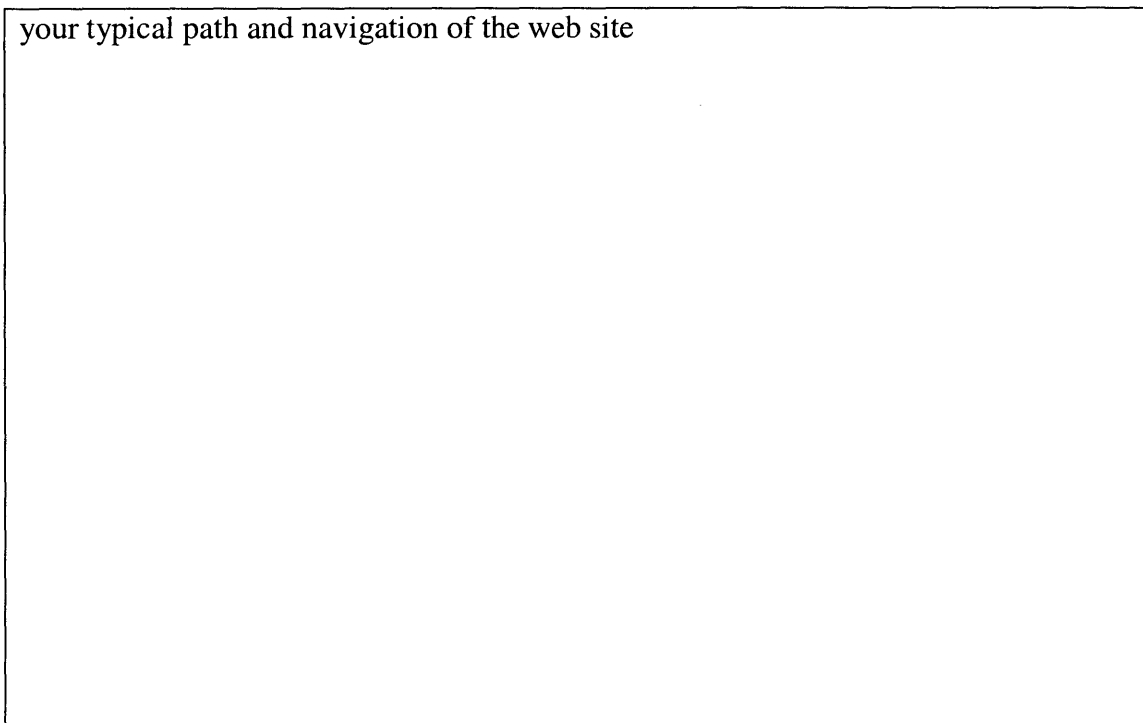
3. What aspects of the sites affect your choices in question 2?
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____

4. If there is any web site that you visit for social interaction, sketch and describe the main page of the web site, your typical path and navigation of the web site. If not, sketch and describe any other site you most frequently visit.

Main Page

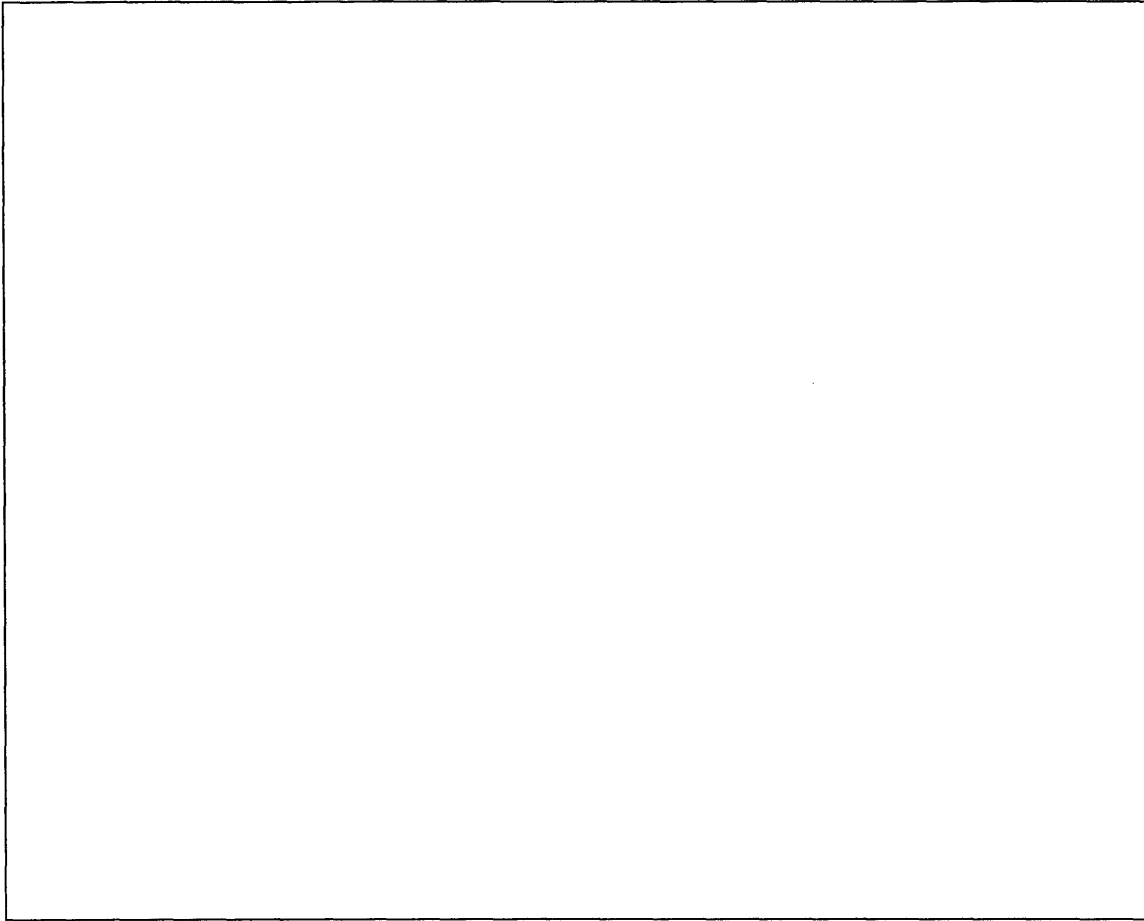


your typical path and navigation of the web site



5. Do you have any frequently visiting section in the web sites that you chose on question 4? If any, how do you get there? Please sketch and describe the paths to the section.

Section: _____



6. How often have you visited the site?

- Rarely (less than once a month)
- Once or twice a month
- Once or twice a week
- Once a day or more

7. What characteristics of the site do you think most affect your visiting frequency?

- The frequency of information updating
- The frequency of other members' participations (Examples: Posting opinions, Responses to your opinions)
- The probability of encountering other members
- Your desire to inform others or discuss issues with them
- Others _____

Part III: DUSP Plaza

Here, I am interested in your perception of the web space Plaza, your opinions about it and your activities there.

Activities in Plaza

1. For what purpose, do you visit Plaza?

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

2. For each purpose that you mentioned in question 1, which section do you visit?

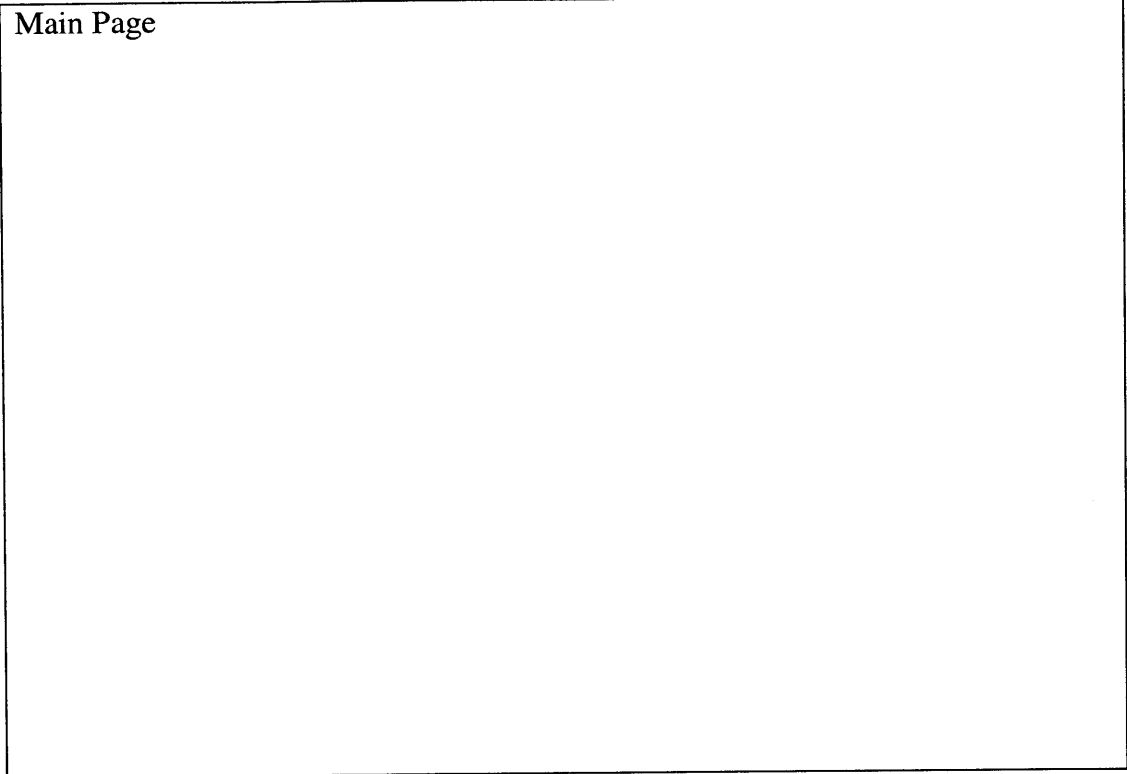
- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

3. What usually motivates you to visit Plaza?

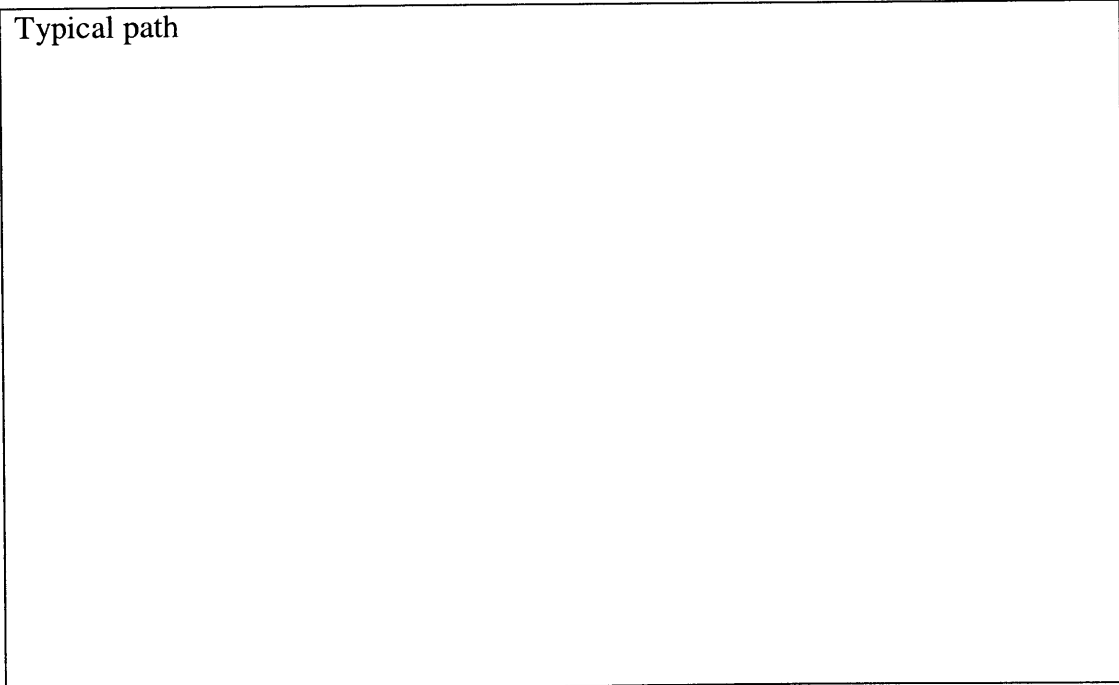
- 1) Seeing some interesting news or issues on the Plaza daily news letter
- 2) Hearing about some interesting news or issues from other DUSPers
- 3) Regular habit (Examples: Once a day or On every Monday morning)
- 4) Others _____

4. Sketch and describe the main page of Plaza and your typical path in Plaza as much as you can.

Main Page

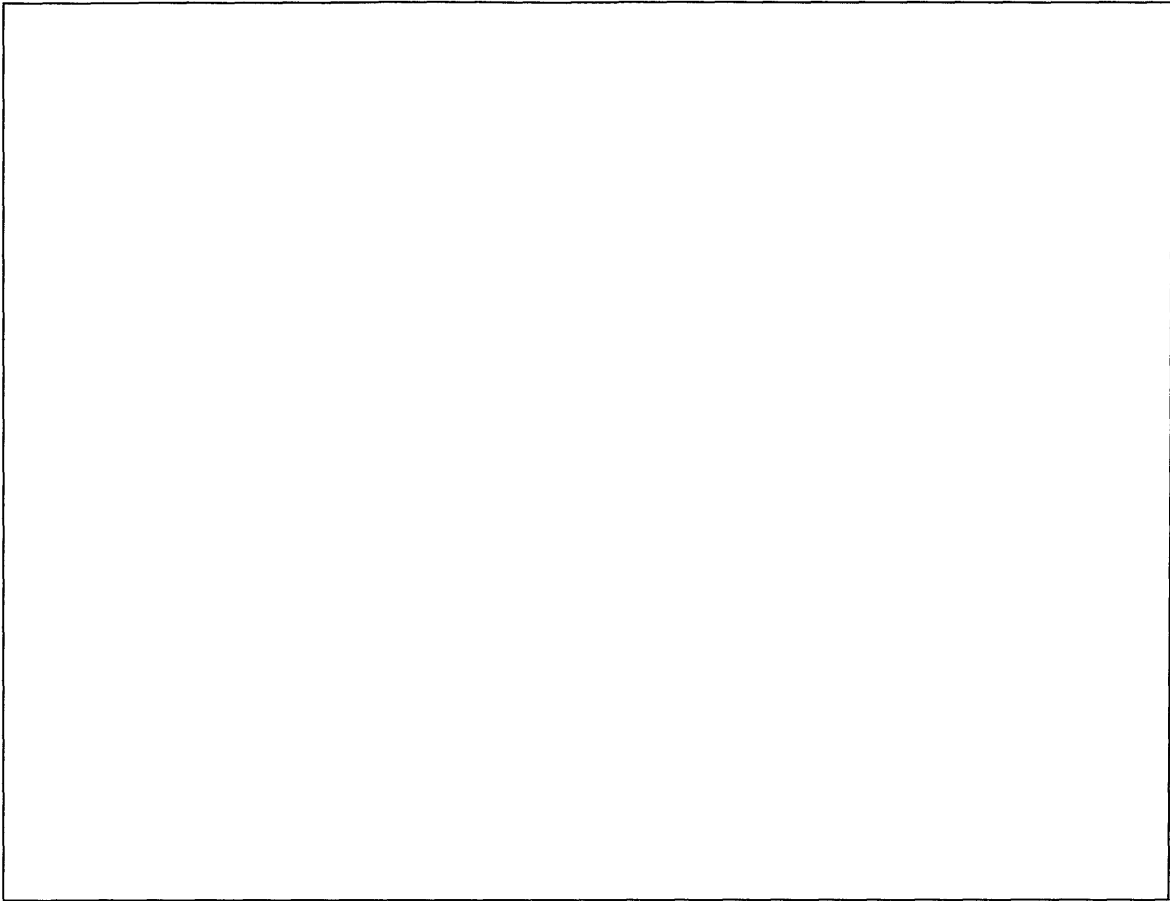


Typical path



5. Which section is your favorite in PLAZA? Sketch and describe the path that you usually go through to reach there.

Section: _____



6. How often you visit the Plaza?

- Never
- Rarely (less than once a month)
- Once or twice a month
- Once or twice a week
- Once a day or more
- Others _____

7. What characteristics of PLAZA do you think most affect your visiting frequency?

- The frequency of information updating
- The frequency of other members' participations (Examples: Posting opinions, Responses to your opinions)
- Your desire to inform others or discuss issues with them
- Others _____

8. For which purposes, do you think, current Plaza is working well? (Number up to three in the order of priority)

- Providing administrative information
- Providing DUSP community information
- Providing forums for community discussion
- Improving communication between students
- Improving communication between students and faculty
- Improving communication between academic groups
- Providing connections with alumni
- Reducing mass emails
- Others 1 _____
- Others 2 _____

9. What do you think the primary purpose of Plaza should be? (Number up to three in the priority)

- Providing administrative information
- Providing DUSP community information
- Providing forums for community discussion
- Improving communication between students
- Improving communication between students and faculty
- Improving communication between academic groups
- Providing connections with alumni
- Reducing mass emails
- Others 1 _____
- Others 2 _____

2. Summary of Interviewees' Responses

2.1. Part I: Profiles of DUSPers

Items	Responses
Degree Programs	MCP1 (14), MCP (17), PhD (2)
Special Groups	CDD (12), EPG (3), HCED (8), IDRP (8), PSS (2)
Design Experiences	Average: 1.9 Years
Internet Access at Home	Yes (31), No (2)
Using a Laptop for Internet Access at School	Yes (12), No (21)
Wireless Internet Access at School	Yes (9), No (24)
Internet Experiences	Email (33), WWW (33), Instant Messenger (28), Chat Room (18), Visual Conference (6)
The First Languages	English (23), Spanish (3), Chinese (3), Hindi (2), German (1), Turkish (1)

2.2. Part II: Everyday Life on the Web (Summary of Interviews)*

Table 9. Everdaylife on the Web (Interview summary)

Category	Examples	Reasons for the choice of Web Space																	
		Contents	Visual Representation	Reliability	Locality	Realtime Update	In-depth Editorials and Stories	Political Stand	Easy Navigation	Diversity of Information	Habit	Email News Service	Quick loading	Multi Media	Few Ads	Cross Word	Easy URL	Total	
Online News Service	NY times, CNN, BBC, Guardian	9	8	8	7	6	5	4	4	3	2	1	1	1	1	1	1	62	
		15%	13%	13%	11%	10%	8%	6%	6%	5%	3%	2%	2%	2%	2%	2%	2%	2%	100%
Search Engine	Google, Yahoo	Reliability	Ease to use	Speed	Simplicity	Accuracy	Habit	Good Classification	User-Friendly Designed	Effectiveness	Wealth of Info	Cashed files	Few Ads	Email Provider					
		12	9	8	6	4	2	2	2	2	2	2	1	1	1				52
		23%	17%	15%	12%	8%	4%	4%	4%	4%	4%	4%	2%	2%	2%				100%
Web Sites for Economic Interaction	Amazon, Ebay, Expedia	Price	Reliability	Variety	Habit	Efficiency	Past Experience	Ease to use	User Profile	Relation with Real Stores	accuracy								
		12	6	5	4	2	2	2	2	2	1	1							37
		32%	16%	14%	11%	5%	5%	5%	5%	5%	3%	3%							100%
Web Sites for Social Interaction	Craigslist, Yahoo Group, MSN Group	Membership in the real world	Users	Locality	Ease to use	Simplicity	Community Feeling	Free	Wealth of Info	Visual Representation	Habit	Race							
		6	4	3	3	2	2	2	2	1	1	1	1						26
		23%	15%	12%	12%	8%	8%	8%	8%	4%	4%	4%	4%						100%

*Interviewees were allowed to list more than one reason.

*Each percentage means the percentage of the related responses to the total responses.

First, in case of online news services, contents themselves and their characteristics ('reliability', 'in-depth editorials and stories', 'political stand', 'diversity' and 'real time update') are mentioned by many interviewees as important reasons of their choices by interviewees. In addition, the visual representation of information also was important to interviewees.

Second, in case of search engines, the reliability of information ('reliability' and 'accuracy') and the convenience of search engines ('ease to use', 'speed', and 'simplicity') seem to be important reasons of interviewees' web site choice.

Third, in case of web sites for social interaction, the relationship in the real world ('membership in the real world', 'users', and 'locality') was mentioned as the most important reason by interviewees.

Finally, in case of web sites for economic interaction, 'price' is said as the most important reason of the web site choice by interviewees.

2.3. Part III: DUSP PLAZA

a. Reasons for Visiting PLAZA³⁹

Table 10. Reasons of Visiting PLAZA

Reasons for Visiting PLAZA (Visiting Sections)	Social Events (Social Events)	Official Notices (Official Notices, Academia)	Community Discussions (Student Committees, Issues & Ideas)	Job Searching (App'd Student Jobs, Career)	For Fun & Gossip (All sections)	To Post for Social Gathering (Social Events)	Class Info (Quick Reference)	To Buy & Sell (Buy & Sell)	Contact Info (Quick Reference)	Admin Info (Virtual Sandy)	weather (weather)	Calendar (Calendar)	housing (housing)
Number of Interviewees	22	19	17	14	12	7	5	5	4	4	4	2	2
	1	2	3	4	5	6	7	8	9	10	11	12	13
% of Interviewees	67%	58%	52%	42%	36%	21%	15%	15%	12%	12%	12%	6%	6%

b. Existing and Desirable Primary Purposes of PLAZA that Interviewees think

Table 11. Primary Purposes of PLAZA that Interviewees thought

Purposes	Existing Condition						Desirable Condition					
	The First		The Second		The Third		The First		The Second		The Third	
Providing administrative information	4	12%	3	9%	1	4%	5	15%	2	6%	2	7%
Providing DUSP community information	11	33%	15	47%	2	8%	15	45%	9	28%	3	10%
Providing forums for community discussion	7	21%	7	22%	10	38%	4	12%	7	22%	8	27%
Improving communication between students	5	15%	3	9%	7	27%	4	12%	6	19%	5	17%
Improving communication between students and faculty	1	3%		0%		0%	2	6%	1	3%	2	7%
Improving communication between academic groups		0%		0%		0%		0%		0%	1	3%
Providing connections with alumni		0%		0%		0%	1	3%		0%	1	3%
Reducing mass emails	5	15%	4	13%	4	15%	2	6%	7	22%	8	27%
Others		0%		0%	2	8%		0%		0%		0%
Sum	33	100%	32	100%	26	100%	33	100%	32	100%	30	100%

³⁹ Interviewees were allowed to list more than one reason.

2.4 External Factors (Testing the difference between Groups)

		mug	DUSP	PLAZA	Personal greeting	home	forum	calendar	preferences	weather	about	logout	official notice	calendar	academia	student committee	app'd student jobs	career	computing	social events	issues	buy	housing	misc	quick ref.	quick link	other sites	pepper
Category	Total	H1	H2	H3	H4	T1	T2	T3	T4	T5	T6	T7	ON	CA	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	FP9	FP10	ML1	ML2	E1	E2
English vs. Non-English																												
English	23	14%	14%	27%	32%	32%	9%	18%	0%	23%	0%	5%	73%	41%	91%	32%	68%	77%	18%	82%	77%	41%	18%	45%	55%	18%	55%	
	s	3	3	6	7	7	2	4	-	5	-	1	17	9	21	7	16	18	4	19	18	9	4	10	13	10	4	13
	s.e.	0.072	0.072	0.093	0.097	0.097	0.060	0.080	0.000	0.087	0.000	0.043	0.093	0.103	0.060	0.097	0.097	0.087	0.080	0.080	0.087	0.103	0.080	0.104	0.104	0.104	0.080	0.080
Non-English	9	0%	10%	0%	30%	20%	20%	0%	20%	40%	10%	10%	50%	40%	70%	0%	50%	60%	10%	50%	50%	30%	70%	70%	60%	10%	30%	
	s	-	1	-	3	2	2	-	2	4	1	1	5	4	6	-	5	5	1	5	5	6	3	6	6	5	1	3
	s.e.	0.000	0.100	0.000	0.153	0.133	0.133	0.000	0.133	0.163	0.100	0.100	0.167	0.163	0.153	0.000	0.167	0.163	0.100	0.167	0.167	0.153	0.153	0.153	0.153	0.163	0.100	0.153
s.e.d		0.072	0.123	0.093	0.181	0.165	0.146	0.080	0.133	0.185	0.100	0.109	0.191	0.193	0.164	0.097	0.193	0.185	0.128	0.185	0.188	0.184	0.173	0.185	0.185	0.194	0.128	0.185
t score		1.9057	0.2957	2.9368	0.1004	0.7165	-0.7462	2.2608	-1.5000	-0.9326	-1.0000	-0.5003	1.1912	0.0471	1.2742	3.2762	0.9426	0.9326	0.6376	1.7194	1.4493	-1.5813	-0.6846	-1.3290	-0.8368	-0.7517	0.6376	1.3290
MCP1 vs. MCP2																												
MCP1	13	7.7%	15.4%	15.4%	15.4%	23.1%	7.7%	15.4%	7.7%	23.1%	7.7%	7.7%	76.9%	38.5%	92.3%	23.1%	53.8%	61.5%	15.4%	76.9%	76.9%	38.5%	23.1%	30.8%	69.2%	38.5%	15.4%	53.8%
	s	1	2	2	2	3	1	2	1	3	1	1	10	5	12	3	7	8	2	10	10	5	3	4	9	5	2	7
	s.e.	0.27	0.36	0.36	0.36	0.42	0.27	0.36	0.27	0.42	0.27	0.27	0.42	0.49	0.27	0.42	0.50	0.49	0.36	0.42	0.42	0.49	0.42	0.46	0.46	0.49	0.36	0.50
MCP2	18	12%	12%	24%	41%	35%	18%	12%	6%	29%	0%	6%	65%	47%	82%	24%	71%	76%	18%	71%	71%	53%	18%	65%	53%	12%	47%	
	s	2	2	4	7	6	3	2	1	5	-	1	12	8	15	4	13	14	3	13	13	10	3	12	10	10	2	8
	s.e.	0.32	0.32	0.42	0.49	0.48	0.38	0.32	0.24	0.46	0.00	0.24	0.48	0.50	0.38	0.42	0.46	0.42	0.38	0.46	0.46	0.50	0.38	0.48	0.50	0.50	0.32	0.50
s.e.d		0.076	0.076	0.100	0.116	0.113	0.090	0.076	0.055	0.107	0.000	0.055	0.113	0.118	0.090	0.100	0.107	0.100	0.090	0.107	0.107	0.118	0.090	0.113	0.118	0.118	0.076	0.118
t score		-0.3843	0.2882	-0.5758	-1.6835	-0.7527	-0.8556	0.2882	0.1959	-0.3991	1.0408	0.1959	0.7527	-0.4802	0.8556	-0.0294	-0.9563	-0.8892	-0.1682	0.3991	0.3991	-0.8088	0.3684	-1.9903	0.9369	-0.8088	0.2882	0.3739
On Campus vs. Off Campus																												
on campus	10	10.0%	20%	10%	40%	30%	30%	0%	20%	30%	10%	10%	50%	40%	70%	10%	80%	80%	20%	70%	30%	70%	50%	80%	60%	60%	10%	40%
	s	1	2	1	4	3	3	-	2	3	1	1	5	4	7	1	8	8	2	7	3	7	5	8	6	6	1	4
	s.e.	0.095	0.126	0.095	0.155	0.145	0.145	0.000	0.126	0.145	0.095	0.095	0.158	0.155	0.145	0.095	0.126	0.126	0.126	0.145	0.145	0.145	0.158	0.126	0.155	0.155	0.095	0.155
off campus	22	9.5%	10%	24%	29%	29%	5%	19%	0%	29%	0%	5%	76%	43%	95%	29%	57%	67%	14%	76%	90%	38%	5%	38%	57%	43%	14%	52%
	s	2	2	5	6	6	1	4	-	6	-	1	17	9	21	6	13	15	3	17	20	8	1	8	13	9	3	12
	s.e.	0.29	0.29	0.43	0.45	0.45	0.21	0.39	0.00	0.45	0.00	0.21	0.43	0.49	0.21	0.45	0.49	0.47	0.35	0.43	0.29	0.49	0.21	0.49	0.49	0.49	0.35	0.50
s.e.d		0.063	0.063	0.091	0.096	0.096	0.045	0.084	0.000	0.096	0.000	0.045	0.091	0.106	0.045	0.096	0.106	0.101	0.075	0.091	0.063	0.104	0.045	0.104	0.106	0.106	0.075	0.106
t		0.114	0.141	0.131	0.182	0.174	0.152	0.084	0.126	0.174	0.095	0.105	0.182	0.187	0.152	0.135	0.165	0.162	0.147	0.171	0.158	0.178	0.165	0.163	0.187	0.187	0.121	0.188
t score		0.0419	0.7423	-1.0516	0.6265	0.0821	1.6619	-2.2752	1.5811	0.0821	1.0541	0.4980	-1.4364	-0.1524	-1.6619	-1.3737	1.3877	0.8253	0.3891	-0.3620	-3.8312	1.7914	2.7500	2.5638	0.1524	0.9146	-0.3551	-0.6586
Laptop vs. Non Laptop																												
Laptop	12	16.7%	16.7%	25.0%	25.0%	33.3%	8.3%	25.0%	8.3%	33.3%	8.3%	0.0%	83.3%	33.3%	83.3%	25.0%	50.0%	66.7%	16.7%	58.3%	66.7%	33.3%	16.7%	50.0%	58.3%	66.7%	25.0%	33.3%
	s	2	2	3	3	4	1	3	1	4	1	-	10	4	10	3	6	8	2	7	8	4	2	6	7	8	3	4
	s.e.	0.37	0.37	0.43	0.43	0.47	0.28	0.43	0.28	0.47	0.28	0.00	0.37	0.47	0.37	0.43	0.50	0.47	0.37	0.49	0.47	0.47	0.37	0.50	0.49	0.47	0.43	0.47
Non Laptop	20	5.0%	10.0%	15.0%	35.0%	25.0%	15.0%	5.0%	5.0%	25.0%	0.0%	10.0%	55.0%	45.0%	85.0%	20.0%	70.0%	75.0%	15.0%	80.0%	70.0%	60.0%	25.0%	55.0%	60.0%	40.0%	10.0%	55.0%
	s	1	2	3	7	5	3	1	1	5	-	2	11	9	17	4	14	15	3	16	14	12	5	11	12	8	2	11
	s.e.	0.22	0.30	0.36	0.48	0.43	0.36	0.22	0.22	0.43	0.00	0.30	0.50	0.50	0.36	0.40	0.46	0.43	0.36	0.40	0.46	0.49	0.43	0.50	0.49	0.49	0.30	0.50
s.e.d		0.049	0.067	0.080	0.107	0.097	0.080	0.049	0.049	0.097	0.000	0.067	0.111	0.111	0.080	0.089	0.102	0.097	0.080	0.089	0.102	0.110	0.097	0.111	0.110	0.110	0.067	0.111
t		0.118	0.127	0.148	0.164	0.167	0.113	0.134	0.093	0.167	0.080	0.067	0.155	0.176	0.134	0.154	0.177	0.167	0.134	0.168	0.170	0.175	0.145	0.182	0.180	0.175	0.142	0.176
t score		0.9878	0.5258	0.6742	-0.6086	0.4990	-0.5906	1.4907	0.3565	0.4990	1.0445	-1.4907	1.8309	-0.6638	-0.1244	0.3253	-1.1299	-0.4990	0.1244	-1.2890	-0.1957	-1.5265	-0.5758	-0.2744	-0.0928	1.5265	1.0574	-1.2378

APPENDIX III: PLAZA System Log Data

1. The Number of Logins by Status of Users (09.01.2001~12.01.2002)

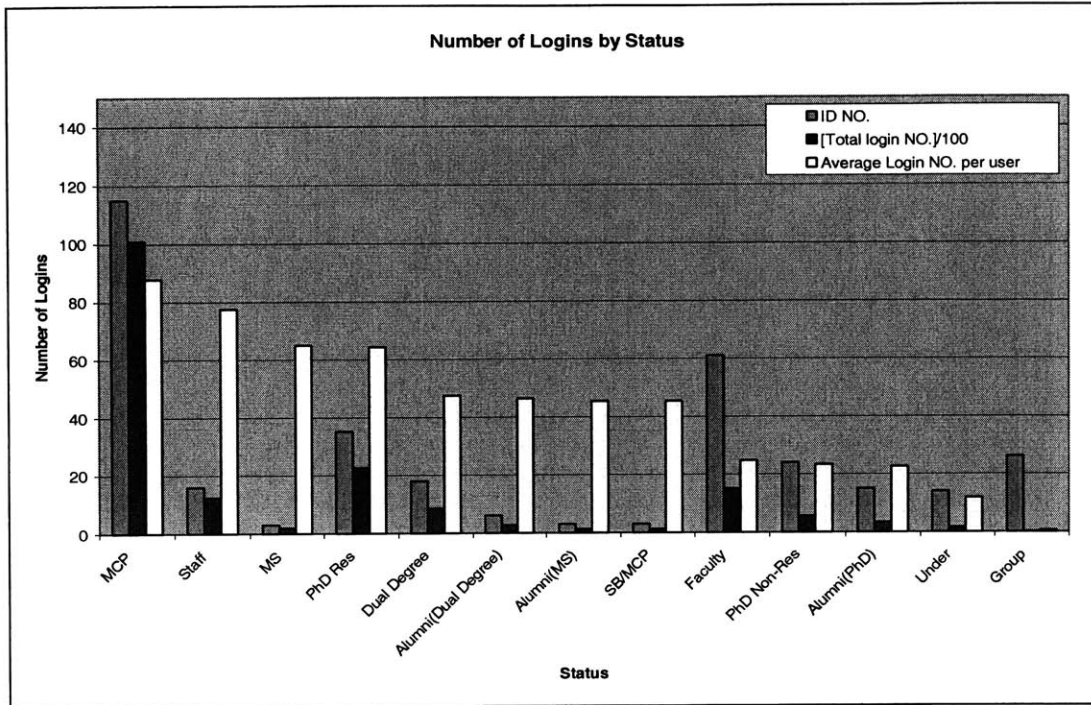


Figure 30. The Number of Logins by Status

MCP students are the major users of PLAZA with respect to both the number of accounts and users' average number of access. Staffs, the number two group with respect to users' average number of logins, mainly access PLAZA to post administrative information. Faculty, the second largest group in the number of accounts, shows low participation in PLAZA. Both groups are difficult to be regarded as a major user group of PLAZA.

2. The Number of Logins by Program Groups (09.01.2001~11.11.2002)

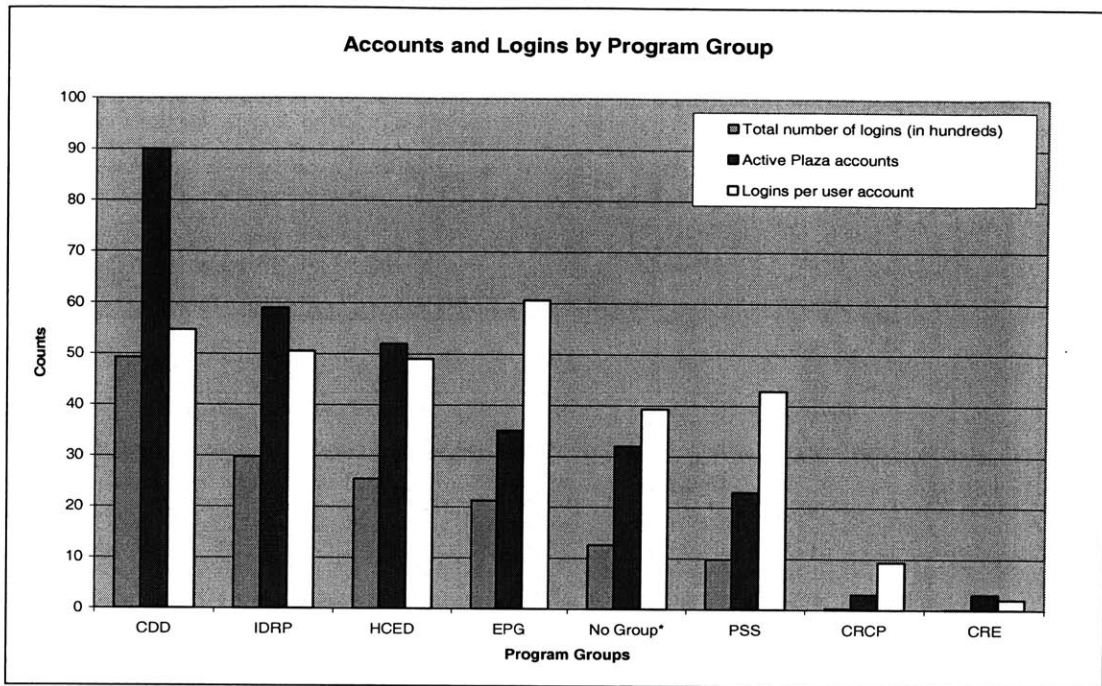


Figure 31. Accounts and Logins by Program Groups

There is no significant difference among the five major program groups (CDD, IDRP, HCED, EPG, and PSS) with respect to the average logins per person, although the total numbers of logins are varied according to the number of people who belong to each program group.

3. Time Series Pattern of Logins for a Year (09.01.2001~12.01.2002)

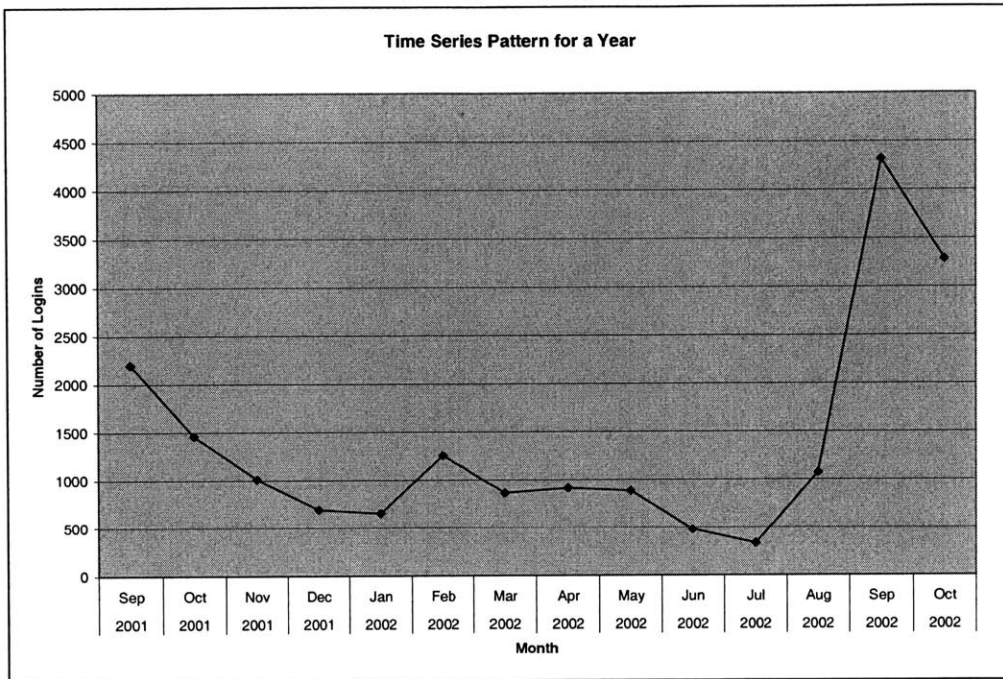


Figure 32. Time Series Pattern of Logins for a Year

The life in PLAZA during semesters seems to be opposite to the school schedule. Usually, PLAZA is most crowded at the beginning of semesters when students are less busy than the end of semesters. However, during vacations, both PLAZA and real DUSP are similarly inactive. In addition, PLAZA seems to grow as time goes by. Comparing with 2001, the number of logins in September 2002 is almost doubled.

4. Time Series Pattern of Logins for a Week (09.01.2001~12.01.2002)

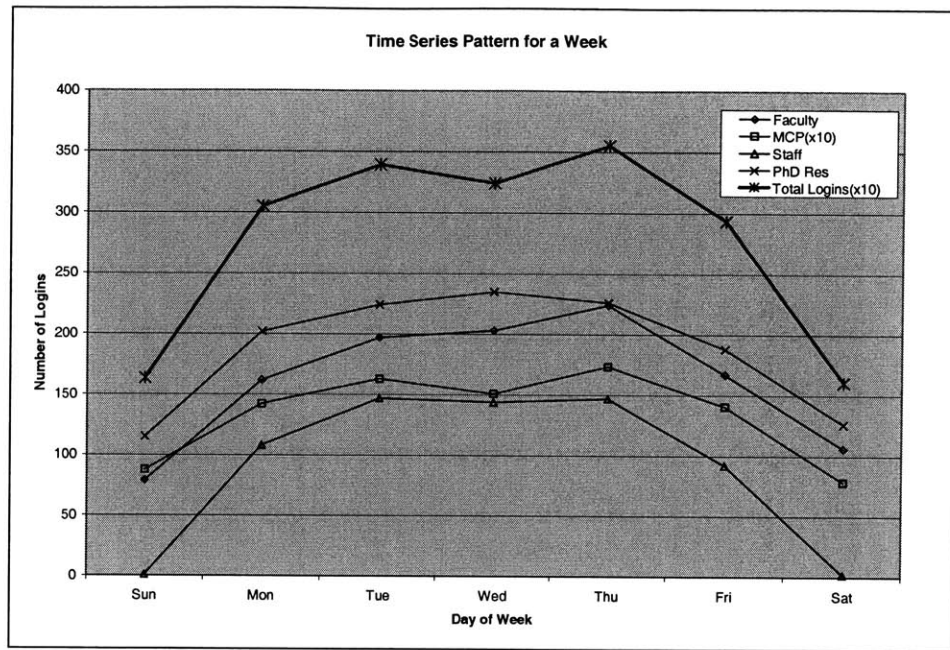


Figure 33. Time Series Pattern of Logins for a Week

The life of PLAZA for a week is similar to that of real DUSP. PLAZA is most crowded from Tuesday to Thursday when many classes and activities usually occur in DUSP, and it is not busy during weekend.

5. Time Series Pattern of Logins for a Day (09.01.2001~12.01.2002)

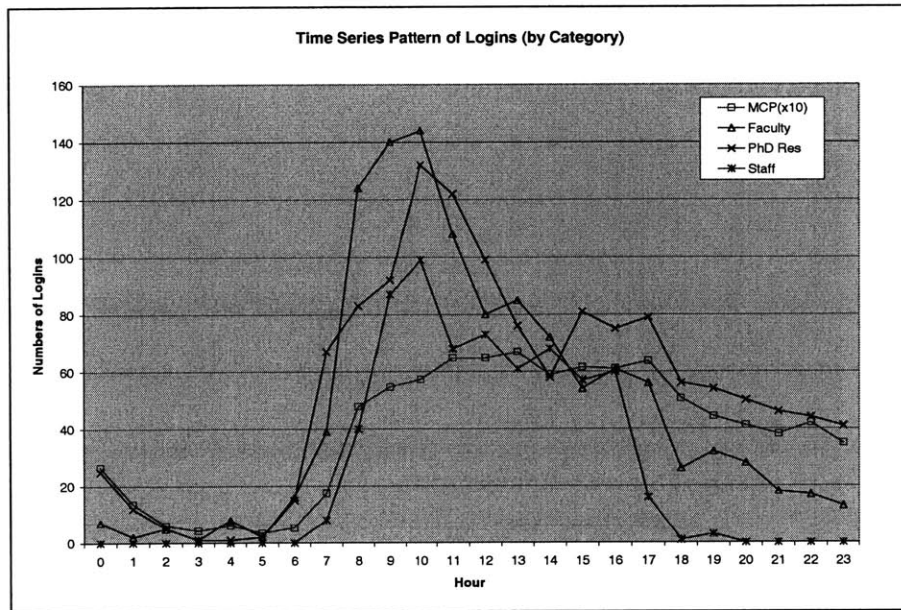


Figure 34. Time Series Pattern of Logins for a Day

Time series pattern for a day shows that other groups except MCP students usually access PLAZA more in the morning than in the afternoon or evening. However, MCP students do not show much difference in the access between in the morning and in the afternoon. It may be because many MCP students visit PLAZA for community discussions and information while other groups visit PLAZA for administrative information.

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