

CONCEPTUAL MODEL FOR DESIGN TEAM TOWARD WEBSITE CONSTRUCTION

HUI-JIUN HU^{1,2}, JEN YEN¹

¹Graduate School of Design, National Yunlin University of Science and Technology, Yunlin, Taiwan

*²Department of Information Management, Transworld Institute of Technology, Yunlin, Taiwan
momo@tit.edu.tw*

Abstract. Since mid 1990s internet has been developing rapidly to become the most booming and emerging media in late history and play an important role in living. Therefore, how to design an interface of easy to use has become an important issue pertaining to Human Computer Interaction. Norman (1986) proposed in the human computer interaction, there is a design model in the mind of designer. In turn, the designer will follow design model and to design a set of system image that is functional, learnable, and usable. Therefore, we want to understand the critical factor of influencing toward website construction, we should find out the mental model that web design team at first. In this paper, we using the Interactive Qualitative Analysis (IQA) approach. The data collection method of the participant of the focus group's silent brainstorming is adopted. Further analyze web design team's the conceptual model on website construction through inductive coding and axial coding. The result shows the affinities of 9 web design team is thus produced. And, Business Decision, Team Performance, Self-Fulfillment and Entrepreneur Communication are main influence factor. These factors can lead trend and goal of a website.

Keywords. website construction; web design team; conceptual model; Interactive Qualitative Analysis (IQA).

1. Introduction

According to the Internet World Stats report, the global population to surf the net is up to 1,460 million by June of 2008. And then, the number of subscribers frequently accessing to the Internet in Taiwan had reached 10.14 million

accounted for 44% by June 2008 (FIND, 2008). It indicates that the Internet market has become mature. Basically, website construction work is a succession of communication activities, diversified integration of including engineering technology, visual design, content planning, marketing strategy and sales promotion etc. Therefore, the web design team needs facing the HCI design questions that become more complicated and diversely.

In the notions of cognitive psychology, it is assumed that human “Mental Model” is the important factor influencing behavior. Fodor (1975) acclaimed that mental express is a language for thinking. If the mental models of design team can be detected, it would be able to find mental orientation influencing designers’ R & D on interface.

In this paper, we using the Interactive Qualitative Analysis (IQA) Approach derived from qualitative research method for searching design team’s conceptual models. Focus Group is used for data collection, category coding and analysis. The explanations are then made for the relation between causes and effects concerning various factors and also mindmap developed from design team. Positive suggestions and directions for futuristic website design are then provided.

2. Literature review

2.1 MENTAL MODEL

Mention model was initiated by Kenneth Craik (1943). Clark assumes that the human will establish Small-scale Models for external physical according to past experiences and also use such a model to predict futuristic situations as to make the most appropriate and safest responses regarding the situations faced by them. Johnson-Laird (1983) submitted that mental model a process pertaining to human’s problems solving and logic reasoning and is also the concepts and operation performance upon the interaction between the human and complicated system. Norman (1983) believed that mental model is personalized intrinsic experience model formed by interaction phenomena between the human and nature and those phenomena provide us the basis for predicting and explaining interactive behavior. That is the human transform external world into intrinsic symbols to create mental model. Languages, worlds or other symbols are used for communications among social groups by model operation. The mental model interactions among the human thus develop the models commonly accepted by social groups. The notion of mental model has also applied and also research by such fields as psychology, computer science, artificial intelligence and education (Preece, 1993; Senge, 1990; Velodf and Beavers, 2001).

Norman (1986) proposed that has three different aspects of mental model must be distinguished: the Design Model, the User's Model, and the System image. The Design model is the conceptual model of the system to be built. Ideally, this conceptualization is based on the user's task, requirements, and capabilities.

2.2 WEB DESIGN TEAM

A website construction includes business decisions, content planning, engineering technology, visual design, marketing strategy and promotion constituting diversifying integration and emphasizing the importance of team division. Friedlein (2000) stated that it is difficult to establish an excellent web design team, as it demands various professional staff. Olsson (2000) also assumed that web operators' backgrounds are highly different. Meanwhile, as the design team suffers insufficient interaction and proper communication mechanism (Friedlein, 2000; Powell, Jones, and Cutts, 1998), they thus have different opinions and insistence on website function, purposes and displaying technology. As the discrepancy among culture, aesthetics, technology and market might occur easily in a team, a team consensus thus becomes very important for a website construction. That is an excellent team performance is a necessary requirement for a successful website construction.

3. Research Method

Interactive Qualitative Analysis (IQA) approach is a qualitative data-gathering and analysis process. IQA research method is collective opinions as to find the relationships between cause-and-effect and real problem cause through a group of participants' focus group and brainstorming. The participants' focus group can provide diversifying experience and ideas pertaining to our research problem and can establish their interpretation on such affinity by using interactive discussion and also use their own cognitions to point out the relationship between each affinity and affinity. And, IQA provides the greatest assistance in interpretation (Northcutt and McCoy, 2004).

The whole IQA process takes about 3~4 hours. IQA starts with proceeding focus group. The host explains the research purpose and actualization methods and each participant fill in the cards by silent brainstorming and each participant fill in about 25 cards in about 1 hour. The cards are then classified and named and inductive coding is conducted on all cards. After inductive coding category naming is finished, axial coding is conducted.

Theoretical coding is conducted then. Each participant fills the mutual affected arrow head direction among each affinity into the Affinity Relationship Table (ART). Pareto Principle is used for deciding which relationships shall be included into Interrelation Diagram (IRD). Finally System Influence Diagram (SID) is drawn according to the driver or outcome derived from between IRD and each affinity. The IQA procedure is shown as in Figure 1.

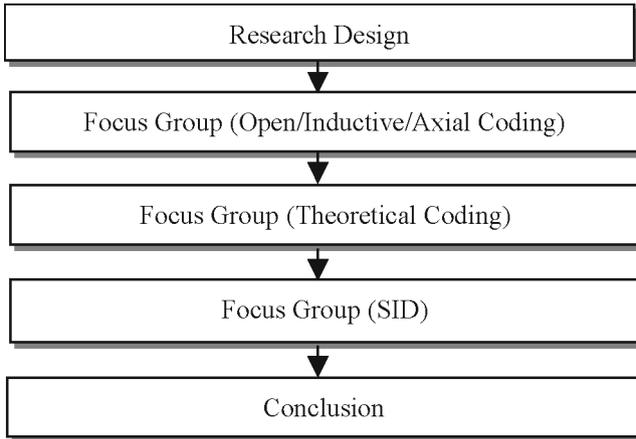


Figure 1. IQA Research Flow.

4. Data Collection and Analysis

The web design team for focus group has 8 participants, consisting of marketing manager, project manager, visual designer and engineer. They are an average of at least 8-year working experience. The problem is: According to your professional experience, what factors (attributes) shall be taken into consideration for developing/planning/designing a good website? The affinity of 9 web design team (see Table 1) is thus produced after data coding.

We find that the first 44 (61.1% of total) relationships (Fig. 2) account for 73.8% of the total variation (Fig. 3). The power curve peaks at a value of 12.7 (Fig. 2), which is associated with 73.8% of the total variance.

TABLE 1. Affinities by Web design team from the focus group.

<i>Affinity</i>	<i>Definition</i>
Business Decision(BD)	Make analysis on market SWOP to devise the website operation mode and direction and measures for coordinating with website’s marketing channels in the future.

(Contd...)

<i>Affinity</i>	<i>Definition</i>
Project Management (PM)	Website working schedule control and the human resources, facilities and costs required by overall development.
Web Planning (WP)	Conduct analysis on users' behavior and also plan website structure and edit such documents as website prospectus according to website targeted demands.
Operations Management (OM)	Data updating and maintenance after website building, including management on human resources, time and frequency
Technology Support (TS)	Basic jobs for website building, including computer room management, back-end exchange server building, program editing, database building, platform testing, various new internet technology support
Visual Design (VD)	Website style and orientation design complying with visual beauty and emphasis on interface design expansion and compatibility.
Team Performance (TP)	Website construction team members' professionalism, communication abilities, responsibilities, experience and stability
Self-Actualization (SA)	Self-positioning for website building can be better than expected satisfaction level?
Enterpriser Communication (EC)	The negotiation and communication with investor can reach professional and mutually-trusted basis?

We decide which relationships could be retained by MinMax criterion. The retained relationships are then used to organize Interrelationship Diagram (IRD) and arranged in a descending sequence according to delta value to get a design team's IRD (see Table. 2). The tentative System Influence Diagram (SID) assignment of each affinity is then defined (see Table. 3). Tentative SID assignments can be used to decide the relationship between affinities and SID. Finally, we draw out SID of the web design team (Figure. 4). The SID is drawn with all Drivers on the left and all Outcomes on the right.

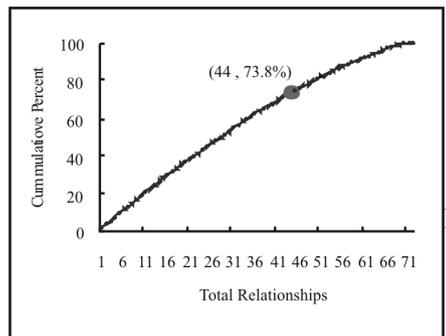
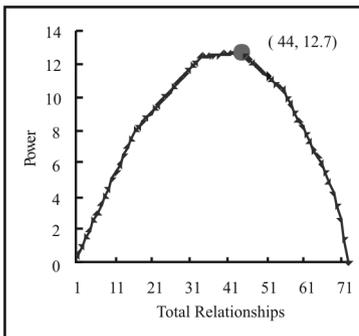


Figure 2: Power Analysis-Total Relationships diagram of web design team

Figure 3: Cumulative Frequency Percent-Total Relationships diagram of web design team.

TABLE 2. Focus group Tabular IRD of web design team.

	BD	PM	WP	OM	TS	VD	TP	SA	EC	OUT	IN	□
TP		↑	↑	↑	↑	↑		←	↑	6	1	5
BD		↑	↑	↑		↑			←	4	1	3
SA		↑	↑			↑	↑		←	4	1	3
EC	↑				↑		←	↑		3	1	2
WP	←			↑		↑	←	←		2	3	-1
TS		↑		↑		←	←		←	2	3	-1
PM	←				←	↑	←	←		1	4	-3
VD	←	←	←		↑		←	←		1	5	-4
OM	□		□		□		□			0	4	-4

*Count the number of up arrows (↑) or Outs.

*Count the number of up arrows (←) or Ins.

*Subtract the number of Ins from the Outs to determine the (Δ) deltas.

*Δ = Out-In.

TABLE 3. Focus group Tentative SID Assignments of web design team.

<i>Affinity Name</i>	<i>Determinant</i>
Team Performance (TP)	secondary driver
Business Decision (BD)	secondary driver
Self-Actualization (SA)	secondary driver
Enterpriser Communication (EC)	secondary driver
Web Planning (WP)	sceondary outcome
Technology Support (TS)	sceondary outcome
Project Management (PM)	sceondary outcome
Visual Design (VD)	sceondary outcome
Operations Management (OM)	primary outcome

5. Conclusion

In this paper, we found 9 affinities design team taken into consideration toward construction a good website: Business Decision, Enterpriser Communication, Team Performance, Self-Actualization, Web Planning, Visual Design, Project Management, Technology Support and Operation Management. There are 4

drivers in the SID as Business Decision, Enterpriser Communication, Team Performance and Self-Actualization. Drive is causing the phenomenon. It means can affect intention and the force to make some action. These factors of driver can lead trend and goal of a website.

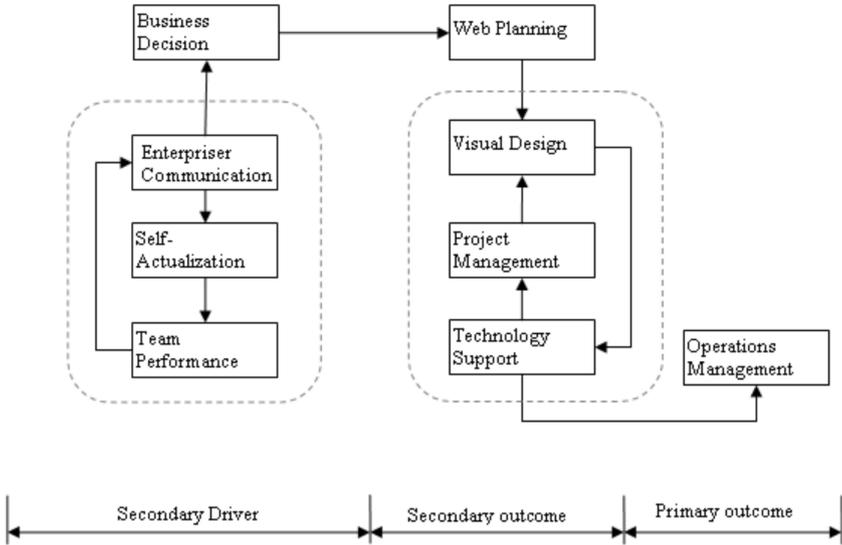


Figure 4. Focus Group uncluttered SID of web design team.

As internet is a cross-field combination and web design team is composed of various professional staff, an excellent capability is thus a requirement (Friedlein, 2000) and design team shall reach a consensus with enterpriser to enact a website operation strategy and to confirm brand image. As focus group indicate (Table 1) Team Performance means team members’ professionalism, communication abilities, responsibilities, experience and stability. And, the team member’s backgrounds are highly different (Olsson, 2001). They thus have different opinions and insistence on website function, purposes and displaying technology. Therefore, we suggest respected the team performance and interaction.

The enterprise’s demand and intention are highly changeable. The web design team communication with enterpriser can has a common consensus and mutually-trusted basis at all time. Further, make analysis on market SWOP to devise the website operation mode and measures for coordinating with website’s marketing channels in the future.

Another interesting phenomenon is that affinity is Self-Actualization. Team members regard a website construction as a self-actualization and challenging job. Such a phenomenon has never been found by any previous research. The

demand theory submitted by Abraham H. Maslow (1954) stated clearly that human final expectation is to reach self-actualization needs.

Finally, we also found that the highly close relationship among Enterpriser Communication, Self-Actualization and Team Performance constituting a first mutually influencing loop. It means that Enterpriser Communication excellent leads to Self-Actualization. Due to self transcendence and achievement for web design team members are expected have equally excellent professional attributes and consensus and excellent Team Performance can give enterpriser better persuasion and communication. And, Visual Design, Technology Support and Project Management constituting second mutually influencing loop. These three factors have relationship each other, especially Visual Design has been more attention. As we know, Visual Design of website is the first image and most website operation is making interaction with users by vision-driven.

References

- Craik, K.: 1943, *The Nature of Explanation*, Cambridge University Press, Cambridge, UK.
- FIND: 2008, *Global population to surf the net*, <http://www.find.org.tw/find/home.aspx?page=news&id=5340>.
- Fodor, J. A.: 1975, *The Language of Thought*, Thomas Crowell, New York.
- Friedlein, A.: 2000, *Web Project Management: Delivering Successful Commercial Web Sites*, Morgan Kaufmann, San Diego, CA.
- Johnson-Laird, P. N.: 1983, *Mental Models: Towards a Cognitive Science of Language, Inference and Consciousness*, Harvard University Press, Cambridge, MA.
- Norman, D. A.: 1983, *Some Observation on Mental Model*, Lawrence Erlbaum, NJ.
- Norman, D. A.: 1986, Cognitive engineering, in D. A. Norman, S. W. Draper (eds.), *User Centered System Design: New Perspectives on Human-Computer Interaction*, Lawrence Erlbaum Associates, Hillsdale, New Jersey.
- Northcutt, N. and McCoy, D.: 2004, *Interactive Qualitative Analysis: A Systems Method for Qualitative Research*, Sage, Thousand Oaks, CA.
- Powell, T. A., Jones, D. L., and Cutts, D. C.: 1998, *Web Site Engineering: Beyond Web Page Design*, Prentice Hall, NJ.
- Preece, J.: 1993, *A Guide to Usability: Human Factors in Computing*, Addison-Wesley, England.
- Senge, P.: 1990, *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday/ Currency, New York.
- Velodf, J. and Beavers, K.: 2001, Going mental: Tackling mental models for the online library tutorial, *Research Strategies*, **18**, 3–20.