Behaviour & Information Technology

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/tbit20

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Accepted author version posted online: 01 Aug 2012.Published online: 10 Sep 2012.

To cite this article: Chun-Cheng Hsu & Yi-Shian Lee (2014) Exploring the Critical Factors Influencing the Quality of Blog Interfaces Using the Decision-Making Trial and Evaluation Laboratory (DEMATEL) Method, Behaviour & Information Technology, 33:2, 184-194, DOI: 10.1080/0144929X.2012.695395

To link to this article: http://dx.doi.org/10.1080/0144929X.2012.695395

Behaviour & Information Technology, 2014
Vol. 33, No. 2, 184–194, http://dx.doi.org/10.1080/0144929X.2012.695395

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(*Received 26 June 2011; final version received 16 May 2012*)

Many studies have shown the significance of a good user interface in affecting a blogger's decision to select a platform for their blog and a reader's decision to read one, and so it is vital that both developers and bloggers need a greater understanding of how they can improve user experience through perfecting their blog interfaces. The aim of this research is to explore the critical factors influencing the quality of blog interfaces and the causal relationships between these factors, enabling blog interfaces to be designed more effectively. Using an approach combining a focus group and the Decision-Making Trial and Evaluation Laboratory (DEMATEL), this study defined eight factors in four dimensions that influence blog interface quality. The results of the DEMATEL analysis identify the key causal factors and effect factors, as well as the causal relationships between the eight factors via the impact-relations map. The research also indicates the most critical causal factors that bloggers and developers should focus on, in order to most effectively improve the quality and attractiveness of blog interfaces.

Keywords: blog; Interface design; quality; DEMATEL

1. Introduction

Blogs are one of the most frequently used Internet-based applications to appear since the development of e-mail, BBS (Bulletin Board System), and instant messengers. Blogs provide a space where bloggers can freely express themselves, and there is no limit to the number of blogs any individual blogger can maintain. According to a survey (FIND 2009), the number of blogs in Taiwan has reached 271,000, which equates to 21% of Taiwan's Internet users. Blogs are not only popular with individuals, they are also used by businesses as a tool for communicating and interacting with employees, and in marketing to promote brands and interact with consumers. It has been noted that corporate blogging is an emerging career choice in the marketing and public relations industries (Du and Wagner 2006). They are also used in online versions of print newspapers and periodicals to allow interaction between the authors of articles and the readership.

Research (InsightXplorer 2011) has found that when deciding on a suitable blog platform, the two most important considerations are (1) good interface design and (2) recommendations from friends, especially for first-time blog users. The growing interest shown in recent research focuses on the user interface, not only in the discussion of usability (Lavie and Tractinsky 2004, Bargas-Avila *et al*. 2009) but also in the quality of websites (Liu and Arnett 2000, Zviran *et al*. 2006, Chang and Chen 2009, Kincl and Štrach 2012). Research shows that blog quality and user experience are just as important as content (Du and Wagner 2006, Guan and Liu 2007, Hsu and Lin 2008). Du and Wagner (2006) indicated that a blog's success may not necessarily depend simply on its content and that technological features may contribute significantly to its popularity. Hsu and Lin (2008) showed that 'ease of use', 'enjoyment', and 'knowledge sharing' positively influenced attitudes toward blogging, and that enjoyment may be a significant factor influencing people's choice to use blogs. Taking Taiwan's most popular blog platform – Wretch Website, for instance, Guan and Liu (2007) evaluated the design from a usability perspective. It was concluded that the Wretch interface still needs to be improved, because most bloggers are not design experts, they tend to overlook usability issues, to the point that there is sometimes no way for readers to effectively read or use blogs. Thus, for blog developers and designers, a thorough study of blog interface is necessary in assuring the quality of blog platforms.

While the use of blogs is increasing, very little research discusses blog interface quality (Guan and Liu 2007). There has been prior research into website quality that concluded a number of important factors to websites in general, but whether or not these factors

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are applicable to blog interface design is still unclear. Blog readers and bloggers are demanding better quality blog interfaces, so it has become increasingly important to clarify which of the factors influence blog interface quality and to determine whether bloggers and readers embrace a blog platform.

Thus, the main purpose of this study is (1) to identify a framework for blog interface quality; (2) to discuss the key factors influencing the quality of blog interfaces and (3) to analyze the causal relationships between these factors. These findings will help to promote the development of more successful interfaces for blog platforms. For blog developers or designers, it will be important to understand the relationship among key factors in order to design an optimal and popular blog platform.

2. Literature review

2.1. Blog

The term 'blog' refers to a kind of web page that allows users to log whatever new ideas or things they have discovered onto the web to share with other people. Blogs are a common communication medium where posted articles and photos are recorded in sequential order. They are standardized across the Internet, in that the posts, or entries, of a blog are stamped with the date and time of their post. The word 'blog' can either refer to the blog website itself, or, in its verbal usage, to describe the act of writing blog posts, which may be comprised of any combination of text, photos and video clips. The person writing the blog is known as a 'blogger', while the 'blogosphere' is a collective noun that refers to the collection of all blogs, authors and social groups on the Internet. Four characteristics of blogs are as follows: (1) they are personalized by individuals, and usually informal in style; (2) they are web-based, facilitating fast updates, easy management and viewed with web browsers; (3) they are built using platforms that allow interconnection to form communities and (4) they are automated without the use of HTML scripting languages, allowing the blogger to concentrate on the blog content. The significance of blogs lies in their connectedness, community activity or social networking function (Blood 2002).

2.2. The qualities of a successful website

Definition of quality is the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs (ISO/IEC 9126, 1991). DeLone and McLean's (1992) 'Information System Success Model' indicates that a successful information system can be influenced by two qualities: information quality and system quality. In this model, information quality is the indicator of semantic success, and system quality is the indicator of technical success. In response to technological developments, DeLone and McLean (2003) later updated their Information System Success Model, adding an important third dimension to the success of a website, namely service quality. All three dimensions are vital in guaranteeing the successful execution of a website.

Based on the Information System Success Model, many studies proved that there is a high correlation between quality of a website and its success (Liu and Arnett 2000, Zviran *et al*. 2006, Chang and Chen 2009). Website quality is a characteristic that reflects how well it meets the needs of its users; as such, it is associated with user satisfaction (Negash *et al*. 2003). To measure the quality of website interfaces, Parasuraman *et al*. (2005) developed a scale with four dimensions: efficiency of the website, system availability, privacy and post-transaction experience. Chang and Chen (2009) said that the customer interface serves to give an online store its 'atmosphere'; they reviewed the literature and then proposed four factors of customer interface quality: convenience, interactivity, customization and character. Kincl and Štrach (2012) pointed out that both content and navigation are key ingredients when users judged the website quality.

Some studies focused on the relationship between website design and user satisfaction (Zviran *et al*. 2006). Chang and Chen (2009) indicated that interface quality significantly influences customer satisfaction in terms of trust and affective response. Bailey and Pearson (1983) defined user satisfaction as the 'sum of one's positive and negative reactions to a set of factors'. It may also be regarded as being the outcome of a process of weighting expectations against the perceived performance level of an application (Bargas-Avila *et al*. 2009). Thus, the perception of quality is significant for a successful website (Iwaarden *et al*. 2004).

Recent research suggests that the visual aesthetics of the interface are an important factor in user satisfaction (Schenkman and Jönsson 2000, Tractinsky *et al*. 2006). In order to discuss the aesthetics of website interfaces, Lavie and Tractinsky (2004) considered four components: usability, playfulness, pleasure and service quality. Schenkman and Jönsson (2000) suggested that the balance between illustrations and text, overview, and aesthetic beauty are the three main factors used in deciding preferences towards the page layout.

Traditionally, much research has discussed the issue of web interface quality (see Table 1), but relatively little has examined the quality of blog interfaces. According to Access Rating Online (ARO) (October 2009), the reach of social networking websites (number of social website users/total online users) was 88.57%, second behind portal websites with a reach of 97.96%.

Table 1. Summary of previous research.

References	Factors of website or blog quality
Argawal and Venkatesh (2002)	Content, ease of use, promotion, made-for-the-medium, emotion
Cox and Dale (2002)	Clarity of purpose, design, accessibility and speed, content, customer service, customer relationships
DeLone and McLean (2003)	System quality, information quality, service quality
Du and Wagner (2006)	Content value, technology value, and social value
Hsu and Lin (2008)	Ease of use, enjoyment, knowledge sharing , social factors (community identification)
Koufaris (2002)	Perceived control, shopping enjoyment, concentration, perceived usefulness, perceived ease of use
Lavie and Tractinsky (2004)	Classical aesthetics, expressive aesthetics, usability, pleasurable interaction, service quality
Lee and Kozar (2006)	System quality, information quality, service quality, vendor-specific quality
Liu and Arnett (2000)	Quality of information and service, system use, playfulness, system design quality
Mahlke and Lindgaard (2007)	Perception of instrumental (i.e., usability), perception of non-instrumental qualities (i.e., visual aesthetics)
Negash et al. (2003)	System quality, Information quality, Service quality, satisfaction
Palmer (2002)	Download delay, navigation/organization, interactivity, responsiveness, information/content
Schenkman and Jönsson (2000)	Illustrations versus text, overall impression, and beauty
Zhang and Li (2004)	Affective quality, perceived usefulness, perceived ease of use
Zviran, Glezer, and Avni (2006)	Content, search, usability, performance, navigation, satisfaction

However, users spent 32.3% of their total time online on social networking websites, compared with 27.3% on portal websites. Thus, it is worthwhile for developers or bloggers to explore which key factors influence the interface quality of social networking websites such as blogs.

2.3. *The use of DEMATEL*

Much prior research on web interface quality (as shown in Table 1) has used conventional statistical analysis and linear models, a good example of which is factor analysis, in which subjects' preferences or satisfactions are extrapolated from their responses to surveys and interviews. Factor analysis is commonly used to divide factors into groups, but the weights between the factors may differ. Therefore, it may not be appropriate to assume that factors' weights are equal. However, DEMATEL has overcome these insufficiencies. It provides a method for determining the causal relationships and degree of impact between factors in a complex system (Tzeng *et al.* 2007, Chen *et al.* 2011). This information makes it possible to focus effort on the critical factors, saving time and reducing costs when developing blog platforms.

The DEMATEL method originated at the Battelle Memorial Institute's Geneva research center in 1971. It has found wide acceptance for its usefulness in solving complex problems in scientific disciplines such as technology, environmental science and anthropology. DEMATEL is invaluable in countless applications to inform the process of reaching appropriate decisions and is a practical and an useful means of visualizing the structure of complicated causal relationships using matrices or digraphs. Bloggers or developers need to understand which factors influence the quality of blog interfaces. The DEMATEL method can be utilized to easily establish the important relationships between many factors by means of a network relationship map. DEMATEL's three basic requirements are as follows: (1) at the research planning stage, researchers must ensure that the research questions they set are clear; (2) the weighted association between factors of the research question can be indicated by allocating them rankings in magnitude; and (3) understanding of the characteristics of each factor arising out of the research question followed by supplementary conclusions after analysis.

3. Method

This study discusses the important dimensions and factors by means of a literature review and use of a focus group to create a questionnaire. Then, a number of subjects were asked to fill out the questionnaire, and DEMATEL was then used to analyze the data obtained. This is discussed in further detail in the following sections.

3.1. *Questionnaire design: factors influencing blog interface quality*

The questions contained in the DEMATEL questionnaire were discussed and designed as follows: Relevant literature was first reviewed by researchers (Table 1), then a focus group was assembled. A focus group is a systematic method of research that uses group discussion (Krueger and Casey 2000); the focus group for this study consisted of a panel of eight experts: four

bloggers with at least three years' experience writing their own blogs, two interface designers with at least 5 years' professional experience, and two researchers with a background in Human-Computer Interaction (HCI). The focus group discussed decisions together in a laboratory, which were made by majority vote. They had shared ideas and discussed which factors should be used to assess blog interface quality for approximately 1 hour and 20 minutes.

Based on the outcome of the above literature review and focus group discussion, this study decided on eight important factors influencing the quality of blog interfaces and classified them into four dimensions (Table 2). The four dimensions used in this study are system quality, information quality, service quality and design quality. Information quality comprised of the factors of 'content' (D1) and 'communication' (D2); system quality consists of 'ease of management' (D3) and 'accessibility and speed' (D4); service quality consists of 'customization' (D5) and 'emotion' (D6); and design quality includes 'clarity of layout' (D7) and 'usability' (D8). Three of the dimensions chosen (system quality, information quality and service quality) were referenced from the Information System Success Model (DeLone and McLean 2003).

Information quality is defined as the usefulness and comprehensibility of web content or information. It has two factors, content (D1) and communication (D2). Content (D1) indicates the quality and depth of content of articles and pictures. Content quality influences blog user satisfaction and repeated visits (Rosen and Purinton 2004, Guo and Salvendy 2009). Communication refers to the socializing aspect of blog content. It also reflects social needs such as making new friends, keeping in touch, and maintaining links within online communities that may influence the continued use of a blog.

System quality refers to the effect of system performance and technological features in delivering information (DeLone and McLean 2003, Lee and Kozar 2006). Previous research has suggested that ease of management and accessibility and speed are important influences on system quality. Ease of management (D3) refers to the perceived ease of use for a first-time user and ease of maintenance. Accessibility and speed (D4) refers to the quality of functions that are provided by the system platform and the time taken to upload or retrieve blog posts. A fast response time is an important factor in increasing system quality, since online users are unwilling to wait more than a few seconds for a response (Cox and Dale 2002).

Table 2. Factors influencing blog interface quality.

Dimensions		Factors	Concepts	Reference
Information quality	D1	Content	Depth of content of articles and pictures Content management Variety of content (text and graphics)	Du and Wagner (2006); Rosen and Purinton (2004); Zviran et al. (2006); Guo and Salvendy (2009)
	D2	Communication	Socializing aspect Building an online community Making friends	Du and Wagner (2006); Preece (2001); James and Susan (2008)
System quality	D3	Ease of management	A first-time blogger is able to manage The site relatively unaided Maintenance	Chang and Chen (2009); Cox and Dale (2002)
	D4	Accessibility and speed	High page download speed Functions Interactivity	Bargas-Avila et al. (2009); Liu and Arnett (2000); James and Susan (2008)
Service quality	D5	Customization	Adaptability to individual users' needs Personalization Responsiveness	Chang and Chen (2009); Macías and Paternò (2008)
	D6	Emotion	Aesthetics Appeal Pleasure Entertainment	Lavie and Tractinsky (2004); Lindgaard et al. (2006); Liu and Arnett (2000); Hsu and Lin (2008); Zhang and Li (2004)
Design quality	D7	Clarity of layout	The arrangement of elements (fonts, graphics, colors) Readability Use of categories Adequate font size	Schenkman and Jönsson (2000); Mullet and Sano (1995); Fang and Salvendy (2003); Liu et al. 2008; Zviran et al. (2006)
	D8	Usability	Easy orientation Easy to use Easy to navigate	Lavie, Tractinsky (2004); Tao (2008); Chang and Chen (2009); Cox and Dale (2002)

Compared with the former which is concerned with product effectiveness, service quality is concerned with the feelings of individuals (DeLone and McLean 2003). In this study, service quality is defined as the difference between expected and perceived service (Parasuraman *et al.* 2005). The more users' expectations are met or surpassed, the higher the service quality. Service quality is influenced by two important factors, customization (D5) and emotion (D6). Customization (D5) refers to the ability to adapt a blog to each user's individual and unique needs. To meet these needs, blog platforms provide an increasingly diverse range of basic templates for their bloggers to express their self-identity through a blog. Emotion (D6) refers to the degree to which users respond emotionally to a blog; a blog's ability to make a user feel an overall sense of joy, pleasure or playfulness is a factor critical to its success (Negash *et al.* 2003, Hsu and Lin 2008). Information and system quality focus on specific aspects of the blog platform and the results they produce. However, service quality differs in that it places importance on the overall experience of the entire process of using a blog platform.

Quality in use should be the major design objective for an interactive product (Bevan, 1999). There have been many studies that pointed out the importance of design quality to general computer users (Zviran *et al.* 2006, Liu *et al.* 2008). In this study, design quality can be judged according to clarity of layout and usability. Clarity of layout (D7) is the ease by which users, when browsing a blog, can correctly identify the function of the elements effectively via a good layout design (Palmer 2002). Usability (D8) encompasses concepts such as ease of use, orientation and navigation, each of which enhances users' ability to control the interface easier and intuitively (Kincl and Štrach 2012). Usability contributes to quality associated with the design of the user interface and interaction (ISO/IEC 9126, 1991).

3.2. Materials

The design of the DEMATEL questionnaire was discussed in Section 3.1. In this study, subjects, that is sampled experts, were asked to indicate the direct effect based on their experience that each factor exerts its influence on each other factor by a 5-point scale, where 0 indicated 'no influence'; 1 indicated 'little influence'; 2 indicated 'medium influence'; 3 indicated 'strong influence' and 4 indicated 'very strong influence'. When the surveyor gave the questionnaire to the subject, he explained the definition of each factor again (Table 2).

3.3. Subjects

To participate in this phase, subjects had to be familiar with blogs. To qualify as a blog expert, a subject must have at least 2 years' experience in a blog operating and visiting a blog at least once a week in the past 3 months. After screening, 34 subjects were chosen to participate in this study, consisting of 22 men and 12 women aged from 21 to 35. Every subject spent approximately 50 minutes to finish the questionnaire, and received a fee for participating in the experiment as an incentive to cooperate with the study.

3.4. Data analysis

After the collecting 34 subjects' data, the direct-relation matrix was obtained through a series of pairwise comparisons between eight factors. The next step was to process the data using the DEMATEL algorithm. The calculation procedures are described in detail in Appendix 1. According to Equations (1)–(10) in Appendix 1, the total relation matrix for the eight factors was obtained (Table 3). After computing the data in the total relation matrix, the causal influence table was obtained (Table 4). An impact-direction map and an impact-relations map (Figures 1 and 2) were then drawn based on the total relation matrix and causal influence table. The results are discussed in further detail in the following sections.

4. Results

4.1. Causal influence table

The result of the causal influence table from DEMATEL analysis is summarized in Table 4. The term $r_i + c_i$

Table 3. The total relation matrix for the eight factors.

	D1	D2	D3	D4	D5	D6	D7	D8
D1	1.148	1.246	1.38	1.253	1.315	1.106	1.184	1.289
D2	1.116	1.106	1.199	1.049	1.18	0.898	1.005	1.17
D3	1.296	1.306	1.264	1.23	1.354	1.149	1.2	1.31
D4	1.174	1.117	1.243	0.998	1.193	0.999	1.091	1.152
D5	1.207	1.235	1.295	1.155	1.149	1.096	1.073	1.247
D6	1.245	1.133	1.383	1.192	1.364	1.135	1.129	1.279
D7	1.126	1.079	1.221	1.095	1.136	0.969	0.925	1.143
D8	1.054	1.045	1.14	1.018	1.122	0.965	0.98	0.982

Table 4. The causal influence table for the eight factors.

	Factors	$r_i + c_i$	$r_i - c_i$
D1	Content	17.041	**0.405**
D2	Communication	17.877	− 1.266
D3	Ease of Management	17.281	**0.108**
D4	Accessibility and Speed	19.286	**0.554**
D5	Customization	17.955	− 0.023
D6	Emotion	19.271	− 0.354
D7	Clarity of Layout	19.127	**0.593**
D8	Usability	20.234	− 0.016

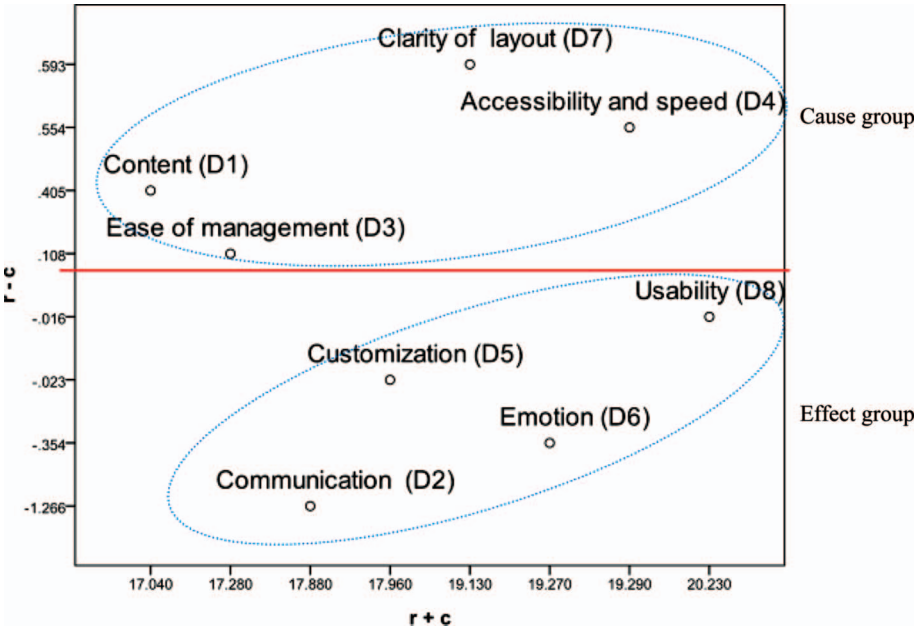

Figure 1. The impact-direction map between eight factors.

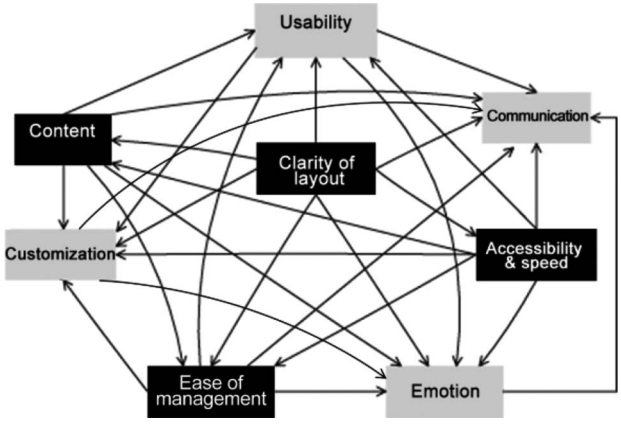

Figure 2. The impact-relations map, indicating which factors influence which other factors. The arrows indicate the direction of the influence.

reveals how much importance a given factor a_i has, while $r_i - c_i$ indicates whether factor a_i belongs to the cause group or the effect group. If $r_i - c_i$ is positive, the factor a_i belongs to the cause group; if negative, a_i belongs to the effect group. Table 4 shows that the highest value of $r_i - c_i$ ($r_7 - c_7 = 0.593$) is for clarity of layout (D7), indicating that this is the most critical factor influencing the quality of blog interfaces; the factor communication (D2) is the most influenced factor, because it has the lowest $r_i - c_i$ value ($r_2 - c_2 = -1.266$). These results clearly indicate that the most effective strategy for improving the quality of a blog interface is to enhance clarity of layout (D7).

4.2. *Impact-direction map*

Figure 1 illustrates the causal diagram between a factor's importance $r_i + c_i$ (x axis) and the strength of its influence $r_i - c_i$ (y axis). The eight factors can be divided into two groups of four through a line at $r_i - c_i = 0$. This division of the factors at $r_i - c_i = 0$ makes it easy to judge which factors are more important and how influential the factors are within each group. When $r_i - c_i > 0$, i.e. for clarity of layout (D7), accessibility and speed (D4), content (D1), and ease of management (D3), this indicates that these four factors' influence is relatively strong compared with those factors for which $r_i - c_i < 0$, i.e. usability (D8), customization (D5), emotion (D6), and communication (D2).

4.3. *Impact-relations map*

In order to further understand the relationships between these factors clearly, the impact-relations map is a good way to visualize the data. Although some literature utilized threshold values to take into account experts' opinions to decide the importance of a given factor a_i out of all factors (Tzeng *et al.* 2007), it may influence the explanation of importance of factor a_i objectively. Because the settings of threshold values are subjective, the outcome of setting will influence the explanation of impact-relations map. Moreover, some articles still could not explain why some factors having self-feedback influence based on giving threshold values (Lin and Tzeng 2009). Therefore, some research

used $r_i - c_i$ as an index to build up the map instead of the threshold value (Chen *et al.* 2011). In this study, after discussing with eight experts (the same people participating at the 'questionnaire design stage' in this study), we adopt the index, $r_i - c_i$, to determine the ranking of all factors since of easy understanding. The impact-relations map for the eight factors, a graphic representation of the relationships between factors and their influential strength is shown in Figure 2. Top four strongly influential factors are rendered in dark boxes, while all other factors are rendered in light boxes. In Figure 2, the arrows indicate the direction of the influence, so it is shown that clarity of layout (D7) influences content (D1), customization (D5), ease of management (D3), usability (D8), communication (D2), accessibility and speed (D4) and emotion (D6). In addition, accessibility and speed (D4) influences content (D1), customization (D5), ease of management (D3), usability (D8), communication (D2) and emotion (D6). Besides this, content (D1) influences customization (D5), ease of management (D3), usability (D8), communication (D2) and emotion (D6). As a result, any improvements in causal factors will effect improvements in other factors. By clearly illustrating these causal relationships, the eight-factor impact-relations map may be a useful reference for bloggers or designers.

5. Discussion

The Information System Success Model (2003) contains three quality-level success factors that are associated with information systems in general. Du and Wagner (2006) examined 126 highly successful blogs and tracked over 3 months, and suggested a blog success model, including technology, content and social factors. However, the factors influencing blog quality are complicated and intertwined. Based on studies mentioned above, this research further contributes by investigating into the quality of blog interfaces from both an overall perspective and the point of view of the causal relationships between factors. The DEMATEL method has been developed to study the structural relations in a complex system and is able to distinguish the factors of a system into cause and effect groups. Furthermore, the impact-direction map and impact-relations map render the resulting statistics considerably easier to interpret by bloggers, developers or anyone not well-versed in statistics. In the impact-direction map (Figure 1), it is easy to distinguish which factors should be more seriously taken into account from the cause and effect groups. The impact-relations map (Figure 2) mainly demonstrates in detail the network of relationships between factors. The factors belong to the cause group are content (D1), ease of management (D3), accessibility and speed (D4) and clarity of layout (D7).

Content (D1) relates to the richness of text and photos presented on a blog and categorization of the content. Many studies emphasized the importance of web content (Guo and Salvendy 2009, Bargas-Avila *et al.* 2009, Kincl and Štrach 2012). We further proposed that the critical factors affecting the quality of content (D1) are clarity of layout (D7). Therefore, content, including text, pictures and animation, should be arranged and designed with readability via clarity of layout.

Clarity of layout (D7) embodies the importance of font, graphics, color, layout, and the concept of readability (Shieh and Ko 2005). Du and Wagner (2006) emphasized that technological features will affect the layout and organization of blog content, as well as nurture social circles around them. Moreover layout with visual appeal influences the overall impression and emotion (Lindgaard *et al.* 2006). Hassenzahl (2008) proposed layout is possibly a key potential factor simultaneously influencing aesthetic emotion and usability. Similarly, we found that clarity of layout, the top one influential factor, influences content (D1), communication (D2), emotion (D6), and usability (D8).

Accessibility and speed (D4), the second most influential factors, refers to how convenient it is to access a blog and navigate its content. Accessibility of the interface will enhance bloggers' ability to create and deliver content for a blog. We found that accessibility and speed (D4) may influence a blog's success in delivering information quality (content D1 and communication D2). Rosen and Purinton (2004) indicated that simplicity of design should be an important consideration as it makes websites faster to load. Graphics and photos improve visual and content richness; however, it is important to strike a balance between the use of such elements and the time it takes to load the webpage.

Ease of management (D3) belongs to the cause group (since $r_i - c_i > 0$); however, it can be seen from Figure 2 to be less influential than some factors. This is because that ease of management is influenced by the factors of content, clarity of layout, and accessibility and speed, while it also influences the factors of customization, communication and emotion.

In contrast to former research, which focused on the functionality aspect of websites, an increasing number of studies have emphasized the importance of emotional factors (Schrepp *et al.* 2006, Light 2006). Hsu and Lin (2008) indicated that enjoyment was the most significant antecedent of attitude toward using blog. This study further asserts that although emotion (D6) is indeed a very important factor, it would in fact be more effective to focus on the factors, such as

content, clarity of layout, accessibility and speed, and ease of management, as these most influence it.

Many studies have verified the value of emphasizing service quality in websites. However, Negash *et al.* (2003) performed an structural equation modeling analysis of data collected from 726 subjects, and they concluded that user satisfaction depends on information quality and system quality, while service quality has no impact. Similarly, we concluded that System quality (accessibility and speed D4), Information quality (content D1), and Design quality (clarity of layout D7) all included influential factors; the two factors of Service quality (customization D5, emotion D6) were both factors that were influenced by other factors. From this we can infer that in order to improve Service quality, the most efficient use of bloggers or developers' time is to concentrate on the factors that belong to causal group.

6. Conclusions and limitations

A blog interface is not just the means by which users use a blog, it is also the channel by which users and the blog platform communicate with each other. For this reason, much research highlights users' overall interactive experience and visual impressions as two of the important considerations that have significant bearing on whether users will continue to use a particular blog platform. Prior research has been carried out into website interface quality and the factors that influence it; however, the causal relationships between these factors of blog interface quality remains under-researched. To summarize, this study (1) defines a framework of blog interface quality, including four dimensions and eight factors (see Table 2); (2) investigates the causal and effect relationships between these eight factors of interface quality and illustrates them in maps (Figures 1 and 2); (3) discusses the applications of these in the form of design guidance for developing blog interfaces.

Prior studies of blogs employed methods that insufficiently examined the interrelationships between influential factors. A useful way of clarifying the causal interrelationships between factors is to adopt the DEMATEL method incorporating experts' opinions on the matter. The DEMATEL method is applied to analyze the causal relationships between factors, identify the primary and secondary factors, and reconstruct the causal relationships between factors influencing the quality of blog interfaces. The implications of this study are that developers or bloggers should formulate better design strategies that ensure the quality of blogs by focusing on improving those factors in the cause group, as these factors most influence the other factors. In this way, overall quality can be effectively enhanced, especially in the initial stages of development. Additionally, the DEMATEL method can analyze the casual relationship among factors for a complex problem in order to explore which factors are key ones.

This study has some limitations. First, as this study is dedicated to examine the interface quality of ordinary blogs, another direction for future research would be to analyze whether there are any significant differences in terms of design between different types of blog, or blogs with different purposes, for example personal diary type blogs or publically shared blogs. Second, a future study could set out to verify the results from 34 exports of this study by surveying a large sample of users. Third, in the literature review, many website design standards were discussed, and these may serve as a useful reference for future research into ways to improve the quality of blog interfaces. However, the relative importance of features such as readability, social networking functions and customizability of layout differentiates blogs from other kinds of website. For example, as users may spend relatively longer time reading blogs than some types of website, demonstrating the importance of legibility of textual and graphical information and the clarity and intuitiveness of content layout. Thus, even though blogs are a form of websites, there are some qualitative differences between blogs and most other forms of website. Indeed, the applicability of criteria used in website interface design for designing blog interfaces is a topic worthy of further discussion.

Acknowledgements

The author would like to thank Ms. Jo-Tzu Chu's support in data collection. This study was supported in a research grant from the National Science Council, Taiwan (NSC 99-2410-H-009-055-MY2).

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Reference

Bailey, J.E. and Pearson, S.W., 1983. Development of a tool for measuring and analyzing computer user satisfaction. *Management Science*, 29, 530–545.

Bargas-Avila, J.A., *et al.*, 2009. Intranet satisfaction questionnaire: development and validation of a questionnaire to measure user satisfaction with the Intranet. *Computers in Human Behavior*, 25, 1241–1250.

Bevan, N., 1991. What is usability. *In: Human aspects in computing: design and use of interactive systems with terminals*. Amsterdam: Elsevier Science, 651–655.

Blood, R., 2000. *Weblogs: a history and perspective* [online]. Rebecca's Pocket. Available from: http://www.rebeccablood.net/essays/weblog_history.html [Accessed 30 January 2010].

Chang, H.H. and Chen, S.W., 2009. Consumer perception of interface quality, security, and loyalty in electronic commerce. *Information & Management*, 46, 411–417.

Chen, F.-H., Hsu, T.-S., and Tzeng, G.-H., 2011. A balanced scorecard approach to establish a performance evaluation and relationship model for hot spring hotels based on a hybrid MCDM model combining DEMATEL and ANP. *International Journal of Hospitality Management*, 30 (4), 908–932.

Cox, J., and Dale, B.G., 2002. Key quality factors in Web site design and use: an examination. *International Journal of Quality & Reliability Management*, 19 (7), 862–888.

DeLone, W.H. and McLean, E.R., 1992. Information Systems Success: the quest for the dependent variable. *Information Systems Research*, 3 (1), 60–95.

DeLone, W.H. and McLean, E.R., 2003. The DeLone and McLean model of information systems success: a ten-year update. *Journal of Management Information Systems*, 19 (4), 9–30.

Du, H.S. and Wagner, C., 2006. Weblog success: exploring the role of technology. *International Journal of Human-Computer Studies*, 64 (9), 789–798.

Fang, X. and Salvendy, G., 2003. Customer-centered rules for design of e-commerce Web sites. *Communications of the ACM*, 46 (12), 332–336.

FIND. 2009. *Internet use survey* [online]. Available from: http://www.find.org.tw/find/home.aspx [Accessed 25 July 2009].

Guan, S.S. and Liu, Y.Y., 2007. Evaluation from the Perspective of Usability on Wretch Website's Blog Interface Design. *Journal of Science and Technology*, 16 (1), 61–74.

Guo, Y. and Salvendy, G., 2009. Factor structure of content preparation for e-business web sites: results of a survey of 428 industrial employees in the People's Republic of China. *Behaviour and Information Technology*, 28 (1), 73–86.

Hassenzahl, M., 2008. Aesthetics in interactive products: correlates and consequences of beauty. *In*: H.N. Schifferstein and P. Hekkert, eds. *Product experience*. San Diego, CA: Elsevier Science, 287–302.

Hsu, C.L. and Lin, J.C.C., 2008. Acceptance of blog usage: the roles of technology acceptance, social influence and knowledge sharing motivation. *Information & Management*, 45 (1), 65–74.

InsightXplorer, 2011. *InsightXplorer Report 2011*. Taipei: InsightXplorer Limited.

ISO/IEC 9126, 1991. *Software engineering – Product quality* [online]. Available from: http://www.iso.org/iso/catalogue_detail.htm?csnumber=16722.

Iwaarden, J., *et al*., 2004. Perceptions about the quality of web sites: a survey amongst students at Northeastern University and Erasus University. *Information & Management*, 41, 947–959.

James, R.B. and Susan, M.M., 2008. Blogging as a social tool: a psychosocial examination of the effects of blogging. *Cyberpsychology & Behavior*, 11 (6), 747–749.

Kincl, T. and Štrach, P., 2012. Measuring website quality: asymmetric effect of user satisfaction. *Behaviour & Information Technology*, 31 (7), 647–657.

Koufaris, M., 2002. Applying the technology acceptance model and Flow theory to online customer behavior. *Information Systems Research*, 13, 205–223.

Krueger, R.A. and Casey, M.A., 2000. *Focus group: A practical guide for applied research*. 3rd ed. Thousand Oaks, CA: Sage.

Lavie, T., and Tractinsky, N., 2004. Assessing dimensions of perceived visual Aesthetics of web sites. *International Journal of Human-Computer Studies*, 60 (3), 269–298.

Lee, Y. and Kenneth, A.K., 2006. Investigating the effect of website quality on e-business success: An analytic hierarchy process (AHP) approach. *Decision Support Systems*, 42, 1383–1401.

Light, A., 2006. Adding method to meaning: a technique for exploring peoples' experience with technology. *Behaviour & Information Technology*, 25, 175–187.

Lin, C.L. and Tzeng, G.H., 2009. A value-created system of science (technology) park by using DEMATEL. *Expert Systems with Applications*, 36 (6), 9683–9697.

Lindgaard, G., *et al*., 2006. Attention web designers: you have 50 milliseconds to make a good first impression! *Behaviour & Information Technology*, 25 (2), 115–126.

Liu, C. and Arnett, K.P., 2000. Exploring the factors associated with web site success in the context of electronic commerce. *Information & Management*, 38 (1), 23–33.

Liu, X., *et al*., 2008. An empirical study of online shopping customer satisfaction in China: a holistic perspective. *International Journal of Retail & Distribution Management*, 36 (11), 919–940.

Macías, J.A. and Paternò, F., 2008. Customization of Web applications through an intelligent environment exploiting logical interface descriptions. *Interacting with Computers*, 20 (1), 29–47.

Mahlke, S. and Lindgaard, G., 2007. Emotional experiences and quality perceptions of interactive products. *In*: J. Jacko, ed. *Human–computer interaction*. Part I, HCII 2007. Berlin: Springer.

Mullet, K. and Sano, D., 1995. *Designing Visual Interfaces*. CA: SunSoft Press.

Negash, S., Ryanb, T., and Igbaria, M., 2003. Quality and effectiveness in Web-based customer support systems. *Information & Management*, 40, 757–768.

Palmer, J.W., 2002. Website usability, design, and performance metrics. *Information Systems Research*, 13 (2), 151–167.

Parasuraman, A., Zeithaml, V.A., and Malhotra, A., 2005. E-S-QUAL: a multiple-item scale for assessing electronic service quality. *Journal of Service Research*, 7 (3), 213–233.

Preece, J., 2001. Communication and usability: twenty years of chatting online. *Behavior and Information Technology*, 20 (5), 347–356.

Rosen, D.E. and Purinton, E., 2004. Website design: viewing the web as a cognitive landscape. *Journal of Business Research*, 57, 787–794.

Schenkman, B.N., and Jönsson, F.U., 2000. Aesthetics and preferences of web pages. *Behaviour and Information Technology*, 19 (5), 367–377.

Schrepp, M., Held, T., and Laugwitz, B., 2006. The influence of hedonic quality on the attractiveness of user interfaces of business management software. *Interacting with Computers*, 18, 1055–1069.

Shieh, K.-K. and Ko, Y.-H., 2005. Effects of display characteristics and individual differences on preferences of VDT icon design. *Perceptual and Motor Skills*, 100 (2), 305–318.

Tao, Y.H., 2008. Information system professionals' knowledge and application gaps toward Web design guidelines. *Computers in Human Behavior*, 24 (3), 956–968.

Tractinsky, N., *et al*., 2006. Evaluating the consistency of immediate aesthetic perceptions of web pages. *International Journal of Human-Computer Studies*, 64 (11), 1071–1083.

Tzeng, G.H., Chiang, C.H., and Li, C.W., 2007. Evaluating intertwined effects in e-learning programs: a novel hybrid MCDM model based on factor analysis and DEMATEL. *Expert Systems with Applications*, 32 (4), 1028–1044.

Zhang, P., and Li, N., 2004. The importance of affective quality. *Communications of the ACM*, 48 (9), 105–108.

Zviran, M., Glezer, C., and Avni, I., 2006. User satisfaction from commercial web sites: the effect of design and use. *Information & Management*, 43, 157–178.

Appendix 1. DEMATEL algorithm

The DEMATEL structural frameworks and calculation procedures are described in detail below:

Step 1: Find the average matrix. Assume that the questionnaire has n factors and Q test subjects. A pairwise comparison between factors must be made to establish the measurement scale. The Likert scale is often utilized, which ranges from 0 to 4, representing 'no influence', 'little influence', 'medium influence', 'strong influence' and 'very strong influence', respectively. The influence matrix of the q^{th} respondent between total factors n is given as:

$$Z^q = \left[z_{ij}^q\right]_{n\times n} \tag{1}$$

a_i denotes the i^{th} factor. Furthermore, the total average influence value from all subjects when considering the score from the i^{th} factor (a_i) to the j^{th} factor (a_j) is given as:

$$z_{ij} = \frac{\sum_{q=1}^{Q} z_{ij}^q}{Q} \tag{2}$$

Hence, the resulting total average matrix is given as:

$$Z = \begin{array}{c} \\ a_1 \\ \vdots \\ a_i \\ \vdots \\ a_n \end{array} \begin{array}{c} \begin{array}{cccccc} a_1 & \cdots & a_j & \cdots & a_n \end{array} \\ \begin{bmatrix} z_{11} & \cdots & z_{1j} & \cdots & z_{1n} \\ \vdots & & \vdots & & \vdots \\ z_{i1} & \cdots & z_{ij} & \cdots & z_{in} \\ \vdots & & \vdots & & \vdots \\ z_{n1} & \cdots & z_{nj} & \cdots & z_{nn} \end{bmatrix} \end{array} \tag{3}$$

Step 2: Calculate the normalized initial direct-relation matrix. Equation (4) represents the maximum value between the sum of each row and the sum of each column. Equation (5) represents the normalized initial direct-relation matrix.

$$S = \text{Max}\left[\max_{1\le i\le n}\sum_{j=1}^{n} z_{ij}, \max_{1\le j\le n}\sum_{i=1}^{n} z_{ij}\right] \tag{4}$$

$$Z_{\text{nor}} = \begin{bmatrix} z_{11}/S & \cdots & z_{1j}/S & \cdots & z_{1n}/S \\ \vdots & & \vdots & & \vdots \\ z_{i1}/S & \cdots & z_{ij}/S & \cdots & z_{in}/S \\ \vdots & & \vdots & & \vdots \\ z_{n1}/S & \cdots & z_{nj}/S & \cdots & z_{nn}/S \end{bmatrix} \tag{5}$$

Step 3: Compute the total relation matrix. After step 2, the total relation matrix can be obtained by using simple numerical calculation. The total relation matrix, T, is given by:

$$\begin{aligned} T &= Z_{nor} + (Z_{nor})^2 + \ldots + (Z_{nor})^p = \sum_{p=1}^{\infty}(Z_{nor})^p \\ &= Z_{nor}\times(I - Z_{nor})^{-1} = [t_{ij}], i,j = 1,2,\ldots,n \end{aligned} \tag{6}$$

where p represents the power. Hence, when p tends to infinity, the matrix T will converge. Furthermore, I is the identity matrix. The total relation matrix also can be displayed in Figure A1. The totals for each row and each column in Equation (6) can be obtained as follows:

$$r_i = \sum_{j=1}^{n} t_{ij}, \quad i = 1,2,\ldots,n \tag{7}$$

$$c_j = \sum_{i=1}^{n} t_{ij}, \quad j = 1,2,\ldots,n \tag{8}$$

where r_i represents the direct influence value, which is given by the factor a_i; c_j represents the indirect influence value which given by the factor a_j. Similarly, if the l^{th} factor is used, the direct–indirect value is given as:

$$r_l = \sum_{j=1}^{n} t_{lj}, \quad l = 1,2,\ldots,n \tag{9}$$

$$c_l = \sum_{i=1}^{n} t_{il}, \quad l = 1,2,\ldots,n \tag{10}$$

From Figure A1, if the value of $r_l - c_l$ is positive and has greater value, it means that the factors a_l is of the positively

	a_1	...	a_j	...	a_n	
a_1	t_{11}	...	t_{1j}	...	t_{1n}	r_{i1}
...	...		...		...	...
a_n	t_{n1}	...	t_{nj}	...	t_{nn}	r_{in}
	c_{1j}	...	c_{nj}	...	c_{nn}	

Figure A1. The total relation matrix.

affected type and has more impact on other factors. If $r_i - c_i$ is negative, it means the i^{th} factor is affected by other factors.

Step 4: After step 3, the DEMATEL impact-relations map can be obtained.

Appendix 2. DEMATEL questionnaire

With the rise in Worldwide Internet, it can be seen from Web 1.0 and 2.0 that the Internet is not only an information transmission tool. Notably, it is an important media for instant interaction, and instant and global interaction. For example, there must be reasons why the YouTube and Wiki have attracted so many communities of viewers in such 'interactions'. The rise in Blog has not only allowed individuals to market their personal styles to the world, but more importantly, it can save a lot in traditional media cost. Therefore, we want to understand the important factors that make a blog successful. First, understanding these factors can help us move towards that direction. Second, it can help blog developers further understand current design mechanisms and develop better platforms. This study seeks to determine the relevance of blog standards under different dimensions, and the relevance of different dimensions, so that recommendations can be made to blog developers. Be assured that your responses to the questionnaire are for research purposes only and will not be used outside of this study. Finally, we appreciate your participation in this study. If you need the research results, we will be happy to provide professionals with the study outcome.

Thank you.

Part I. Basic personal data

1. Gender: ☐ Male ☐ Female
2. Age:_____
3. Background: ☐ Blog user ☐ Human-computer designer ☐ Other_____
4. Jobs title/Department: _____

Part II: Comparison of the impact of the four dimensions

Instructions for filling out the index: 0. No impact; 1. Low impact; 2. Medium impact; 3. High impact; 4. Very high impact

Example: The impact of A on B is low impact, so '1' is filled out at the corresponding position.

Factor	A	B	C	D
A		1		
B				
C				
D				

Part III: Comparison of the impact of the 8 factors (Please fill out the compared level of 8 factors in the following table)

Factor	Content	Communication	Ease of Management	Accessibility and Speed	Customization	Emotion	Clarity of Layout	Usability
Content								
Communication								
Ease of Management								
Accessibility and Speed								
Customization								
Emotion								
Clarity of Layout								
Usability								