

Examining the Cognitive Style Effects on the Acceptance of Online Community Weblog Systems

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Abstract

Weblog is increasingly important over time with researchers anxious to learn why millions of Internet users are so eager to post their own diary on the web everyday. This study collected views from 265 business school undergraduate students on their opinions concerning the use of weblog. In this questionnaire, cognitive style was used to analyze potential significant differences among various user types. Cognitive style measured respondents in a spectrum of two extremes that is, the intuitive, who had nonlinear thinking at one end; while the analytic, who used a rational type of information processing at the other end. Group analysis found that there were significant differences between the two cognitive groups: (1) performance expectancy was significantly higher; while (2) effort expectancy and social influence were significantly lower towards intention to use in the analytical group. Nevertheless, differences in facilitating conditions towards intention to use were found not significant.

1. Introduction

“The Weblog (blog) is a form of online diary or regularly updated journal which provides a personal viewpoint [8]”. A number of sites exist that provide weblog services that can then enable users to apply the *online weblog system* to prepare individual weblogs, for example, Xanga¹, which represents itself as a community of online diaries and journals. Users can easily *“start their own free journal, share thoughts with their friends and meet new friends.”* Of course, weblogs are global in the sense that they are

not confined to any geographical area. Moreover, there are many thousands of popular weblogs in existence, in addition to the example just given above.

An important research questions worth considering is: “Why are people motivated to reveal their thoughts and feelings in this way?”

“*Why do I Weblog?*” becomes an interesting question to ask users of these services. First of all, we should consider the context that Internet users were prone to publishing in one form or another. At the beginning of the digital era using Internet, there were already millions of users who had learned HTML in order to develop their own websites and publish their own OR personalized webpages. Web surfers also enjoy sharing of public information, cool links or specific computer techniques. Therefore, Internet users created webpages and now weblog provides another available platform to express opinions and share personal thoughts that can be easily accessed. (e.g., [3]). Secondly, it provides a means to minimize forwarded email from and to friends. If one does not want to forward a lot of email to a number of friends; or to receive tenths of forwarded email from friends, weblog provides a fast and easy way to leave messages, or links for more information, that all friends could access. Thirdly, “*Surfing the Internet was fun, learning new things and discovering new resources was cool, and sharing the wealth with the weblog readers was a joy,*” (e.g., [4]). Many users agree that weblogs provide an efficient way not only to save links and jot down notes, but also to share information that had been gathered after extensive browsing or surfing. . Fourthly, it creates a sense of community. Surfing the internet is often a solitary experience. Therefore users generally like to subscribe to all sorts of email lists, online communities and users groups. In this way, users feel a sense of community to which they contribute to on a

¹ Xanga could be accessed at <http://www.xanga.com>.

regular basis, for example, posting new threads to discussion forums. Weblog provides a place for individuals to contribute experiences, knowledge and information. Weblog readers correspond to suggest links and give details of shared experiences. This gives rise to an online community who share thoughts and individual experiences through the medium of discussion. Barriers are broken down with strangers becoming friends.

2. Motivation and Research Questions

If weblog is so effective, does it mean that everyone wants to create his or her own weblog using a weblog system? What system characteristics would mediate the use of weblog? Would there be any differences between the different user types in the use of weblog? While weblog systems are designed for mass use, there would still be windows of opportunity for improvement in the design of systems for different users, as we have a better understanding as to the motivational beliefs toward the use of weblog. Therefore, the guiding research questions for this study would be:

- (1) What are the motivational variables for individuals to use weblog systems?
- (2) Would significant differences exist between different user types?
- (3) How, if any, are the levels of differences in motivational variables between different user types affect the use of weblog systems?

The paper is organized as follows. The next section matches motivational variables from prior literature and an analysis of the weblog phenomenon. Hypotheses are developed to explain effects of the variables toward the intention to use of weblog systems. Hypotheses are also developed to test the interaction effects between the motivational variables and the different users' types. Then, research methodology is explained with details in subjects, methods, and ways of data analysis. Results of data analysis and model testing are reported. Implications, limitations and conclusions are discussed at the end.

3. Hypotheses Development

Whether Internet users consider using a weblog system depends on whether the system can help satisfy their needs. Their prime motivation appears to be a need to publish and share personal experiences. Therefore, they would consider using a system if it

could help, especially in a more effective and efficient way. Considering a construct helps measure the usability and usefulness of better performance, Venkatesh, Morris, Davis, and Davis ([10]) suggests *performance expectancy*, which is defined as the degree to which an individual believes that using the system would help him or her to attain gains in job performance. Here, though job refers to the task in blogging. Therefore, we propose,

H1a: Performance expectancy would influence behavioral intention to the use of weblog system. That is, the higher the level of performance expectancy of an individual user toward a weblog system, the more likely the individual intends to use the system.

A number of sites provide free weblog services. These free services provide weblog system designed to enable individuals to publish their own weblogs quickly and easily. It is expected this easiness of using weblog system would affect users to use the system. To measure such a variable, Venkatesh et al. ([10]) suggests a construct *effort expectancy*, which is defined as the degree of ease associated with the use of the system. Therefore,

H2a: Effort expectancy would influence behavioral intention to the use of weblog system. That is, the lower the level of effort expectancy of an individual user toward a weblog system, the more likely the individual intends to use the system.

On the other hand, a sense of community motivates Internet users to consider weblog. The original purpose is for Internet users to share experiences and information with friends and other users surfing the web. If most of your acquaintances are defined as bloggers, then the need to identify and join is strong. This becomes a form of communication within the group and the tendency would be to follow the group norm. . Of course, it would be necessary to have some early adopters who start, before remainders who follow. To capture such a phenomenon, Venkatesh et al. ([10]) suggests a construct *social influence*, which is defined as the degree to which an individual perceives that important others believes he or she should use the new system. Hence,

H3a: Social influence is a direct determinant of behavioral intention to use a weblog system. That is, if an individual perceives that someone important to him or her thought he should use the system, he or she would be more likely to use the system.

On the other hand, not all individual Internet users are heavy users. They would be unaware of current technology presently available that would help them

to complete their task; they would have no idea whether they themselves have the necessary skill, competence or resources to start with. They don't know whether the weblog system would be compatible to the way they work, either. In the computer world, the vast range of available software applications is constantly evolving. All claim to be useful and easy to use. However, we may have the experience that a minute of job would cost you hours of interaction – not clear. Problems in application exist because of hardware, software and support (both technically and psychologically). Sometimes, it is not the actual functionality of a software application but the wrong perception of need by the individual user. Venkatesh et al. ([10]) suggests a construct of *facilitating conditions* to capture this phenomenon. Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exist to support use of the system. It is the way how an individual perceives weblog services and the developers provide for them. Therefore, we propose,

H4a: Facilitating conditions influence intention to use a weblog system. That is, if an individual perceives that a weblog provides all infrastructure and support needed for their use of the weblog system, he or she would be more likely to use the system.

On the other hand, given the number of users of this digital world, there are bound to be discrepancies. Some users are more prone to browse the Internet freely while some may be more cautious to search through their own key words for what they want. It is interesting to test empirically if there are any differences among difference users and how it is different. Allinson and Hayes ([2]) suggest a generic intuition-analysis dimension of cognitive style. They suggest that intuition would be a basis for decision making and problem solving in organizations. Hayes and Allinson ([6]) cite evidence of the value of cognitive style in relation to personnel selection, careers guidance, task design, team composition, conflict management and training and development. Others have demonstrated the appropriateness of certain styles to cope with particular tasks ([7]). In the work context, an analytic person would tend to be compliant, prefer a structured approach to decision making, apply systematic methods of investigation and be especially comfortable when handling problems requiring a step by step solution. An intuitive individual, on the other hand, would tend to be relatively nonconformist, prefer a rapid, open-ended approach to decision making, rely on random methods of exploration and work best on problems favoring a holistic approach ([1]).

Bloggers can be defined as having the following characteristics, that is, a need to publish and a fundamental need to share. An individual blogger would most likely have a weblog system to help publish his or her journal in an effective and efficient way. However, an analytic individual would be more critical and want to see if the weblog system could really help. Therefore, we would expect that the influence of *performance expectancy* would be moderated by cognitive style. Hence,

H1b: Cognitive style moderates performance expectancy influence on behavioral intention, with stronger expected effects for analytic individuals.

On the other hand, once an analytic individual critically finds better performance through using a weblog system, they are likely to be more determined to continue to use that system. They probably pay less attention to the effort they really need to invest in the future. Even though the process might be complicated and require more effort, they would be able to follow the step by step process to complete the blogging task at the end. Therefore,

H2b: The influence of effort expectancy on behavioral intention would be moderated by cognitive style, such that the effect would be stronger for intuitive individuals.

An individual becomes a blogger partly due to a shared sense of community. He or she might want to share their knowledge and experience with a group of people, whether in the same community or with strangers. Intuitive individuals tend to be relatively nonconformist, preferring rapid, open-end approaches and random exploration. Therefore, an intuitive individual would be more affected by his/her peers, instead of insisting on his/her own stands. Hence,

H3b: Influence of social influence on behavioral intention is moderated by cognitive style, such that the effect is stronger for intuitive individuals.

On the other hand, by the fact that an intuitive individual would prefer more open-ended approach and the exploration process, we would expect that,

H4b: Influence of facilitating conditions on behavioral intention is moderated by cognitive style, such that the effect is weaker for intuitive individuals.

4. Methodology

4.1 Subjects

To test the hypotheses, a survey instrument was introduced to year one undergraduate students in the business school of a local university in Hong Kong. The students were asked to complete the questionnaire after an introductory information system laboratory session. The students were told that answering the questionnaire was on a voluntary basis; however, this produced a satisfactory response (265 completed of 280 questionnaires issued). Background of the respondents is listed below (see Table 1).

Table 1. Background of Respondents

Gender	Male: 89 (33.5%); Female: 176 (66.5%)
Age	Below 18: 5 (1.9%); 18-22: 260 (98.1%)
Weblog experience	Never: 118 (44.5%); Less than 1 year: 61(23%); 1-2 years: 62 (23.4%); 3-4 years: 19 (7.2%); More than 4 years: 5 (1.9%)
Logged in frequency	Seldom: 133 (50.1%); At least once a month: 14 (5.3%); At least once a week: 46 (17.4%); Once a day: 72 (27.2%)
Familiar with Weblog	Not at all: 99 (37.4%); A little bit: 96 (36.2%); Familiar: 52 (19.6%); Very familiar: 18 (6.8%)
Access to Internet after class	Yes: 259 (97.7%); No: 6 (2.3%)
Internet usage	Seldom: 3 (1.1%); At least once a month: 2 (0.8%); At least once a week: 11 (4.2%); At least once a day: 249 (93.9%)
Computer knowledge	Very little: 49 (18.5%); Fair: 172 (64.9%); Good: 42 (15.8%); Expert: 2 (0.8%)

4.2 Methods

The survey instrument was divided into three parts. Part A collected demographic data and usage pattern of the respondents. Part B consisted of 19 statements asking their opinion toward weblog systems in a seven point Likert's scale where 1 represented strongly disagree and 7 represented strongly agree. The 19 statements included four items for each of the four constructs, including *performance expectancy*, *effort expectancy*, *social influence* and *facilitating conditions*; and three items for *behavioral intention* (adapted from [10]).

4.3 Method of data analysis – Cognitive Style

Part C used a self-report format for cognitive style index², consisting of 38 items asking respondents to identify the way they think, for example, “Formal plans are more of a hindrance than a help in my work,” “I am most effective when my work involves a clear sequence of tasks to be performed,” “My philosophy is that it is better to be safe than risk being sorry,” “I am inclined to scan through reports rather than read them in detail.”. A trichotomous true-uncertain-false response mode was used throughout. Twenty-one of the items were worded in such a way that a response of ‘true’ indicated an analysis orientation. Scoring of the remaining 17 was reversed, so that the nearer the total cognitive style index scores to the theoretical maximum of 76, the more analytical the respondent, and the nearer the total score to the theoretical minimum of zero, the more intuitive the respondent. Items were placed in random order. While distinguishing high (analytic) and low (intuitive) scores by splitting groups according to their cognitive style index median would have been arbitrary, it was decided that it would be more valid to adopt as the criterion of split the median score (median=43) previously obtained from a relatively large sample ([1]). Therefore, cognitive style index scores were designated low (intuitive) if less than 43 and analytic if greater than or equal to 43. Out of a total of 265 respondents, results indicated that 121 respondents were designated as analytic while 144 as intuitive.

5. Analysis and results

5.1 Reliability and validity

Means and standard deviations for the 19-items are reported in Table 2. All construct items had means ranging from 4.12 to 4.78, while standard deviations ranging from 0.68 to 1.29. Internal construct consistency was evidenced by Cronbach's alpha coefficients ranging from 0.72 to 0.86, where the literature suggests a threshold of 0.7 or above ([8]).

Construct validity via discriminant and convergent validity was confirmed using factor analysis, with factor loadings shown for each construct, ranging from 0.20 to 0.96. Significant factor loadings or each item towards the corresponding construct showed the construct validity of the measurement instrument.

² As explicitly stated by Allison & Hayes ([2]) in their article, the Cognitive Style Index could not be reproduced in full here. Anyone wishing to use the instrument for research purposes should contact the authors directly.

Table 2. Descriptive Statistics, Reliability and Confirmatory Factor Analysis

Constructs	Means	StdDev	Alpha	Factor Loadings
Performance Expectancy				
PE1	4.46	1.00	0.86	0.54**
PE2	4.58	1.10		0.71***
PE3	4.12	1.10		0.75**
PE4	4.15	1.11		0.69**
Effort Expectancy				
EE1	4.57	1.10	0.80	0.73***
EE2	4.62	1.03		0.70***
EE3	4.78	1.12		0.81***
EE4	4.59	1.13		0.63***
Social Influence				
SI1	4.39	1.02	0.78	0.43**
SI2	4.31	1.23		0.77***
SI3	4.24	1.13		0.90**
SI4	4.23	1.15		0.59***
Facilitating Conditions				
FC1	4.51	1.01	0.72	0.64**
FC2	4.44	1.06		0.85***
FC3	4.21	0.68		0.23*
FC4	4.23	1.08		0.59*
Behavioral Intentions				
BI1	4.56	1.29	0.78	0.83*
BI2	4.48	1.19		0.92*
BI3	4.46	1.23		0.96**

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

5.2 Model testing results

We tested the model with structural equation modeling conducted by LISREL 8.5. From Table 2, it showed that the model fit was established. The χ^2 / degree of freedom ratio indicated an acceptable level of fit as it satisfied the requirement of being less than 3.0 ([5]). The Goodness-of-fit index, GFI, also indicated an acceptable fit with GFI was equal to 0.93, higher than the required level of 0.90 ([5]). The P-value for test of close fit and also root-mean-square error of approximation (RMSEA) indicated acceptable fit with those recommended levels.

Table 3. Model Testing Results

Fit Indices	Suggested [#]	Results
χ^2 (Chi-square)		252.31
χ^2 /degree of freedom	<3.0	0.873
GFI	>0.90	0.93
P-value for test of close fit	>0.05	0.29
(RMSEA<0.05)		
RMSEA	<0.08	0.00

[#] ([5])

5.2 Group Analysis of Cognitive Style Moderating Effects

Group analysis in LISREL 8.5 was used to analyze the difference, with sample split between subjects of analytical characteristics and subjects of intuitive characteristics. LISREL allowed us to test whether two group were equal by examining whether different matrices in the model (which represent sets of path coefficients) were “invariant”. The structural models with and without the invariance of path coefficients were compared. Regarding the path coefficients of performance expectancy, effort expectancy and social influence, the model rejected the hypotheses of invariant factor patterns at the significance level of 5%. Regarding the path coefficient of facilitating conditions, the model didn’t reject the hypotheses of invariant factor patterns at the significance level of 5%.

Moreover, both group models gave good explanation power to the final variance of the dependent variable, behavioral intention (analytic: 67%; intuitive: 61%).

Table 4. Group Model Testing Results

Constructs	Path Coefficients		Hypotheses
	Analytic	Intuitive	
PE→BI	0.53***	0.31***	H1, H1a <i>supported</i>
EE→BI	0.37*	0.54*	H2, H2a <i>supported</i>
SI→BI	0.21***	0.43***	H3, H3a <i>supported</i>
FC→BI	0.69***	0.70***	H4 <i>supported</i> H4a <i>not-supported</i>
R ²	0.67	0.61	

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

In viewing the data, it was found that nearly half of the sample (44.5%) were non bloggers. Bloggers and non bloggers may view the system differently and may have an interaction effect on the model. Moreover, although a majority of the sample had a fair to good computer knowledge (a subtotal of 80.7%); the differences in computer knowledge may also affect their views on using a technology. Further analysis found that computer knowledge and weblog experience did have significant interaction effects on the constructs though not strong (sig. at $p < 0.1$ level). It was found that (1) performance expectancy had a stronger effect for individuals with higher computer knowledge and longer weblog experiences; (2) effort expectancy had a stronger effect for individuals with lower computer knowledge and short or none weblog experiences; (3) social influence had a stronger effect for individuals with lower computer knowledge and short or none weblog experiences; and (4) there were no significant differences for facilitating conditions.

6. Discussion

The model testing results found that all the direct effect hypotheses were supported. Performance expectancy was found to significantly influence behavioral intention (H1a). The moderating effect was also found significant where performance expectancy toward behavioral intention was stronger among analytic individuals (H1b). This could be explained by the fact that analytic individuals were more evaluative and were more conscious about the ability of the weblog system to perform well in helping them in a more effective and efficient way to publish their journals and to share their knowledge and experience over the online community. A simple checking of the user type through the cognitive style index instrument, system developers would be able to provide a better interface and system design to cater for the needs of these individuals. To take a practical example, weblog services could provide not just the publishing function, but also ways to build the online community. The tighter the relationships among the bloggers, the more likely they contributed in the community activities. Weblog community worked only if people wrote and shared.

Effort expectancy was found to significantly influence behavioral intention (H2a). Therefore, users would probably consider effort as one of the variables when accepting weblog systems. On the other hand, effort expectancy influenced behavioral intention was found moderated by cognitive style, where the effect was stronger among intuitive individuals (H2b). While analytic individuals were more cautious about the performance and outcomes, it would expect them to be more determined to use weblog systems, even if they were required to pay more effort. However, just the opposite, intuitive individuals would be more concerned about the effort they needed to pay to use the weblog systems. To personalize the weblog system to suit these individual differences would make a good (or satisfactory) user experience for all. For example, after a simple checking of the cognitive style type of new users, the system might provide two interfaces templates for the two different users. A simple and easy to start with system interface, without even any preference setting options for the intuitive would be a good match. Traditionally, system designers had little information about the types so attempted to satisfy everybody. They designed a simple interface but provided additional options for expert users to manipulate the settings. It seemed to be an all-round safe option. However, we could not restrict users from clicking those "additional options". Some users would be very confused to find all that options and choices. They would probably create a very bad user experience that affected all their

perceptions over the system and the process in using the system.

Social influence was found to significantly influence behavioral intention (H3a). Most people, who experience the need to write personal thoughts and experiences, would not feel the need to publish on the web. It was the fundamental social need that triggered Internet users to publish their diaries on weblog. It was the sense of community to share with friends and make new friends, for example, "*I blog you*" - to add your weblog link to mine in order to keep track of all your weblog updates. If an Internet user perceived that his or her most important others thought he or she should use weblog, most probably that individual would consider using weblog. It was the sense of community that individuals wanted to follow the group norm. On the other hand, social influence affected behavioral intention was found moderated by cognitive style, such that it was stronger among intuitive individuals (H3b). Although weblog started with small technical expert groups, users could use weblog alone without joining any community activities. It was found that the effect of social influence on behavioral intention was found significantly lower among analytic individuals. While this group of individuals appreciated the use of weblog, they might perceive group norm in a different way. A simple practical suggestion would be that adopting a push strategy, continuously sending frequent information updates about the community would find more appropriate among the intuitive individuals.

Facilitating conditions were found significantly influenced behavioral intention (H4a). In fact, it was the strongest effect among all the variables. However, there was no significant difference among the groups and the hypothesis that cognitive style would be a moderator toward facilitating conditions was not supported (H4b). Therefore, both types viewed facilitating conditions, such as, knowledge, resources, infrastructures and compatibility of systems toward work practice were important to them to consider using weblog. This had many implications to system designers to cater for these needs. For example, how could a weblog design be more compatible to work practices? Organizations were starting to require employees to have weblog to keep journal updates for collaborative work purposes.

7. Limitations

Using undergraduate students as study subjects might have limitations to generalize the results to other settings. However, weblog was truly a voluntary behavior among young adults. They were not required by the organization to do so. However, they were also

among the major users of the weblog services. Demographic data showed that undergraduate students were heavy users of Internet, more than half of the subjects had weblog experience, about thirty percent of the subjects used weblog services at least once a day. Therefore, this target groups served as a good representation to the users group of the weblog system. However, to view the same data on the other side of the same coin, there were 44 percent never wrote Blogs, 50 percent seldom read blogs, 73 percent are not familiar with weblog systems. It would also be a potential threat to the conclusion made. On the other hand, it was found that, although only at a weak significance level of $p < 0.1$, control variables of weblog experience and computer knowledge did have significant interaction effects on the constructs. This confounding effect should be considered together in the interpretation of the results. Moreover, this one-shot survey study provided us with only limited information about the process of blogging. It would be better to examine the phenomenon at the scene, that is, the weblog platform in order to understand more about why users used weblog and how they used weblog.

8. Conclusions

This study aimed at finding the motivational variables for individuals to use weblog systems. A survey-based questionnaire was introduced to a local university at Hong Kong. Data analysis found that all the variables in the model affected significantly the behavioral intention to use weblog systems, including namely performance expectancy, effort expectancy, social influence, and facilitating conditions. With the cognitive style index instrument, this study successfully identified the two important cognitive style types of individuals, namely analytic and intuitive. It was found that, through group analysis of model testing, significant differences were found among the variables such that cognitive style was a significant moderator affecting the level of influence toward the final behavioral intention to use weblog systems.

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