Research on User Value of ScienceNet Blogs (Postprint)

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Abstract

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Full Text

Preamble

A Study on User Value of ScienceNet Blog

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Abstract

[Purpose/Significance] The development of academic blogs is closely tied to user engagement. This study explores which user values guide the use of academic blogs and analyzes the relationships among these values. **[Method/Process]** Drawing upon Woodruff's customer value hierarchical model, we conducted semi-structured interviews with 10 ScienceNet blog users using the laddering method and coded the interview content. **[Result/Conclusion]** We created a comprehensive correlation matrix of

ScienceNet blog user values, constructed a hierarchical model of user value, and identified four value chains: “blog writing–sense of accomplishment,” “blog reading–academic exchange,” “recommendation–dissemination effect,” and “friend linking–academic exchange.”

Keywords: user value; ScienceNet; academic blog; hierarchical structure; value chain
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1 Introduction

With the deepening development of internet technology and Web 2.0, information communication patterns are undergoing transformation. In the research community, the rise of academic social networking sites has provided scholars with more convenient channels for exchange. Academic blogs represent a typical example—primarily authored by researchers and focused on discussing academic issues. They help sustain continuous communication, greatly expand its spatial scope, and enhance its timeliness.

Currently, academic blogs are developing rapidly and are profoundly influenced by users. On one hand, an increasing number of researchers leverage online platforms for academic exchange and viewpoint dissemination. On the other hand, the general public, facing an increasingly high-entropy information environment, requires access to more and more specialized scientific content for knowledge construction. Evidently, active user participation has become a crucial force driving the development of academic blogs. Therefore, studying academic blog users helps uncover their academic needs and preferences, knowledge selection criteria, and motivations for online academic behavior.

This paper focuses on the dimension of user value, aiming to identify the constituent elements of ScienceNet blog user value and the relationships among different elements. In the information field, user value refers to the value that users provide to information product and service providers, or the value that information products or services provide to users. Value research is the process of concretizing the abstract concept of “value,” analyzing user behaviors, attitudes, and other surface-level manifestations to identify underlying reasons and summarize what value entails. ScienceNet was selected as the research object primarily because it stands out among numerous academic blog platforms. As China’s largest academic blog community, ScienceNet has gathered a large number of researchers and serves as one of the most important online exchange platforms for Chinese scholars.

Current research on user value in the academic blog domain primarily focuses on the relationship between perceived value and satisfaction. In fact, marketing and information systems research has long demonstrated that user value profoundly

influences user satisfaction. In the academic blog context, Chen Minghong et al. found that perceived usefulness, perceived ease of use, and the fit between scientific tasks and academic blogs positively affect satisfaction. Wang Weijun and Gan Chunmei discovered that experiential value exerts varying degrees of positive influence on user satisfaction. These studies effectively illustrate the important role of user value. However, research on what user value actually means in academic blogs—that is, how to measure these values—is virtually nonexistent.

Therefore, this paper introduces theories related to measuring user value into academic blog research, using empirical methods to explore user value orientations in academic blogs and how these orientations influence their behavior. We hope to provide recommendations for academic blog service providers on how to create and enhance value, thereby better serving users.

2 Research Foundation and Methods

User value research originated in marketing. In the mid-20th century, customer value theory began to emerge, and by the 1980s, research on information user value had also appeared in library and information science. Scholars have developed numerous methods to define and measure customer value, such as the SERVQUAL model, Philip Kotler's customer delivered value model, and Gale's customer value map, which divide customer value into different dimensions for study.

This paper primarily draws upon Woodruff's customer value hierarchical model theory. Unlike the aforementioned models, Woodruff's model provides a measurement and analysis framework that includes both user surveys and in-depth analysis of customer value. The measurement method employed in Woodruff's model is the laddering method.

Our research approach consists of two parts: (1) using the laddering method to conduct user interviews, data collection, and analysis; and (2) combining Woodruff's hierarchical model to construct a ScienceNet blog user value model. We aim to measure the constituent elements of ScienceNet blog user value and their interrelationships to deeply explore user value on the platform.

This chapter primarily elaborates on Woodruff's customer value hierarchical theory, the specific operational methods of the laddering method, and their application in this study.

2.1 Woodruff's Customer Value Hierarchical Theory

Woodruff proposed the hierarchical value map model, defining customer value as "customers' perceived preferences for and evaluations of product attributes, product performance, and consequences arising from use that facilitate (or block) achieving customers' goals and purposes in use situations." This model, built upon means-end theory, divides the relationship between products and

customer value into three levels: the attribute level, the consequence level, and the value level. Means-end theory, established by marketing scholar J. Gutman in 1982, posits that customers purchase products and services to achieve certain values.

Our model design is based on this hierarchical model, dividing academic blog user value into three levels from low to high: first, the functional value generated when users employ academic blogs; second, the consequence value these functions bring to users; and third, the highest-level value.

2.2 Laddering Method

Based on means-end theory, this study employs the laddering method for empirical analysis. The laddering method is a combined qualitative and quantitative data collection approach that "obtains information through one-on-one interviews to understand the connections between product attribute levels and user value levels." The laddering method consists of two parts: semi-structured in-depth interviews and coding and analysis of interview content.

In semi-structured interviews, we communicate with interviewees using open-ended questions, unfolding layer by layer. Questions typically begin with a specific functional attribute of the product, using a series of guiding questions to identify relationships between attributes and higher-level consequences and ultimate purposes. For example: "Why do you browse articles on ScienceNet?" "What does that mean to you?" "What does it mean to you if ScienceNet has (or doesn't have) a bookmarking function?" The core of this interview is to complete the entire ladder from attributes to consequences to ultimate purposes, thereby discovering key elements of user value and their relationships across the attribute, consequence, and value levels, ultimately establishing a complete "ladder."

3 Data Collection and Analysis

We employed the laddering method for data collection and analysis, encoding and analyzing the content information.

3.1 Data Collection

The interview process began with ScienceNet blog functions, guiding, probing, and encouraging users to discuss important consequences of using ScienceNet blog, including both positive and negative consequences, to uncover ultimate value-level purposes. We initially compiled ScienceNet blog functions and, through horizontal comparison with other platforms, summarized the platform's important functions as follows: blog posting, blog dissemination, point system, friend linking, groups, personal information, and others. These functions serve as basic options for the laddering method, meaning interviews start with users' usage of these functional points.

We interviewed 10 ScienceNet blog users, primarily comprising university teachers and graduate students—two representative groups—with one being a journal editor who is also a doctoral student. All interviewees held doctoral degrees, and most had used ScienceNet blog for over two years, making them experienced users and a representative sample. Sample statistics are shown in Table 1 .

Table 1 Basic Information of Interviewees

Gender	Age	Education	Title	Years of Use
Male/Female	35-49	PhD	Professor/Lecturer	1-2 years / 2+ years

The interview is the foundation and core of this study. Starting from ScienceNet blog's functional points and combining them with user usage scenarios, we conducted in-depth discussions using a semi-structured approach. The interviews were highly open-ended. We extracted each interviewee's responses from recordings and transformed the textual interview content into more concise phrases and expressions. Different interviewees expressed the same content differently, requiring appropriate summarization. We then calculated word frequencies and assigned different weights. These abstracted phrases constitute the basic data for this study.

3.2 Data Analysis

This paper employs quantitative analysis methods, using coding techniques and laddering analysis techniques to categorize data and convert it into frequency data, measuring key elements of ScienceNet blog user value. We conducted content coding analysis, establishing summary content codes, a summary implication matrix, and a hypothetical hierarchical value map.

3.2.1 Content Coding First, we established a set of coding summaries based on interview content. These codes reflect all ladder content mentioned in the interviews—that is, the basic data mentioned in the previous section. We summarized ScienceNet blog user value and derived 35 codes. We provided explanatory notes for unclear concepts and assigned each code a numerical value related to the order of appearance in the interview content. For instance, codes 1-9 represent the earliest discussed content, while other values emerged as interviews progressed. See Table 2 .

These codes exist at three different levels: attribute level, consequence level, and purpose level. ScienceNet blog has numerous functions; this paper selected the 24 most commonly used attribute-level functions. Except for codes 1-9, which are existing ScienceNet blog functions, others are derivatives. Based on interviewees' usage patterns, we identified seven consequence-level values, ultimately aggregating them into four purpose-level values. Additionally, functions such as the point system, groups, and personal information were rarely or never used by users and are therefore not discussed in this paper.

3.2.2 Creating Comprehensive Association Matrix Based on content coding, we constructed a scoring matrix where each ladder obtained from interviews could be converted into a coding chain. For example, the interview ladder "blog posting–relatively free posting–sharing achievements–dissemination effect–influence–sense of accomplishment" could be converted into the coding chain "1-10-11-12-13-33." Aggregating all codes into a matrix diagram formed the association matrix. The matrix illustrates all relationships in the user value scoring matrix. See Table 3 .

As shown in Table 3, the ScienceNet blog user value matrix includes the 35 codes on both axes. Each cell represents the number of times a pair of codes co-occurs in the user value scoring matrix. Numbers in each cell indicate how frequently users associated or placed a pair of codes adjacent to each other. Notably, the digit left of the decimal represents direct associations or adjacency between two codes, while the digit right of the decimal represents indirect associations. Indirect association means two codes appear in the same ladder but are not directly connected; blank cells indicate no association between two codes.

The comprehensive association matrix summarizes the most frequently discussed associations in the interviews and serves as the data foundation for constructing the hierarchical structure diagram.

3.2.3 Constructing Hierarchical Structure Diagram The above matrix diagram contains both direct and indirect relationships among value codes. These relationships mainly include five types, as shown in Table 4 :

Table 4 Five Types of Association Relationships

Code	Relationship Description
A-D	Elements are adjacent with numerous direct relationships
N-D	Elements are nonadjacent but have numerous direct relationships
A-I	Elements are adjacent with numerous indirect relationships but few direct relationships
N-I	Elements are nonadjacent with numerous indirect relationships but few (non-zero) direct relationships
N-O	Elements are nonadjacent with few (or zero) indirect relationships

These five association relationships clearly present the matrix construction process. Taking blog posting as an example: "blog posting–relatively free posting" (1,10) has a score of 12.00, with 10 direct connections and 0 indirect connections, forming a value chain (1-10). "Relatively free posting–sharing achievements" has a score of 11.00, extending the value chain to "sharing achievements" (1-10-11). This chain can be further extended to "dissemination effect" (1-10-11-12), then to "influence" (1-10-11-12-13), and finally to "sense of accomplishment" (1-10-11-12-13-36). Additionally, this value chain involves "altruism" (16) and "academic exchange" (15). The resulting value chain is shown in Figure 1 [Figure 1: see original paper].

Following the five association relationships, we integrated the hierarchical structure from the matrix diagram, incorporating the most frequent associations and eliminating less frequent ones to obtain the final ScienceNet blog user value hierarchical structure diagram, shown in Figure 2 [Figure 2: see original paper].

Figure 2 clearly reveals hierarchical relationships and cross-relationships among ScienceNet blog user values. The bottom layer consists of nine ScienceNet functions, above which are user feedback information from using each function, followed by the consequence layer, with the highest level being purpose values.

3.3 Value Chain Analysis

In the value hierarchical structure diagram (Figure 2), bottom-up paths often represent perceivable potential value chains. The larger the individual values and the greater the sum, the more frequently users mentioned the value, indicating higher importance. This paper extracts four value chain paths with relatively large value sums for analysis, as shown in Tables 5 through 8 .

Table 5 shows the "blog posting–sense of accomplishment" relationship, featuring the longest value chain with the most codes and the highest sum of 39.53. This indicates that authors' motivation for posting on ScienceNet largely stems from achieving a sense of accomplishment derived from writing and receiving recognition from others, which aligns with Maslow's hierarchy of needs. Once physiological and safety needs are met, authors pursue higher-level esteem and self-actualization needs.

Table 5 "Blog Posting–Sense of Accomplishment" Value Chain
Blog Posting (1) → Relatively Free Posting (10) → Sharing Achievements (11) → Dissemination Effect (12) → Influence (13) → Sense of Accomplishment (33) | Sum: 39.53

Table 6 "Blog Reading–Academic Exchange" Value Chain
Blog Reading (2) → Interesting Topics (23) → Academic Judgment (22) → Academic Exchange (15) | Sum: 12.09

Table 7 "Recommendation–Dissemination Effect" Value Chain
Recommendation (4) → Quality Articles (26) → Support (24) → Dissemination Effect (12) | Sum: 21.15

Table 8 "Friend Linking–Academic Exchange" Value Chain
Friend Linking (8) → Understanding Others (31) → Interesting Topics (23) → Academic Exchange (15) | Sum: 14.05

Table 6 demonstrates the "blog reading–academic exchange" relationship, with a relatively short value chain and fewer codes, totaling 12.09. While general internet users may read blogs for knowledge acquisition, our findings reveal that academic blog readers aim for exchange. This is primarily because academic blog users possess high knowledge levels and professional competence, making them not only information receivers but also information creators. Users ac-

tively participate in discussions on topics of interest, jointly promoting academic exchange.

Table 7 illustrates the "recommendation–dissemination effect" relationship, with a sum of 21.15. Although dissemination effect is not the highest-level value, most users only responded up to "dissemination effect," so no further extension was made. The strong correlation between "recommendation" and "dissemination effect" indicates that, similar to offline academic activities, opinion leaders also serve as dissemination pivots in online informal exchange environments.

Table 8 presents the "friend linking–academic exchange" relationship, with a sum of 14.05. Like "blog reading," it points to "academic exchange." The strong correlation between "friend linking" and "academic exchange" demonstrates that interpersonal relationships play a crucial role in informal online exchange activities. Online interpersonal communication has become an indispensable pathway for academic dissemination.

4 Discussion

This section discusses user value hierarchical relationships and key value chains.

4.1 User Value Hierarchical Relationships

Through in-depth user interviews, we summarized 35 content codes, concretely representing user behaviors and underlying value orientations through data, and constructed a value hierarchical model. The model reveals a bottom-up user value hierarchy in ScienceNet blog, where the attribute layer contains numerous functions with complex relationships to the consequence layer. At the highest value level, four key elements emerge: sense of accomplishment, academic exchange, sense of belonging, and scientific mission. Dissemination effect, academic judgment, and academic exchange serve as critical nodes in the user value hierarchy. This conclusion demonstrates that ScienceNet blog usage is guided by multiple values with close interconnections and cross-associations across different dimensions.

These findings provide blog operators and managers with comprehensive, multidimensional insights, offering theoretical guidance. For instance, when optimizing blog functions, managers should balance various value dimensions, conduct comprehensive evaluations, and seek optimal solutions to enhance user value.

4.2 Key Value Chains

Based on the matrix diagram, we identified four primary user value chains: "blog writing–sense of accomplishment," "blog reading–academic exchange," "recommendation–dissemination effect," and "friend linking–academic exchange." These value chains illustrate which values primarily guide users when using ScienceNet blog and explain the pathways through which these chains emerge. This conclusion supplements the user value hierarchy with

more specific, detailed analysis, helping managers distinguish priorities within complex relationships.

These findings suggest strategies for managers to maintain and expand academic blog influence:

(1) **Enhance writing-related sense of accomplishment.** Accomplishment stems from two sources: self-perception and external stimulation. Managers should focus on external stimulation by categorizing academic blogs by discipline, strengthening screening of high-quality blogs, and promoting excellent posts to the platform homepage, official Weibo, and WeChat platforms to expand dissemination. Additionally, managers can reward outstanding bloggers, such as by compiling excellent blog posts into books or offering commemorative gifts.

(2) **Invite and encourage more academics to participate in blog creation, helping users find interesting posts.** Content is the source; the richness of blog posts forms the foundation for user reading. Blogs inherently possess strong freedom attributes. Creating a free, open environment where bloggers enjoy high freedom of speech produces more diverse and richer content. Furthermore, helping users find articles of interest is crucial. Currently, ScienceNet recommends posts through discipline classification, editorial curation, and popularity metrics. However, users have different knowledge backgrounds and interest preferences. The platform needs to enhance information retrieval efficiency and effectiveness to help users better discover quality information. Additionally, since scientific work is highly specialized, the platform should consider how to improve symmetry of research information and promote information sharing.

(3) **Optimize recommendation mechanisms to enhance dissemination effects.** Recommendation refers to users manually "liking" blog posts. Based on user weight and recommendation frequency, excellent posts are promoted to the rankings. Recommendation also serves as a form of light interaction, enhancing user participation and playing an important role in the blog community. Optimizing recommendation mechanisms involves not only presenting excellent posts on the homepage but also promoting blogs based on different themes, such as through editorial thematic curation and dissemination via other social media platforms.

(4) **Increase the shareability of academic blogs to other platforms.** Interview results show that friend linking and academic exchange exhibit strong value-driven relationships, likely because knowledge recommendations from friends carry greater trust. Therefore, academic blog platforms should maximize content shareability within permissible limits, enhance compatibility with other platforms, and attract more user participation.

5 Conclusion

This paper draws upon Woodruff's user value hierarchical theory, conducting semi-structured user interviews through the laddering method, coding and analyzing interview content to construct a user value hierarchical structure. The study reveals that ScienceNet blog user value exhibits a bottom-up hierarchical relationship, with four key value chains: "blog writing–sense of accomplishment," "blog reading–academic exchange," "recommendation–dissemination effect," and "friend linking–academic exchange." Empirical analysis demonstrates the feasibility of applying user value theory from marketing to academic blogs, offering reference significance for knowledge management research. However, due to time and resource limitations, this study has shortcomings. First, the sample size is limited; larger sample analysis would yield more stable results. Second, we did not consider population segmentation, as different user groups have different value preferences and evaluations. Future research should distinguish among user groups.

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Author Contributions

Zhang Qi: Research design, interviews, and paper writing;
Xu Zhiwu: Paper revision;
He Yuying: Paper revision and table formatting.

A Study on the User Value of the ScienceNet Blog

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Keywords: user value; ScienceNet; academic blog; hierarchy structure; value chain

Note: Figure translations are in progress. See original paper for figures.