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Factors Influencing College Students' Online Health Information-Seeking Behavior and Their Interactive Relationships: A Study Based on Information Ecology Theory

Shiqi Li

Department of Sociology, College of Humanities, Jinan University, Zhuhai, Guangdong, China

Abstract: With the deep integration of the Internet and health information, online health information retrieval is becoming increasingly popular. Therefore, it is necessary to systematically study the underlying mechanisms behind this phenomenon. This study is based on the information ecosystem theory and collected data from 15 college students through semi-structured interviews. Through a systematic analysis of four dimensions (online health information-related factors, information subject-related factors, other group-related factors, and social environment-related factors), the study revealed the main influencing factors and their interaction mechanisms. The results show that 11 themes, including content characteristics, personal traits, social communication, and technical environment, have a significant impact on health information retrieval behavior. Moreover, these four dimensions exhibit a two-stage dynamic relationship. This study applies the information ecosystem theory to the micro-level of information retrieval behavior, providing a solid theoretical foundation for understanding the influencing mechanisms of online health information retrieval, and at the same time, proposes specific suggestions for college students' information acquisition strategies.

Keywords: Information Ecology Theory; Health Information Seeking; College Students

1. Introduction

By 2021, the total number of undergraduate and graduate students in ordinary higher education institutions in China had reached 22.26 million [1]. As representatives of the new generation of youth, college students are not only a vital force in the socialist modernization drive but also a group whose physical and mental health has garnered significant attention. The "2020 China College Student Health Report" indicates that up to 86% of college students have faced health issues related to skin, sleep, or mental well-being [2]. Against the backdrop of rapid informatization and the deepening implementation of the "Healthy China 2030" strategy, the accessibility, discernibility, usability, and transmissibility of online health information have become increasingly important [3]. This type of information not only serves as a crucial support for college students in maintaining their health but also significantly compensates for the limitations of traditional health information services in terms of timeliness and coverage.

Young people, especially university students, due to their higher educational attainment and stronger technical adaptability, have significantly increased demand for health information and are more inclined to obtain such information through the internet [4]. Their research behaviors are usually more frequent and in-depth. Therefore, systematically studying the factors influencing students' online acquisition of health information behavior and their internal interaction mechanisms holds theoretical and practical significance for improving the efficiency of health information acquisition.

In this context, this study is based on the information ecosystem theory and aims to conduct an empirical analysis of the online search behavior of college students in this ecosystem. By comprehensively examining the constituent elements and adopting a semi-structured interview method, we attempt to reveal the key factors influencing students' online search behavior and their interrelationships from the overall perspective of the information ecosystem. These research results will provide theoretical references for optimizing the online health information environment and improving the quality of user information acquisition.

2. Theoretical Model

Based on the theory of information ecosystem, this study mainly explores the patterns of students' online information retrieval behaviors in the health field. This research is based on the "three-element theory" in the information ecosystem and holds that in the process of health information retrieval, the three elements of information, information providers, and information environment jointly influence users' information acquisition behaviors. Depending on the different research subjects, this paper defines the information elements as online information in the health field, and divides the information provider element into information providers (i.e., the students themselves) and other groups such as family members and peers. At the same time, it particularly focuses on the element of information environment in the social environment. The specific functions of different elements in the online health information ecosystem are as follows:

"The Influencing Factors of Online Health Information" encompasses multiple aspects in behavioral research, including weight loss, beauty, mental health, medical knowledge, and specific diseases. And "The Factors of Knowledge-Informed Subjects" are the core driving forces behind this behavior. The behaviors of these subjects are influenced by social demographic characteristics (gender, age, education level, etc.), psychological cognitive factors (risk awareness, self-efficacy, etc.) and technological proficiency (search engine usage, platform selection, etc.). Additionally, "Other Group Factors" expand the role of knowledge-informed subjects, supporting the dissemination of knowledge and the sharing of experiences. Finally, "Social Environmental Factors" constitute the external conditions that influence behavior, covering multiple dimensions such as the economic foundation at the macroeconomic level, policies and regulations, cultural traditions, and social norms. These factors collectively systematically regulate the interaction among information receivers, information content, and communication media.

Based on the above conceptual framework, this study has constructed a theoretical model consisting of four main elements, namely online health information, information recipients, other groups, and the social environment. These four elements jointly constitute the key determinants of college students' online health information retrieval behavior, and the complex and interwoven interaction relationships among them are precisely the characteristics and achievements of this study. Specifically, in this model, the information recipient holds a central position and directly interacts with online health information, other groups, and the social environment; at the same time, there are also interactions among the other three elements, forming a multi-level interaction network.

3. Research Design

3.1 Research Method and Data Collection

This study collected qualitative data through semi-structured in-depth interviews. This method is conducive to recording the actual experiences and behavioral motivations of the subjects during the process of obtaining health information. A total of 15 undergraduate and graduate students from University A were selected as participants. The interviews were conducted in three forms: face-to-face, video call, and regular phone call, depending on the specific situation. To protect the privacy of the participants, the data were assigned codes S01 to S15 and were anonymized.

Based on the theoretical framework of information ecology, this study designed an interview guide consisting of four core modules: specific contexts for stimulating health information needs, selection of information retrieval channels and strategies, assessment of research experience, and analysis of obstacles. All interviews were recorded and transcribed in real time by experts, and an Excel database containing the characteristics of the respondents was also constructed.

3.2 Data Analysis Results

This study adopted the principle of targeted sampling to select 15 participants from the university student population (see Table 1). The sample was balanced in terms of gender and educational level, consisting of 7 males, 8 females, 8 undergraduates, and 7 master's students. To ensure that the research results could accurately reflect the differences in information collection behaviors among different academic fields, this sample covered multiple domains such as humanities and social sciences, science and technology, business management, and medical nursing. The diversity of this sample provides a solid foundation for in-

depth comparison and analysis of the internal differences caused by individual factors among information providers.

Table 1. Basic Information of Respondents

Respondent Code	Gender	Education Level	Academic Background
S01	Male	Undergraduate	Computer Science
S02	Female	Postgraduate	Sociology
S03	Female	Undergraduate	Law
S04	Male	Postgraduate	Public Administration
S05	Male	Undergraduate	Accounting
S06	Female	Postgraduate	Nursing
S07	Female	Postgraduate	Sociology
S08	Male	Undergraduate	Electronic Engineering
S09	Female	Postgraduate	Law
S10	Male	Undergraduate	Accounting
S11	Male	Postgraduate	Medicine
S12	Female	Undergraduate	Nursing
S13	Male	Postgraduate	Public Administration
S14	Female	Undergraduate	PPE (Philosophy, Politics, Economics)
S15	Female	Undergraduate	Law

According to the coding process consistent with the agreed requirements, we have identified 20 items that can be presented first (see Table 2). This research was completed by organizing the agreed content and conducting coding, with the aim of achieving a comprehensive understanding. Based on this process and the compiled content, 20 items with significant findings were selected and classified according to the coding scheme. Finally, 20 items were determined. For example, the comparison of health conditions between healthy individuals and those with diseases, where individuals in S03 were compared with the general population in S11. These contents were classified as "Health Comparison" in the final items.

Table 2. Initial Concepts and Sub-Themes with Corresponding Interview Data

No.	Sub-theme	Typical Interview Excerpt
1	Gender Differences	S03: Female students care more about beauty and wellness, male students pay more attention to sports rehabilitation.
2	Academic Background	S11: My medical background makes me focus more on official notices from the CDC.
3	Health Anxiety	S07: Abnormal indicators in my medical report made me search for related literature for three consecutive days.
4	Information Literacy	S14: I can identify pseudo-scientific content, like exaggerated claims of curing all diseases.
5	Search Skills	S09: I will limit searches to academic medical resources from universities.
6	Health Concepts	S05: I believe prevention is better than cure; I frequently check new health guidelines.
7	Information Caution	S12: For health products recommended by influencers, I check their approval numbers first.
8	Media Preference	S08: Medical animation demonstrations are more intuitive and easier to understand than text manuals.
9	Platform Loyalty	S02: I prefer using the official "Dingxiang Doctor" platform.
10	Information Sharing	S10: I regularly share epidemic prevention guidelines from authoritative sources in the family group chat.
11	Authority Reliance	S15: I watch replays of live streams from Peking Union Medical College Hospital experts.
12	Value Assessment	S06: When comparing different treatment plans, I will compare them repeatedly.
13	Interactive Experience	S04: Even if the content is good, I won't use medical apps frequently if they are complex to operate.
14	Privacy Protection	S13: I avoid health consultation platforms that require facial recognition.
15	Economic Rationality	S01: If an online consultation costs more than 50 yuan, I will try free resources first.
16	Time Management	S02: During exam weeks, I set time reminders for health searches.
17	Information Verification	S11: For important medication information, I cross-check it with drug instructions and health commission documents.
18	Professional Barriers	S04: I need a doctor to help interpret the professional terminology in my medical report.
19	Decision Support	S03: A relative of mine is a surgeon; I ask him first if I feel unwell.
20	Cultural Taboos	S07: I'd rather ask anonymously online about gynecological issues than ask the school doctor in person.

Table 3 illustrates the logical correspondence among the influencing factors, topic groups, topics, and subtopics. Based on these subtopics, we incorporated the empirical data into the

information ecosystem theory framework through selective coding. This table shows the logical development process from specific empirical phenomena to abstract theoretical elements: These 20 subtopics were first divided into 11 intermediate groups, and then systematically classified according to four main influencing factors (online health information, information owner, other groups, and social environment).

Table 3. Relationship Structure of Influencing Factors, Thematic Clusters, Connotations, and Sub-Themes

Influencing Factor	Thematic Cluster	Thematic Connotation	Sub-themes (No. & Name)
Online Health Information Factor	Content Characteristics	Information type and level of professionalism	3 Health Anxiety; 18 Professional Barriers; 6 Health Concepts
	Quality Characteristics	Accuracy and authority of information	7 Information Caution; 17 Information Verification; 11 Authority Reliance
	Form Characteristics	Presentation and interaction mode of information	8 Media Preference; 13 Interactive Experience; 12 Value Assessment
Information Subject Factor	Individual Traits	User's inherent attributes	1 Gender Differences; 2 Academic Background; 20 Cultural Taboos
	Capabilities & Literacy	Information processing and utilization abilities	4 Information Literacy; 5 Search Skills; 16 Time Management
	Behavior Patterns	Habitual ways of information acquisition	9 Platform Loyalty; 14 Privacy Protection; 15 Economic Rationality
Other Group Factor	Social Dissemination	Obtaining health information through interpersonal relations	10 Information Sharing; 19 Decision Support
	Trust Construction	Social influence mechanism of information adoption	11 Authority Reliance; 7 Information Caution
Social Environment Factor	Technological Environment	Features of information platforms and services	9 Platform Loyalty; 13 Interactive Experience; 14 Privacy Protection
	Economic Environment	Costs and resource accessibility	15 Economic Rationality
	Cultural Environment	Social norms and behavioral conventions	6 Health Concepts; 20 Cultural Taboos

4. Analysis of Influencing Factors and Interactive Relationships in College Students' Online Health Information-Seeking Behavior

4.1 Analysis of Influencing Factors in College Students' Online Health Information-Seeking Behavior

4.1.1 Influence of the Online Health Information Factor

The influence of health information on search behavior on the Internet mainly lies in its characteristics, particularly in terms of content, quality, and form. Regarding the information content, the type and professionalism of the information have a significant impact on search behavior. For instance, due to concerns about health, people tend to seek information on specific diseases; when lacking professional knowledge, non-medical students often choose content that is easier to understand and digest to grasp professional terms. Moreover, different health concepts also affect the preference for information selection. For example, students who hold a health-oriented perspective usually show a stronger interest in health information.

In terms of quality, accuracy and reliability are the key criteria for evaluating health information. Excessive information or conflicting content can cause users to feel uneasy and lose trust, thereby exacerbating health anxiety [5]. As an important basis for carefully collecting information, special attention should be paid to uncertain information sources. When verifying information, a cross-platform comparison method can be adopted. At the same time, excessive reliance on the reliability of information often leads users to overly trust the information provided by doctors and professional institutions.

The way information is presented directly affects the user experience. Media preferences indicate that users are more inclined to accept content in a specific format. The younger group particularly prefers the video format. Interactive experiences can highlight the user-friendliness of the platform, while value evaluation reflects the behavioral tendencies of users when using the information. During this process, free and easily accessible resources are often given priority.

4.1.2 Influence of the Information Subject Factor

The characteristics of the information provider will have an impact on behavior through

personal traits, abilities, information literacy, and behavioral patterns. First, regarding personal traits: gender differences are reflected in the different focus of the content, and educational background will affect the ability to select information. Additionally, cultural taboos may hinder people from actively discussing sensitive topics. Secondly, in terms of skills and abilities: information literacy is demonstrated by the ability to evaluate the quality of information, while information retrieval skills affect search efficiency. Time management reflects the consideration of search costs, and busy students tend to seek concise summaries. Finally, behavioral patterns: loyalty to a platform indicates the degree of familiarity and use of a specific platform, and the response to data protection reflects concerns about the disclosure of personal information. Economic rationality is manifested in a greater tendency to choose free information resources.

4.1.3 Influence of the Other Group Factor

Other interaction modes are achieved through social interaction and the establishment of trust. Information exchange is an important channel for obtaining medical information, such as obtaining health-related advice from family members or friends. During the decision-making process, if students have serious doubts about health issues, their support is reflected in their trust in the advice of family members or doctors. Building trust is based on a balance between trust in reliable information sources and the importance attached to receiving information: students tend to accept information from authoritative sources, while they rarely trust information from non-professional sources. Even if they receive general information together, they will still verify its accuracy themselves.

4.1.4 Influence of the Social Environment Factor

These social, environmental, economic, and cultural factors include:

Firstly, the technological environment - the characteristics of the service platform and information system will have a significant impact on research behavior. High-quality platforms with comprehensive functions and easy operation are usually used for a long time; while the interactive experience depends on technical performance; data protection aims to ensure the security of the platform, as a secure environment can enhance users' trust.

Secondly, the economic environment - students' economic rationality has a profound impact on their research strategies. Due to their lack of a stable income base, their sensitivity to medical expenses prompts them to prefer low-cost services. This reflects the logic of obtaining information in a resource-constrained situation, making them usually more inclined towards free options.

Thirdly, the cultural environment - social norms and values - determine research behavior. A healthy image depends on social awareness; public health cases will continue to be in the spotlight and trigger research activities. Cultural prohibitions on certain topics may hinder the acquisition of necessary information.

4.2 Analysis of Interactive Relationships in College Students' Online Health Information-Seeking Behavior

4.2.1 Primary Interactions: Direct Interactions Between the Information Subject and Other Factors

This aspect directly influences the students' learning decision-making process, involving three binary relationships:

Information topic and online health information. Personal characteristics and abilities will affect the selection of information content; health concepts determine the preferences of users when choosing learning materials. On the other hand, information quality will affect the probability of its acceptance, and users will verify the information content and are more inclined to accept information from reliable sources.

Information topic and other groups. Other groups influence information acquisition through social dissemination. Information exchanges among colleagues may recommend certain platforms; support for family decisions may change the research direction. Behavioral patterns will affect the depth of interaction, and the degree of trust in a specific group will affect the willingness to consult.

Information and social environment topics. The technological environment will affect behavioral patterns, as people use more convenient platforms more frequently. The economic environment reinforces economic rationality and tends to access free resources. Personal characteristics may also have an impact on the cultural environment. For example, implicit research on sexual health may reflect and influence the openness of the entire society.

4.2.2 Secondary Interactions: Indirect

Interactions Among Other Factors

This level exerts an influence on behavior through the main forms of interaction, particularly through the following three relationships.

Online health information and various groups: Information shared among different groups promotes the dissemination of specific content. The quality of this information affects the credibility of the group, and recommendations from reliable sources can be more effectively conveyed.

Online health information and the social environment: The technological environment constructs the framework of information. Various platforms provide content in video form, and the selection of content is optimized to adapt to the social environment. Important topics are presented in an appropriate way.

Other groups and the social environment: The cultural environment influences the dissemination of information. In societies that value health, information related to mental health is disseminated more frequently. Social recognition further enhances people's trust in the information provided by professionals (such as healthcare providers).

4.2.3 Hierarchical Characteristics of Interactive Relationships

Overall, the first level of interaction is an important factor in triggering actions, determining the content of information, and formulating questioning methods. The second level of interaction aims to reinforce or regulate the first level of interaction. The multi-level interaction forms an energy balance, which helps create a healthy learning environment for students, enabling them to easily obtain information.

5. Conclusion

From an ecological perspective, this study mainly focuses on the information behaviors of students in the field of online health information. By analyzing the influence mechanisms and interactive relationships among the four factors—online health information, information subject, other groups, and social environment—the following conclusions are drawn. These four factors form an interconnected influence network through different thematic clusters. The content, quality, and form characteristics of online health information constitute information acceptability; individual traits, capabilities/literacy, and behavior patterns shape personalized search pathways; social dissemination and trust construction from other groups form a filter for social information; the technological, economic, and cultural dimensions of the social environment constitute an external constraint framework. The interactive relationships exhibit hierarchical features. Primary interactions are the direct purpose of behavior, with the highest frequency between the information subject and online health information, reflecting content matching as the primary decision-making basis. Secondary interactions play a regulatory role, such as technological advances optimizing information form characteristics, thereby enhancing adoption willingness.

Theoretically, this study constructed a four-factor interaction model, extending the application of information ecology theory from macro-level description to micro-level mechanism analysis, offering a new perspective for health information behavior research. In fact, these research results can provide reference for numerous participants to enhance the efficiency of obtaining health information and services through the Internet: a balance must be struck between platform management and ease of use. Educators should enhance students' ability to verify information. Society needs to eliminate cultural barriers and promote progress by promoting scientific and technological innovation. Possible errors include the lack of samples and insufficient data for certain specific health conditions. Future research can adopt quantitative methods, expand the sample size, and deeply explore the differences in relationships among different groups.

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