

A Study on the Influencing Factors of Users' Information Decision-Making in Health Question-and-Answer Communities

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Abstract

The development of social economy is accompanied by the improvement of living standards, and most people begin to pay attention to health problems. The development of artificial intelligence and big data technology promotes the concept of "Internet and Healthcare", which reduces labor costs and provides more convenient services for users. In this study, we explore the factors influencing users' information decision-making in health Q&A communities from three different perspectives: users, platforms and environments, and analyze the mediating role of perceived usefulness and the moderating role of involvement. The experimental results show that health literacy, information quality, and interpersonal relationships have a positive influence on health information decision-making in the context of health Q&A communities. Meanwhile, perceived usefulness mediates the effects of health literacy, information quality, and interpersonal influence on health information decision-making. Involvement has a moderating role in the effects of health literacy and information quality on health information decision-making. When serving users, the health Q&A community satisfies users' access to information that meets their health needs by improving the platform's information quality and users' health literacy, etc., and provides scientific and reasonable references for constructing a virtuous cycle of online health consultation and exchange environment.

Keywords

Health Q&A communities, Information decision-making, Health literacy, Information quality, Interpersonal influences, Perceived usefulness.

1. Introduction

The development of the social economy is closely related to the improvement of living standards, more and more people have started to pay attention to the health of the body, and the development of artificial intelligence and big data technology has led to the concept of "Internet + Healthcare" is also deepening, people start to use the Internet to obtain health information and services, and in the health Q&A community to communicate with doctors and experts, making up for the lack of medical resources. People have begun to use the Internet to obtain health information and services, and to communicate with doctors and experts in health Q&A communities, making up for the lack of medical resources [1]. At the same time, in the process of building a smart society, health Q&A communities play an important role, with a large amount of health-related textual content on their platforms, including health information,

disease symptoms, treatment experiences, and medical resource sharing [2], and playing an increasingly important role in the healthcare industry, such as Good Doctor Online, Clove Garden, and other health communities to provide users with convenience and help users make decisions. However, health Q&A communities also face some challenges in helping users' decision-making process, which include poor quality of information on the platform, abuse of anonymity, etc. These problems not only waste social medical resources and lead to damage to public interests but also jeopardize the life safety of users in serious cases. Therefore, how to effectively deal with the problems of health Q&A communities and guarantee the accuracy of the information obtained by users is an issue that every health Q&A community manager and user needs to think about.

To this end, this study constructs a mediated moderation model to explore the influences on users' information decision-making in a health quiz community from three different perspectives: user, platform, and environment. Through three experiments, it is found that: health literacy, information quality, and interpersonal influence positively influence health information decision-making; perceived usefulness mediates the influence of health literacy, information quality, and interpersonal influence on health information decision-making; and involvement has a moderating role in the influence of health literacy and information quality on health information decision-making. The findings of this paper enrich the related research on health Q&A communities and also help to build a virtuous circle of online health counseling and communication environments.

2. Presentation of the research question and framework

2.1. Health literacy, information quality, interpersonal influence and health information decision-making

Health literacy is the ability of individuals to access and understand basic health information and services and to use them to make sound decisions to maintain and promote their health [3]. Patients' willingness to use health services is influenced by their health literacy [4]. Higher health literacy represents the individual's ability to understand basic health information and is more likely to acquire health knowledge and utilize relevant health information to make rational decisions [5]. Information quality refers to the extent to which users perceive the quality of various health information resources provided by health Q&A communities, and the extent to which they trust the sources of information and the information content itself [6]. Information does not always improve decision making and may even mislead it [7]. If the threshold of the platform is low and the community is mixed, resulting in low-quality information, the quality of decision-making will be reduced. The higher the information quality of the platform, the more it can promote users' information decision-making behavior. Interpersonal influence is the environmental influence factor of individual health information adoption behavior [8]. Users communicate and diffuse information with people around them and share information and ideas, which can stimulate the positive attitude of adopting information and help motivate users to make information decisions. The interpersonal environment around users will have an impact on their information decision-making. Based on this, the research hypothesis is proposed. Based on this, the research hypotheses are proposed as follows.

H1: Users' health literacy has a positive effect on health information decision-making.

H2: The information quality of the platform has a positive effect on health information decision-making.

H3: Interpersonal influence has a positive effect on users' health information decision-making.

2.2. The mediating role of perceived usefulness

Individuals with higher health literacy can better assess the usefulness and credibility of search information and thus adopt correct health information behaviors [9]. Related studies have examined the relationship between information quality and information usefulness, and users perceive the information provided in a platform as useful when they perceive the health information in the platform to be of higher quality [10], and the quality of the information positively affects the perceived usefulness of the information [11]. Information sharing enjoys the influence of the strength of intergroup relationships as well as the degree of friendship between individuals [12], and when users use the health Q&A community, their judgments about the usefulness of information will be based on the reference of friends or family members around them, and they will produce their judgments based on the influence of others. Therefore, in the health Q&A community environment, it is reasonable to assume that users' health literacy, the quality of information on the platform, and interpersonal relationships will have an impact on users' perceived information usefulness. Based on this, the research hypothesis is proposed: H4-H6: Health literacy, information quality and Interpersonal influence positively affects perceived usefulness.

The higher the perceived usefulness of the information by the user means that the user's self-perception is more consistent with the viewpoints of the knowledge owner [13], and self-esteem as well as self-needs are enhanced [14], which in turn promotes the user's willingness to adopt the health information from the knowledge owner and the community [15, 16]

H7: Perceived usefulness positively affects health information decision-making. The higher the perceived usefulness of information, the stronger the users' willingness to trust, select and adopt health information.

Health literacy also affects a person's cognitive ability, which indirectly influences their decision to receive information [17]. According to information processing theory, users of health Q&A communities also process information according to its quality, continuously improve their self-narratives, deepen their emotions and trust in the knowledge possessor, and thus facilitate decision-making and other behaviors [18]. Sharing and exchanging opinions with partners, family, and friends affects their assessment of the usefulness of the information, which in turn affects their decision-making behaviors regarding health information [19]. Therefore, the following hypotheses are proposed in this study:

H8-H10: Perceived usefulness mediates the relationship between health literacy, information quality, interpersonal influence and health information decision-making.

2.3. Regulating effect of the degree of roll-in

Involvement is particularly important in a user's information search process. When confronted with information, high involvement is more important than low involvement in the decision-making process [20] may pay less attention to the content of the information, while those with a high level of involvement will read the content carefully [21]. With a high level of involvement, users will pay attention to all aspects of health information and usually have a tendency to process all the information [22], and users with high health literacy can use their health knowledge to determine whether more information is useful or not to make the best decision; for quality information quality, users with high involvement will consider the information useful; people around them, such as family members as well as friends, etc. opinions and behaviors are also moderated by high involvement, providing support for the reasonableness of their information. In low-involvement decision-making, the role of health literacy, information quality, and interpersonal influence on information usefulness will be moderated due to information-seeking behaviors and less information being processed [23]. Based on this, the research hypothesis is proposed.

H11-H13: Involvement positively moderates the effects of health literacy, information quality, and interpersonal influences on health information decision-making.

H14-H16: Involvement plays a positive moderating role in the effect of health literacy, information quality and interpersonal influence on perceived usefulness.

3. Data collection and results of data analysis

3.1. Pre-programmed research

This study used the online survey platform Questionstar to conduct the questionnaire survey. In order to ensure the reliability and validity of the questionnaire, a pre-survey was conducted before the formal research, and 157 questionnaires were distributed, with 128 effectively recovered. The post-test data showed that the reliability and validity of the questionnaire variables were good (Cronbach's $\alpha > 0.8$, KMO > 0.8), indicating that the questionnaire was well designed and could be used to carry out large-scale research studies. In this study, 734 questionnaires were collected from users of the health quiz community. After excluding invalid questionnaires, a total of 589 valid questionnaires were retained.

3.2. Reliability and validity analysis

3.2.1. Reliability analysis

The data collected in this study were analyzed using SPSS 25.0 and the Cronbach's α for each variable was 0.905, 0.852, 0.805, 0.850, 0.815, 0.840, and the Cronbach's α for the overall questionnaire was 0.956, which were all greater than 0.8, indicating that the questionnaire reliability was good.

3.2.2. Validity analysis

(1) Convergent validity

Validated factor analysis of the collected data using AMOS, the results of the analysis are shown in Table 1, all pass the judgment criteria, indicating that the experimental data have a good fit.

Table 1 Validated factor analysis model fit indices

Common indicators	χ^2/df	GFI	RMSEA	RMR	CFI	NFI	NNFI
Standard of judgment	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
Value	2.633	0.922	0.053	0.032	0.95	0.922	0.943
Judgment results	Good	Good	Good	Good	Good	Good	Good

Distinguishing Validity

In this study, Pearson's correlation coefficient and average extracted variance value (AVE) were used for testing. The results showed that the mean extracted variance values of all tested variables were greater than 0.5; the Pearson's coefficients between the variables were also less than the square root of their mean extracted variance values, indicating that all tested variables had good differential validity.

3.3. Structural Model Analysis

First, judge the degree of fit of the model, the experimental data as shown in Table 2, all the indicators show that there is a good fitting effect, in line with the judgment requirements, can be further analyzed.

Table 2 Structural equation model fitting results

Metrics	χ^2/df	GFI	RMSEA	RMR	CFI	NFI	TLI
Model test results	2.571	0.914	0.052	0.032	0.958	0.933	0.951
Standard of judgment	<3	>0.9	<0.08	<0.05	>0.9	>0.9	>0.9

Judgment results

Good

Good

Good

Good

Good

Good

Good

Secondly, AMOS software is used to build the structural equation model and carry out the analysis of the path coefficients of the model. Fig. 1 shows the diagram of the structural equation model built using AMOS, and its model path coefficients are shown in Table 3.

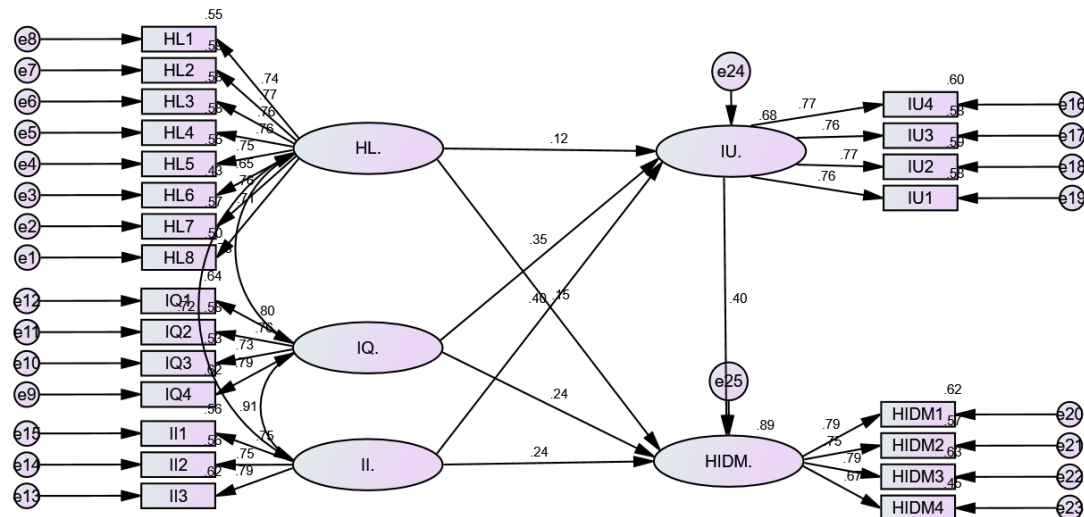


Fig. 1 Structural equation modeling diagram

Table 3 Structural equation model path coefficients and hypothesis testing results

Hypothetical path	Standardized path factor	S.E.	C.R.	P	Hypothetical results
H1a: HL→HIDM	0.150	0.047	3.155	***	correct
H1b: IQ→HIDM	0.243	0.119	2.080	**	correct
H1c: II→HIDM	0.238	0.106	2.173	**	correct
H1d: HL→IU	0.120	0.059	1.997	**	correct
H1e: IQ→IU	0.346	0.149	2.325	**	correct
H2a: II→IU	0.400	0.130	2.947	***	correct
H2b: IU→HIDM	0.395	0.060	6.655	***	correct

Note: * means $p < 0.1$, ** means $p < 0.05$, *** means $p < 0.01$.

According to Table 1, the standardized path coefficients of health literacy, information quality, and interpersonal influence on health information decision-making are all greater than 0 and significant, indicating that health literacy, information quality, and interpersonal influence have a positive effect on health information decision-making, so hypotheses H1, H2, and H3 are verified. The standardized path coefficients of health literacy, information quality, and interpersonal influence on perceived usefulness of information are all greater than 0 and significant, indicating that health literacy, information quality, and interpersonal influence have a positive effect on perceived usefulness, so hypotheses H4, H5, and H6 are tested. The path coefficient of perceived usefulness on health information decision-making is greater than 0 and significant at the 0.001 level, indicating that perceived usefulness has a positive effect on health information decision-making, so hypothesis H7 is verified.

3.4. Mediating effect analysis

The mediating effect analysis in this study refers to the test method proposed by Wen Zhonglin and Ye Baojuan, which is the mediating effect test process based on structural equation modeling. Perceived usefulness is the mediating variable in this study, according to the test

method of mediating effect, the coefficient c is tested first, and the experimental results are shown in Table 4.

Table 4 Main effect coefficient c test results

Path	Inspection program	Standardized estimates	S.E.	C.R.	P
HL→HIDM	c	0.197	0.052	3.764	***
IQ→HIDM	c	0.382	0.130	2.974	***
II→HIDM	c	0.394	0.113	3.360	***

Note: * means $p < 0.1$, ** means $p < 0.05$, *** means $p < 0.01$.

The experimental results show that all three main effect path coefficients c in this study are significant and can be tested in the next step, testing the coefficients a and b in turn, and the results are shown in Table 5.

Table 5 Results of the coefficient test for the mediating effect of cognitive trust

Path	Inspection program	Standardized estimates	S.E.	C.R.	P
HL→IU	a	0.120	0.057	2.000	**
IQ→IU	a	0.346	0.144	2.329	**
II→IU	a	0.400	0.126	2.948	***
IU→HIDM	b	0.395	0.062	6.654	***
HL→HIDM	c'	0.150	0.047	3.155	***
IQ→HIDM	c'	0.243	0.119	2.080	**
II→HIDM	c'	0.238	0.106	2.173	**

Note: * means $p < 0.1$, ** means $p < 0.05$, *** means $p < 0.01$.

The results in the table show that the coefficients a are all significant, indicating that the effect of health literacy, information quality, and interpersonal influence on perceived usefulness is significant. Meanwhile, the coefficient b is significant, proving that the indirect effect is significant, and the data in the table show that c' are all significant and the product of ab has the same sign as c' , indicating that the direct and indirect effects of the mediation test are both significant, then perceived usefulness partially mediates the effect of health literacy and interpersonal influence on health information decision-making, and hypotheses H8, H9, H10 are valid.

3.5. Analysis of moderating effects

3.5.1. Moderating Effect of Involvement between Independent and Dependent Variables

In this study, four regression models were constructed to test the moderating effect of the degree of involvement between the independent variable and the dependent variable, and each regression model contained control variables. The results of the experiments are shown in Table 6, where the R^2 of the model increased after the moderating variable, involvement degree, was added to the model, indicating that the inclusion of the moderating variable in model A2 was justified. The results showed that only the control variables, weekly health quiz community visit length, had a significant positive effect on health information decision-making; the interaction term between health literacy and degree of involvement was significant at the 0.01 level, indicating that there was a moderating effect of degree of involvement in the relationship between health literacy and health information decision-making, and hypothesis H11 was valid; and the interaction term between information quality and degree of involvement was significant at the 0.01 level, indicating that there was a moderating effect of degree of

involvement in the relationship between health literacy and health information decision-making. Indicating that involvement has a moderating role between information quality and health information decision-making, hypothesis H12 holds; the regression coefficient of the interpersonal influence and involvement interaction term is 0.376 but not significant, indicating that involvement does not have a moderating role between interpersonal influence and health information decision making, hypothesis H13 does not hold.

Table 6 Results of the Moderated Effects Test of Involvement between the Independent and Dependent Variables

Numble	Variable	Model A1	Model A2	Model A3	Model A4
Control Variables	Genders	0.078*	0.026	0.015	0.016
	Age	-0.050	-0.013	-0.029	-0.024
	Education attainment	-0.038	-0.003	-0.007	-0.006
	Hours of access to health quiz communities per week	0.112***	0.024	0.031	0.027
Independent Variables	HL	---	0.245***	0.236***	-0.195
	IQ	---	0.368***	0.328***	0.822***
	II	---	0.290***	0.224***	0.005
Moderator Variable	DI	---	---	0.162***	0.071
Interaction	HLxDI	---	---	---	0.739***
	IQxDI	---	---	---	-0.918***
	IIxDI	---	---	---	0.376
Model Evaluation	B	3.266***	0.417***	0.254*	0.056**
	R2	0.021	0.660	0.674	0.684
	Adjusted R2	0.014	0.655	0.670	0.678
	F	3.146**	160.810***	150.042***	113.430***

Note: * means $p < 0.1$, ** means $p < 0.05$, *** means $p < 0.01$.

3.5.2. The moderating effect of the degree of involvement between the independent variable and the mediator variable

In this study, four regression models were constructed to test the moderating effect of the degree of involvement between independent variables and mediator variables, and the results are shown in Table 7, which shows that after the moderating variable, the degree of involvement, was added to the model, the R2 of the model increased, indicating that the addition of the moderating variable to model B2 was reasonable. The results show that the regressions of the interaction terms of health literacy, information quality, interpersonal influence, and involvement degree are all significant at the 0.01 level, indicating that there is a moderating effect of involvement degree between health literacy, information quality, interpersonal influence and perceived usefulness and that hypotheses H14, H15 and H16 are valid.

Table 7 Results of the Moderating Effect Test of Involvement between the Independent and Mediating Variables

	Variable	Model B1	Model B2	Model B3	Model B4
Control Variables	Genders	0.033*	-0.014	-0.036	-0.037
	Age	-0.005	0.027	-0.005	-0.003
	Education attainment	-0.060	-0.030	-0.039	-0.028
	Hours of access to health quiz communities per week	0.073**	-0.012	0.001	-0.003
Independent Variables	HL	---	0.182***	0.164***	-0.165
	IQ	---	0.333***	0.257***	0.880***
	II	---	0.303***	0.178***	-0.057***
Moderator Variable	DI	---	---	0.310***	0.376**
Interaction	HLxDI	---	---	---	-1.128***
	IQxDI	---	---	---	0.679***
	IIxDI	---	---	---	0.964***
Model Evaluation	B	3.438***	0.777***	0.453***	0.164
	R2	0.009	0.538	0.591	0.602
	Adjusted R2	0.002	0.532	0.586	0.596
	F	1.365	96.530***	104.900***	79.355***

Note: * means $p < 0.1$, ** means $p < 0.05$, *** means $p < 0.01$.

4. Conclusion

In the context of health Q&A communities, the health literacy of the users, the quality of the community's information, and the users' interpersonal relationships all have a positive influence on health information decision-making. Perceived usefulness mediates the effects of health literacy, information quality and interpersonal influence on health information decision-making. Involvement has a moderating role in the effects of health literacy and information quality on health information decision-making, but not in the effects of interpersonal influences on health information decision-making. Involvement has a moderating role in the effects of health literacy, information quality, and interpersonal influence on perceived usefulness.

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