

Conceptual Framework of the Mechanism of Information Characteristics on Knowledge Sharing Behavior in Online Health Communities

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Abstract: By reviewing past relevant research and based on Social Presence Theory, this study proposes a research framework and constructs a theoretical model. Focusing on knowledge sharing behavior among doctors, it delves into how the richness and authenticity of information in Online Health Communities (OHCs) influence doctors' knowledge sharing behavior through the mediating role of social presence. Additionally, this study will consider the moderating role of perceived trust between information characteristics and social presence, aiming to reveal the underlying motivational mechanisms for knowledge sharing among doctors in OHCs.

Keywords: Online Health Communities; Knowledge Sharing; Social Presence; Information Characteristics; Perceived Trust

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Online Health Communities are a type of virtual community characterized by health themes, serving as a media platform composed of individuals possessing health knowledge and those with health needs, facilitating activities such as sharing health knowledge, seeking emotional support, and self-help^[1]. With the national push for "Internet+Healthcare," OHCs, as a product of the mutual penetration of the internet and the healthcare industry, possess broader space and development opportunities. Research indicates that knowledge, as an important organizational resource, can provide advantages for sustainable organizational development, and knowledge sharing behavior contributes to the long-term development of OHCs^[2]. Members of OHCs are mainly divided into general users and medically professional users^[3]. Doctors, as holders of professional knowledge, their knowledge sharing in OHCs is crucial for community development and users' acquisition of health knowledge^[4]. However, a virtual community itself is not a collection of all knowledge but an effective technical and social organizational platform for storing and exchanging knowledge; it does not guarantee that knowledge sharing will occur. The occurrence of knowledge sharing activities ultimately depends on psychological, situational, and other factors of the community members^[5]. Due to the increasing public health awareness, research exploring factors affecting doctors' knowledge sharing in OHCs has garnered widespread and high attention from scholars domestically and internationally^[6]. Regarding knowledge sharing, OHCs, as platforms integrating information exchange and support functions, provide important channels for knowledge sharing for both patients and medical professionals^[7]. Knowledge sharing behavior in OHCs refers to the process through which community members (including patients, doctors, or other health-related participants) exchange health-related information, experiences, and knowledge via online platforms^[8]. This behavior includes

sharing professional medical knowledge, health management experiences, disease coping strategies, and interpretations of information^{[9][10][11]}. Based on the different service targets, knowledge sharing in OHCs can be categorized into doctor-patient Q&A communities serving both doctors and patients, patient-patient exchange communities specifically serving patients, and doctor-doctor service communities specifically serving doctors, such as the Dingxiangyuan Community^[12].

OHCs can be viewed as a complex system composed of three main elements: information, users, and the community. They break temporal and spatial limitations, providing users with convenient access to and channels for exchanging health knowledge and experiences, while also possessing the characteristics of virtual community network media—that is, providing abundant information inevitably accompanied by doubts about its authenticity^[13]. Information is key to knowledge generation; frequent information exchange within the community changes the ways people acquire and share knowledge^[10]. However, previous research on knowledge sharing behavior in OHCs has primarily focused on the convenience of information interaction brought by the online environment, neglecting other characteristics of information and their potential psychological impact on members. Research shows that information capital in virtual communities can affect knowledge sharing and inter-professional perceptions among members; users' health information seeking affects their perceived value of each other^[14]. OHCs gather doctors with various knowledge backgrounds and social statuses, and the information contained in their interactions features richness and diversity, but this is accompanied by the presence of false information. When doctors have a demand for information resources, a strong perception of each other's presence forms, fostering a desire for deep interaction, thereby promoting knowledge sharing behavior in OHCs. Conversely, when information authenticity is questionable, doctors form a weaker perception of the presence of other professional doctors based on their professional knowledge, increasing the psychological distance between them, thereby reducing trust and communication, which is detrimental to knowledge sharing^[15]. Therefore, this study posits that social presence—the perceived degree of others' existence in mediated communication—affects doctors' judgments about the community, thus influencing their knowledge sharing behavior.

In summary, past research has mostly focused on doctor-patient knowledge sharing behavior, with relatively few studies targeting knowledge sharing among doctors themselves, and even fewer adopting the research perspective of considering the online media environment's impact on doctors' mutual perception of presence. This study integrates Social Cognitive Theory and Social Presence Theory, exploring how media communication information influences doctors' social presence through cognition, thereby affecting their OHCs knowledge sharing behavior, based on the environment-individual-behavior framework. Therefore, from the perspective of social presence, this study will focus on knowledge sharing behavior among doctors, exploring the mechanism by which information richness and authenticity in the virtual media environment affect doctors' perception of each other's presence and their OHCs knowledge sharing behavior, and further analyzing the moderating role of perceived trust in this process, constructing a theoretical model.

1.Related Concepts and Theoretical Basis

1.1 Knowledge Sharing Behavior

The concept of knowledge sharing behavior originated from knowledge management theory in the 1990s, emphasizing the combination of organizational learning and social exchange^[16]. Scholars initially placed knowledge sharing behavior within social relationships, believing that social capital (trust, network relationships, shared norms, etc.) were important factors influencing knowledge sharing^[17]. With the deepening of knowledge management research, knowledge sharing behavior came to be viewed as specific actions where individuals actively contribute to and acquire knowledge, focusing on the two dimensions of knowledge contribution and adoption^[18]. Against the backdrop of the internet's rise, research shifted towards knowledge sharing behavior in online communities, emphasizing the influence of technological media, user interaction, and virtual social relationships^{[19][20]}. Knowledge in the medical context refers to facts, data, experiences, and information related to patient diseases or treatments mastered by doctors^[21]. Knowledge sharing, as a core link in knowledge management, directly determines whether knowledge can be absorbed by the organization and the ability to integrate dispersed knowledge into systematic technology^[22]. After continuous development, both the concept and connotation of knowledge sharing behavior have undergone significant changes. Synthesizing past research and the needs of this study, knowledge sharing

behavior is defined as doctors actively sharing data, experiences, and information related to patient diseases or treatments in the form of text, voice, images, or videos.

1.2 OHCs Information

Information is the name of the content exchanged with the external world in the process of an individual adapting to the external world and making this adaptation perceived by the external world. The concept of information in OHCs has evolved from one-way dissemination to two-way interaction, and further to contextualization and valorization^[23]. Initially, scholars often drew on the Shannon-Weaver communication model, viewing information as knowledge or signals transmitted through media. At this stage, information primarily came from authoritative medical knowledge and diagnostic advice released by professional medical staff or health experts; information was seen as a carrier for disseminating professional medical knowledge^[21]. With the popularization of the internet and the development of Web 2.0 technology, OHCs gradually transformed from one-way information release platforms to two-way interactive health support communities^{[24][25]}. Information in OHCs is no longer just about knowledge dissemination but also a medium for interaction among users, including patients' experience sharing and emotional communication^[26].

Regarding the specific connotation of OHCs information, different scholars have approached it from functional, relational, emotional, and other perspectives, classifying information into various categories such as knowledge-based information, emotional information, professional information, user-generated information, structured information, unstructured information, static information, and dynamic information. Due to different research subjects and focuses, there is currently no consensus on the dimensions of OHCs information. Daft and Lengel (1986) emphasized that the richness of a medium depends on its ability to convey multiple cues^[27], provide immediate feedback, use natural language, and convey personal information. As a media platform for health information transmission, OHCs, due to the diversity and timeliness of information shared by users, contain information featuring basic health experiences, professional medical knowledge, psychological support, etc., and the information content aligns with the characteristics of richness^[28]. Moreover, the forms of information presentation in OHCs are rich, including text, images, videos, etc.^[11]. The form of multimodal expression not only enhances the intuitiveness of information but also increases its adaptability in complex scenarios. The multidimensional improvement in information quality and perceived content value makes users more willing to adopt and share information^{[14][29]}. Simultaneously, research shows that users tend to choose information that is both detailed in data and reliable in source^[28]. The credibility and accuracy of information are main factors affecting users' information adoption behavior; information quality and source credibility significantly influence users' adoption and sharing behaviors, affecting their decision-making behaviors^[14]. That is, the combination of information richness and authenticity can enhance users' decision-making quality and behavioral intentions.

In summary, based on research needs, this study divides information into two dimensions: richness and authenticity. Drawing on Daft and Lengel's (1986) definition of media richness^[27], information richness is defined as the value, diversity of professional content, and richness of expression forms contained in the information transmission process. Meanwhile, information authenticity is defined as the accuracy, professionalism, and reliability demonstrated in the information dissemination process.

1.3 Social Presence

Social presence, also known as social representation or social existence, was first proposed by Short et al. (1976)^[30], who defined the theory as the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationship, or the perceived degree of connection with others, in mediated communication and interaction. Currently, scholars have different definitions for social presence. From the perspective of media attributes, social presence as the perception of interaction based on online media, including the richness of social cues in information transmission and the individual's experience of the immediacy of the other party's response. From a psychological perception perspective, Gunawardena & Zittle (1997) emphasized that social presence is not only an attribute of media but also a psychological perception formed by participants during social interaction^[31]. With the continuous emergence of new media, domestic and international researchers have promoted the development of Social Presence Theory based on different research backgrounds

and purposes, extending the research context from electronic communication to fields such as psychology and sociology. The dimension division of social presence has evolved from a single dimension to multidimensional models, with the research focus expanding from a sense of presence to multiple dimensions such as affect, behavior, and cognition. In the Community of Inquiry framework, social presence includes three dimensions: affective expression, open communication, and group cohesion (sense of belonging), and this model has been widely validated in the field of online education^[32]. In virtual environments, targeting sharing economy platforms, Woo et al. (2024) proposed a three-dimensional model: Cognitive Copresence^[33], Psychological Involvement, and Behavioral Interdependence. Although different scholars have different standards for defining social presence, and its dimensions vary depending on the research context, looking at the commonalities across existing research, scholars generally support that social presence in virtual environments is the degree to which an audience perceives the existence of others during the use of media and the resulting individual psychological feelings. Therefore, according to the needs of this study, referring to Hassanein & Head (2007), social presence is divided into two dimensions: cognitive presence and emotional presence^[34]. Combining Cui et al. (2013), OHCs cognitive presence is defined as the degree of cognitive connection^[35], based on professional ability and knowledge reserve, with other professional doctors perceived as real in the community during synchronous or asynchronous communication processes. OHCs emotional presence is defined as the degree of emotional connection, based on admiration, recognition, etc., with other professional doctors perceived as real in the community during synchronous or asynchronous communication processes.

1.4 Perceived Trust

Trust, as a core topic in multidisciplinary research, has seen its definition and connotation continuously evolve with changing scholarly perspectives. Psychologist Deutsch (1958) first conducted research on trust in the prisoner's dilemma experiment, believing that trust is an individual's response to the situation^[36]. Subsequently, scholars conducted extensive research on trust based on different contexts. Bachmann (2001) believed that trust is a mechanism to reduce complexity and uncertainty, used to cope with possible future uncertainties^[37]. Rousseau et al. (1998) believed that perceived trust is a psychological state wherein one party is willing to be affected by the actions of another, reflecting positive expectations of the other's behavior^[38]. Gefen et al. (2003) pointed out that perceived trust is an individual's expectation of the trustworthiness of others' behaviors, usually based on past experiences and the current situation^[39]. Ridings et al. (2002) proposed that in virtual communities, perceived trust refers to an individual's cognition and judgment of the reliability of others, information, or the platform in internet-based interaction environments^[40]. Therefore, integrating previous research, this study defines perceived trust as the cognition and judgment of the professionalism of other doctors in the Online Health Community and the reliability of the information they provide.

1.5 Social Cognitive Theory

Social Cognitive Theory (SCT) was first proposed by psychologist Bandura (1977), emphasizing the triadic reciprocal relationship among individual cognition, behavior, and environment^[41]. Its core concepts are metacognition, observational learning, and self-efficacy, aiming to study how people subjectively interpret others' behaviors, intentions, and emotions in social situations, and to explore the internal mechanisms of these cognitive processes. The core concepts in this field focus on individuals' mental representations of social interactions and their dynamics^[42]. Core elements include emotion perception, Theory of Mind, and attributional style. Through these factors, individuals can shape their own behaviors via models, feedback, and self-regulation in the environment^[43]. Individual behavior is influenced by both internal personal factors (such as cognition, emotion) and external environmental factors (such as social interaction, cultural background), and in turn affects the environment and self-cognition. The key characteristic of social cognition lies in its "social" nature, meaning that cognitive processes are shaped and constrained in social interaction: people's subjective interpretations often stem from group dynamics rather than isolated decisions^[42].

Although Social Cognitive Theory has been applied in multiple fields, there are some shortcomings in its application. On one hand, the theory's explanation of individual behavior sometimes seems to overemphasize cognition and individual subjective feelings, neglecting the influence of external factors such as social structure and cultural background. On the other hand, the theory focuses excessively on individual-level behavioral learning, paying less attention to the collective impact of group

behavior and social interaction on individual behavior.

1.6 Social Presence Theory

Social Presence Theory was proposed by psychologists Short, Williams, and Christie (1976), who believed that the occurrence and level of social presence are influenced by the information transmission capacity of the medium^[30]. Its core definition is the degree to which an individual perceives the other party as a “real person” and the strength of the emotional connection established with others during communication through a medium, emphasizing the impact of the social attributes of the medium, such as warmth and humanization, on communication effects. That is, how individuals perceive the presence, interaction, and emotional connection of others through the medium without direct face-to-face contact. Presence refers to the psychological distance connected through the medium; the closer the psychological distance between parties, the more they can perceive each other. Against the backdrop of the universalization of virtual environments, early models emphasizing teaching presence, social presence, and cognitive presence have limitations^[44]. Research shows that the explanatory power of social presence for learning satisfaction increases in online environments, indicating that social presence can compensate for cognitive deficiencies caused by physical isolation^[45]. Therefore, the effect of social presence in virtual community environments remains to be explored.

2. Overview of Research Status

Past research indicates that studies on knowledge sharing behavior in OHCs have mostly focused on doctor-patient interaction behavior. From the perspective of serving patients, doctors are viewed as service providers, exploring service motivations such as external incentives^[46], perceived reciprocity^[47], etc., or service outcomes such as patient satisfaction, user participation behavior, etc.^{[13][48]}. Only a few studies have explored the influencing mechanisms and outcomes of doctor-doctor interactions from the perspective of doctors' personal perceptions, and even fewer have considered the impact of whether doctors can perceive each other's presence in the virtual medium on their OHCs knowledge sharing behavior. However, the development of OHCs relies on the interaction and sharing of professional knowledge. Exploring the influencing mechanisms of doctors' OHCs knowledge sharing behavior in the media environment is conducive to improving the overall operational efficiency of OHCs and promoting the widespread dissemination and in-depth exchange of medical knowledge. In recent years, knowledge sharing behavior among doctors has gradually gained attention, with some studies beginning to explore how doctors enhance each other's professional levels and medical service capabilities through knowledge sharing^[49]. However, the specific mechanisms influencing interaction behavior among doctors remain limited.

Research on knowledge sharing behavior in OHCs is mainly divided into two categories: antecedent influencing factors and consequent outcomes. The current academic focus is primarily on exploring the antecedents of OHCs knowledge sharing behavior. At the individual motivation level, external motivations such as reputation and reciprocity^[46], and internal motivations such as self-efficacy and altruism are considered driving forces for knowledge sharing behavior^[49]. At the community environment level, community atmosphere, community norms, and trust all influence knowledge sharing behavior and intention^[50]. Considering the impact outcomes of OHCs knowledge sharing behavior, existing research explores its value and challenges from multiple dimensions including users, doctors, and the platform. Research shows that knowledge sharing behavior significantly improves the health management level and satisfaction of community users, enhances doctors' professional reputation and patient trust, and promotes user stickiness and activity in the community, benefiting the sustainable development of online communities^[26]. However, reviewing relevant domestic and international research reveals that most studies center on serving patients, exploring the direct impact of doctors' knowledge sharing behavior on themselves or patients, or from the platform's technical level, exploring how to promote doctors' participation and enthusiasm for knowledge sharing. Few studies from the perspective of interaction relationships among doctors to explore the complex mechanism between online environmental information characteristics and knowledge sharing behavior among doctors. Especially, the process of how information affects knowledge sharing under the mediation of social presence is largely ignored.

Social Presence Theory points out that in mediated interaction and communication processes, the degree of salience of interpersonal relationships or the perceived connection with others affects individual interaction behavior. High

social presence promotes more positive interaction behavior, while low social presence affects interaction behavior and effectiveness^[30]. As a virtual media platform, OHCs possess information attributes that, due to their positive or negative utility, cause doctors to perceive the presence of other doctors rich in professional knowledge and ability as stronger or weaker, affecting mutual intimacy and thus influencing interaction behavior. With the development of the theory, Shen and Khalifa (2008) defined social presence as the perception formed during the process of emotional and cognitive connection with others in online communities^[51], a perception accompanied by emotional and cognitive connection with others, thereby realizing the existence of others. Thus, this study posits that the richness and authenticity of information in OHCs can, through the process of emotional and cognitive connection among doctors, evoke doctors' social presence perception of other doctors cognitively or emotionally, further influencing doctors' knowledge sharing behavior. Simultaneously, doctors' perceived credibility of information significantly affects their trust and professional identification with the provider, and individual perceived trust positively influences knowledge sharing at the team level^[4]. Therefore, this study proposes that the process of how information attributes affect changes in social presence is subject to the moderating role of perceived trust.

Reviewing existing research, previous studies were mainly based on perspectives from psychology (e.g., motivation and cognition), economics (e.g., value and cost), and sociology (e.g., social capital), utilizing theories such as Social Exchange Theory, Social Cognitive Theory, MOA perspective, Social Influence Theory, Technology Acceptance Model, and Motivation Theory for exploration. As virtual health communities are derivatives of the internet, possessing some characteristics of the internet, their research has gradually become linked with related concepts and theories in the internet, such as online information characteristics and Social Presence Theory. However, research considering the characteristics of online virtual media remains to be explored.

Based on the review of research on knowledge sharing behavior, OHCs information, social presence, perceived trust, Social Cognitive Theory, and Social Presence Theory, it is found that: (1) Professional knowledge sharing behavior among doctors is beneficial for the sustainable development of OHCs. However, most research focuses on doctor-patient or patient-patient interactions, exploring the impact on patients or doctors centered around patients. The need for doctors to acquire professional knowledge themselves is neglected, and research centered on doctors is relatively scarce. (2) Research shows that users' health information seeking affects their perceived value of each other; information capital transmitted through media affects inter-professional perception and knowledge sharing among members. Previous research on OHCs knowledge sharing behavior mainly focused on the convenience of information interaction brought by the online environment, neglecting other characteristics of information and their potential psychological impact on members. Moreover, in knowledge sharing research, information often appears as a sub-dimension of community atmosphere or community support; relatively few studies treat information attributes as an independent variable. (3) Current research mostly focuses on static individual characteristics or environmental factors such as motivation, self-efficacy, platform atmosphere, etc., ignoring dynamic social interaction processes and individuals' immediate perceptions during interaction. Research considering mutual perception among members from the perspective of OHCs as a virtual medium is currently lacking, and there is a lack of research on social presence among professional doctors perceiving each other's existence in the OHCs context. However, existing research has shown that social presence in online interaction is believed to positively influence user behavior through emotional connection and trust, promoting users' knowledge sharing intention.

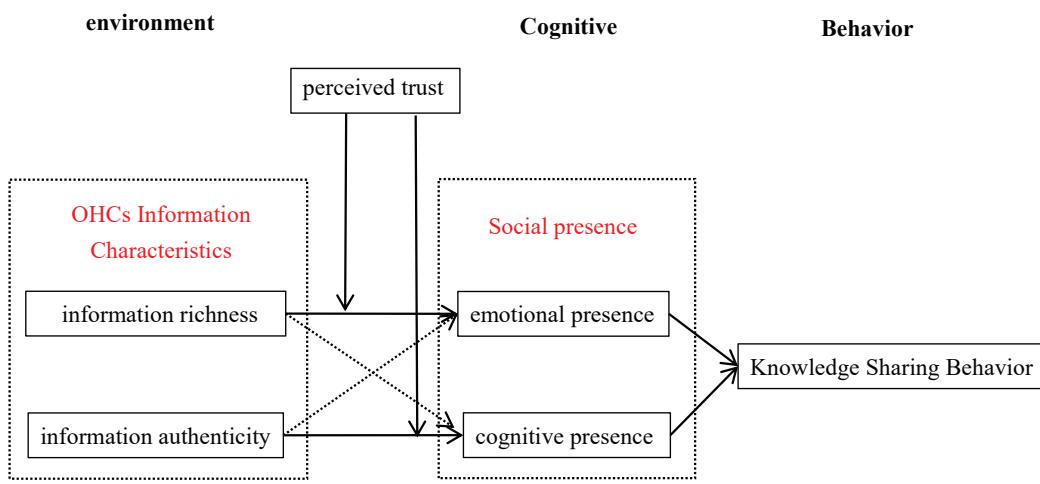
3.Theoretical Framework and Hypotheses

Reviewing existing literature reveals that research on knowledge sharing behavior in OHCs mostly centers on patients, viewing doctors in the role of service providers, focusing on doctor-patient and patient-patient interaction behaviors, while lacking research on the influencing mechanisms of knowledge sharing among doctors themselves. Furthermore, research on influencing factors of knowledge sharing behavior in OHCs mainly focuses on factors at the individual, team, or organizational level, paying less attention to the role of information at the media level in these behaviors. The impact of information characteristics on how individuals make sharing decisions when faced with a large amount of complex information has not been thoroughly studied. Simultaneously, existing research often stems from static individual characteristics or environmental factors, ignoring dynamic social interaction processes and individuals' immediate perceptions

during interaction.

Therefore, this study focuses on knowledge sharing behavior among professional doctors, starting from the media role of OHCs, constructs a theoretical hypothesis model, considers the impact of OHCs information characteristics on doctors' perception of the presence and interaction behavior of other professional doctors through affective/cognitive tendencies, and introduces perceived trust as a moderating variable to explore the boundary conditions in this process. Through this research, the aim is to integrate Social Cognitive Theory and Social Presence Theory, clarify the mechanism by which information richness and authenticity influence doctors' knowledge sharing behavior through social presence from the perspective of social presence, and use perceived trust as a moderating variable, in order to provide corresponding countermeasures and suggestions for optimizing doctor knowledge sharing and platform design in Online Health Communities. Please refer to Figure 1 below for the theoretical framework diagram.

Figure 1 Theoretical Framework Diagram



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