Can AI Speak the Language of Trust in Medicine?

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ABSTRACT

The use of new AI-based technologies has increased exponentially over the past ten years, leading to a transformation in the relationships established within the field of medical services. This ongoing work is part of a research line focused on the characteristics of digital assistants that foster human–machine relationships. The aim is to analyze how, in a simple medical situation, a particular conversation can alter the patient's perception of the quality of information and the quality of interaction, and ultimately their trust in the medical service, depending on whether the communicator is a chatbot or a human doctor. Additionally, the study considers the moderating effect that the country may have on the proposed relationships, as cultural differences may explain discrepancies in the acceptance and perception of these technologies. To achieve this objective, data were collected from 870 Spanish and American participants through an online survey based on an experimental design. Preliminary results are expected to help anticipate medical situations in which communication with digital assistants may enhance the outcome of relationships among the parties involved.

Keywords:

Chatbots, healthcare, quality of interaction, quality of information, trust.

1. Introduction

The technological transformation experienced by the healthcare sector in recent decades is occurring at an accelerated pace. This process began with the digitalization of medical records and continued with the normalization of telemedicine as a healthcare practice, strongly driven by the COVID-19 pandemic (Schmitz, 2019). However, this is not one single process of digitalization but rather a profound transformation as a whole in which disruptive technologies such as artificial intelligence (AI), augmented or virtual reality (AR/VR), and blockchain enable the provision of modern, patient-centered healthcare (Sestino & D'Angelo, 2023). Nevertheless, and despite this global trend toward the acceptance of new health tech, it is worth noting that significant differences may exist across countries in their perception, often shaped by cultural variations (Schmitz, 2019).

This technological transformation has reshaped traditional healthcare systems, increasingly favoring digital consultations over in-person visits (Lapointe-Shaw et al., 2023). Beyond relatively established virtual options such as video consultations, the development of AI has brought a revolution to the sector. According to Statista (2025), total global investment in the digital health industry reached USD 23.3 billion in 2022, a figure that far surpasses the USD 1.1 million invested in 2010. In this context, chatbots - AI-based tools that automatically interact with patients to provide healthcare support - have emerged as valuable resources in physician-patient interactions. They are commonly used in areas such as symptom checking, appointment scheduling,

medication reminders, and mental health interventions, where they provide immediate responses and 24/7 availability - features that traditional medical consultations cannot match.

The implementation of these virtual assistants represents an opportunity for healthcare service providers, offering patients direct, personalized, and efficient communication and assistance (Johannsen et al., 2021). With advances in AI and natural language processing, chatbots are now able to understand and respond to patients' needs by delivering medical solutions in a rapid and convenient manner. However, their use raises several objections related to patient autonomy and privacy, as well as concerns about the potential replacement of humans by technology (Du & Xie, 2021) in a domain as sensitive as healthcare. Chatbots may lack the judgment and expertise of medical professionals, leading patients to perceive lower service quality and, consequently, poorer outcomes in key variables such as satisfaction and trust. This underscores the need to examine how the type of agent (human versus chatbot) conditions patients' perceptions and experiences of medical services, even in cases where the informational content remains unchanged.

Within this context, understanding under which circumstances the use of digital agents, as opposed to medical professionals, positively influences relevant outcome variables - both functional and social - becomes a matter of particular interest. Accordingly, this ongoing study proposes a theoretical framework that examines how the use of chatbots versus medical professionals for consultations regarding apparently minor symptoms affects the quality of the interaction, the quality of the information provided, and, consequently, patient trust.

2. Theoretical Framework

Previous studies analyzing satisfaction with medical service outcomes highlight the importance of both functional variables (quality of the information transmitted) and social variables (quality of the interaction) between the agents involved (Hudecek et al., 2024; Seitz et al., 2022).

Research on the digitalization of medical services (e.g., Riedl et al., 2024) has shown that information quality is conditioned by the type of source (medical professional versus automated system). Traditionally, physicians have been regarded as the primary source of reliable information due to their knowledge and expertise. More recently, chatbots have gained increasing importance as transmitters of medical information (Erren, 2024), as they can provide accurate, relevant, and useful responses—particularly those bots based on large language models (LLMs) that have been specifically trained for this purpose. Regarding interaction quality, recent studies (Novak & Hoffman, 2019; Wirtz et al., 2018) attribute to chatbots a strong potential for developing social skills, such as responsiveness. In other words, prior evidence in the literature indicates that digital assistants may enhance both information quality and interaction quality.

Especially in healthcare contexts, trust is considered a key outcome variable. However, it can deteriorate when physical contact between physicians and patients decreases and part of the personal relationship is replaced by technology. While early research on human– machine interaction revealed a degree of distrust toward AI, more recent studies

(Lin et al., 2024) attribute to chatbots the ability to foster trust, insofar as individuals perceive them as social agents and attribute social presence to them (Cheng et al., 2022).

Moreover, information quality plays a crucial role in building trust in healthcare contexts. In this regard, information quality refers to the accuracy of data, its transparency, and the ability to translate clinical situations into patient-friendly language (Basharat & Shahid, 2024). Finally, interaction quality, measured through the involvement, closeness, and empathy demonstrated by the agent, whether a physician or a chatbot, contributes to strengthening trust (Robinson et al., 2024).

In summary, there is evidence in the literature suggesting that virtual assistants can improve information quality, interaction quality, and trust. However, the question remains whether in specific medical situations they achieve this objective to a greater extent than human medical professionals.

In addition, this study proposes that the relationship among the aforementioned variables (1) information quality, (2) interaction quality, and (3) trust may be moderated by the country in which the study is conducted. Previous research has demonstrated significant cultural differences in the adoption of new technologies when comparing Spain with Anglo-Saxon countries (Schmitz, 2019). Although the digitalization of healthcare systems and the adoption of AI-based technologies have been globally accepted, cultural factors shape expectations regarding both technology and communication styles (Esmaeilzadeh et al., 2024). For example, in the United States, greater emphasis is placed on efficiency and immediate availability of information, whereas in Spain, human warmth and emotional closeness in the physician–patient interaction are more highly valued. Therefore, it is expected that perceptions of information and interaction quality,
conditioned by the type of communicator (physician versus chatbot), will be moderated by the cultural context of the country in which the healthcare service takes place (Spain versus the United States).

The following image presents the theoretical model of this ongoing study (image 1) and a summary of the proposed research questions is offered in table 1.

Image 1 – Research model

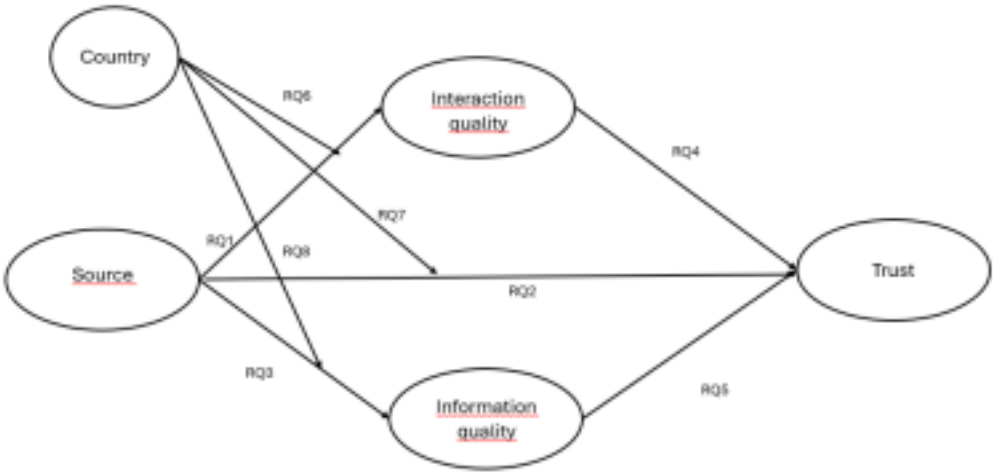

Table 1 – Summary of research questions

Research Question (RQ)	Hypothesized relationship
RQ1	The source (human physician vs. chatbot) has a direct, positive and significant effect on interaction quality.
RQ2	The source (human physician vs. chatbot) has a direct, positive and significant effect on trust.
RQ3	Information quality has a direct, positive and significant effect on information quality.
RQ4	Interaction quality has a direct, positive and significant effect on trust.
RQ5	Information quality has a direct, positive and significant effect on trust.
RQ6-8	Country (Spain vs. U.S.) moderates the relationships between source, information quality, interaction quality, and trust.

3. Methodology

To achieve the previously stated objective, data were collected from 870 individuals of Spanish and U.S. nationality through an online survey, based on an experimental design, during December 2024. In the experiment, the variable corresponding to the type of communicator (medical chatbot vs. licensed physician) was manipulated. Each participant was randomly assigned to one of the two scenarios, in which they were presented with a simulated interaction with either a licensed physician or a medical chatbot. The content of the interaction was identical in both cases, regardless of the type

of communicator. It is worth noting that the consultation presented in the interaction corresponded to a mild-to-moderate symptomatology, specifically persistent headaches. The message that participants received from the physician (or chatbot) sought to downplay the issue, without prescribing any medical treatment or recommending a medical check-up at a healthcare facility.

The items were measured on a 7-point Likert scale in both English and Spanish. To measure interaction quality, the scale of Bieber et al. (2010) was adapted; to measure information quality, the scale of Blasco-Lopez et al. (2019) was employed; and finally, trust items were adapted from Büttner & Göritz (2008). Country was measured using a dummy variable, coded as 1 Spain, and 0 for USA. Cronbach's alpha coefficients exceeded the value of 0.9, thereby demonstrating internal consistency reliability (Nunnally, 1994). Similarly, the composite reliability ranked above 0.90, surpassing the threshold of 0.70, and supported the construct's reliability. Finally, the average variance extracted (AVE) was higher than the cut-off value, varying from 0.88 to 0.9 (Hair et al., 2022). Thus, assuring the convergent validity of the constructs.

The discriminant validity of the constructs was assessed using Fornell and Larcker (1981). According to this approach, the square root of the AVE for each construct exceeded the corresponding inter-construct correlations, thereby offering robust evidence of discriminant validity and reinforcing the distinctiveness of the measurement model.

4. Results

A bootstrapping procedure (10,000 subsamples) was employed to evaluate the research model. Results indicate that source positively influenced the perceived quality of interaction with the physician ($\beta = 0.441$, $p < 0.01$), supporting RQ1. Source also showed a significant effect on perceived information quality ($\beta = 0.337$, $p < 0.01$), confirming RQ3. However, source does not have a significant impact on trust, rejecting RQ2. Both the quality of interaction ($\beta = 0.557$, $p < 0.01$), and the quality of information ($\beta = 0.401$, $p < 0.01$), positively and significantly influence trust, confirming RQ4 and RQ5.

Furthermore, country moderated the relationships between source and both perceived interaction quality ($\beta = - 0.398$, $p < 0.01$), and perceived information quality ($\beta = - 0.322$, $p < 0.05$), thus supporting RQ6 and RQ8. RQ7 was not supported.

This study conducted a post-hoc analysis to examine whether Spanish and American people respond differently depending on the source. A separate bootstrapping procedure was performed for Spanish and American participants (10,000 subsamples) to test the research model.

In both cases, the observed differences indicate that the effect of the message source is significantly greater in the United States group compared to the Spain group. Specifically, U.S. users exhibited greater sensitivity to the source when it came to medical interactions. For these users, interacting with a physician (as opposed to a bot) led to a larger increase in perceived quality of both the interaction (difference Spain –

USA = –0.307; p = .049) and the information received (difference Spain – USA = –0.361; p = .020). In contrast, Spanish participants showed less variation in their perceptions depending on the type of communicator, suggesting a relatively higher acceptance of bots as a source of health information.

5. Conclusions

The objective of this study is to understand under which circumstances the use of a medical chatbot, as opposed to a healthcare professional, may positively influence relevant outcome variables - both functional and social - such as interaction quality, information quality, and, consequently, patient trust. Beyond identifying direct effects, the study also examines how these outcomes may vary depending on contextual and cultural factors that shape patient expectations and evaluations of healthcare interactions.

For the proposed relationships, a country-level moderation is additionally considered, driven by cultural differences regarding the perception of new technologies, since the socio-technological context and communication styles across cultures may influence the acceptance of these systems. In addition, cross-national contrasts in institutional trust, communication norms, and openness to innovation may further explain differing patient perceptions of physicians versus chatbots.

In this regard, comparing countries such as Spain and the United States - marked by significant cultural, institutional, and technological differences - allows for anticipating in which healthcare service situations the use of a virtual agent may be more appropriate without undermining information or interaction quality, and ultimately, for identifying behavioral patterns that can guide future implementation strategies specifically adapted to each context. Such a comparison also provides insights into how differences in healthcare system structures, communication styles, and cultural expectations shape the way patients interpret both human- and AI-mediated medical interactions.

This study contributes to the broader literature by offering empirical evidence on how the type of source, human doctor versus medical bot, influence patients' trust. According to our results, in medical contexts, consulting a medical chatbot or a human physician for straightforward symptoms does not appear to produce different levels of trust. However, differences emerge regarding the quality of information and interaction. Patients perceive both the interaction and the information as higher in quality when provided by a physician rather than a chatbot. These perceptions are likely shaped by cultural context, as Spanish patients may value relational warmth while U.S. patients place greater emphasis on efficiency and immediacy. This result supports prior studies indicating that physicians deliver higher-quality responses to common clinical questions in gynecologic oncology
compared to chatbots (Anastasio et al., 2024). Overall, these findings highlight the need to adapt AI-based communication strategies to national healthcare contexts, where cultural, institutional, and technological factors condition trust and perceived quality.

Referencias bibliográficas

Anastasio, M. K., Peters, P., Foote, J., Melamed, A., Modesitt, S. C., Musa, F., ... & Moss, H. A. (2024). The doc versus the bot: A pilot study to assess the quality and

accuracy of physician and chatbot responses to clinical questions in gynecologic oncology. Gynecologic Oncology Reports, 55, 101477.

Bieber, C., Müller, K. G., Nicolai, J., Hartmann, M., & Eich, W. (2010). How does your doctor talk with you? Preliminary validation of a brief patient self-report questionnaire on the quality of physician–patient interaction. *Journal of clinical psychology in medical settings*, 17, 125-136.

Blasco-Lopez, F., Recuero Virto, N., Aldas Manzano, J., & Cruz Delgado, D. (2019). Facebook's power: factors influencing followers' visit intentions. *Spanish Journal of Marketing-ESIC*, *23*(1), 95-117.

Büttner, O. B., & Göritz, A. S. (2008). Perceived trustworthiness of online shops. *Journal of Consumer Behaviour: An International Research Review*, *7*(1), 35-50.

Cheng, X., Zhang, X., Cohen, J., & Mou, J. (2022). Human vs. AI: Understanding the impact of anthropomorphism on consumer response to chatbots from the perspective of trust and relationship norms. *Information Processing & Management*, 59(3), 102940.

Esmaeilzadeh, P., Mirzaei, T., & Dharanikota, S. (2021). Patients' perceptions toward human–artificial intelligence interaction in health care: experimental study. *Journal of medical Internet research*, 23(11), e25856.

Hudecek, M. F., Lermer, E., Gaube, S., Cecil, J., Heiss, S. F., & Batz, F. (2024). Fine for others but not for me: The role of perspective in patients' perception of artificial intelligence in online medical platforms. *Computers in Human Behavior: Artificial Humans*, *2*(1), 100046.

Lin, H., Han, J., Wu, P., Wang, J., Tu, J., Tang, H., & Zhu, L. (2024). Machine learning and human‐machine trust in healthcare: A systematic survey. *CAAI Transactions on Intelligence Technology,* 9(2), 286-302.

Novak, T. P., & Hoffman, D. L. (2019). Relationship journeys in the internet of things: a new framework for understanding interactions between consumers and smart objects. *Journal of the Academy of Marketing Science*, 47(2), 216–237.

Riedl, R., Hogeterp, S. A., & Reuter, M. (2024). Do patients prefer a human doctor, artificial intelligence, or a blend, and is this preference dependent on medical discipline? Empirical evidence and implications for medical practice. *Frontiers in Psychology*, 15, 1422177.

Robinson, E. J., Qiu, C., Sands, S., Khan, M., Vora, S., Oshima, K., ... & Feng, M. I. (2024). Physician vs. AI-generated messages in urology: evaluation of accuracy, completeness, and preference by patients and physicians. *World Journal of Urology*, 43(1), 48.

Schmitz, A. (2019). *Análisis internacional de las vídeo consultas médicas: Una adaptación de la teoría UTAUT2*. Tesis Doctoral. Universidad Autónoma de Madrid (España).

Seitz, L., Bekmeier-Feuerhahn, S., & Gohil, K. (2022). Can we trust a chatbot like a physician? A qualitative study on understanding the emergence of trust toward diagnostic chatbots. *International Journal of Human-Computer Studies*, *165*, 102848.

Statista. (2025). Inversión total de la industria de salud digital. Disponible en : Inteligencia artificial: utilización según propósito entre los profesionales sanitarios 2019| Statista (Acceso: 15 de abril de 2025).

Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., & Martins, A. (2018). Brave new world: service robots in the frontline. *Journal of Service Management, 29(5), 907–931.*