

Exploring Antecedents and Consequences of Anthropomorphism in Digital Environments: "Implications for User Experience and Customer Loyalty"

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Abstract:

Objective: "In the digital age, anthropomorphism—attributing human characteristics to non-human entities in digital environments—plays a pivotal role in improving user experience (UX) and fostering customer loyalty. With the increasing adoption of artificial intelligence (AI) and intelligent interfaces, simulating human interactions such as digital platforms has emerged as a powerful mechanism for creating emotional connections and facilitating interactions. This study seeks to identify the antecedents and consequences of anthropomorphism in digital user environments and assess its impact on user experience and customer loyalty.

Methods: Using a qualitative and exploratory approach, this research examines data collected from semi-structured interviews with 16 academic and industry experts using thematic analysis. Sampling was conducted through a snowball technique, and theoretical saturation was considered as the criterion for determining sample size.

Results: The findings show that the antecedents of anthropomorphism include six main factors: personalization and optimization of user interactions (including personalized user experiences and emulation of human emotions), human-like interactions and natural communication in digital spaces, social and emotional experiences of users, intelligent responsiveness and optimal interactions, emulation of human and psychological behaviors, and user loyalty and trust enhanced through human-centered interactions.

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The implications of anthropomorphism include increased social interactions, intelligent responsiveness, personalized experiences, and enhanced customer trust and loyalty.

Conclusions: The results indicate that anthropomorphism helps increase user satisfaction and strengthen customer loyalty by personalizing interactions and creating emotional bonds. These insights offer valuable implications for designers and marketers of digital systems who aim to optimize user experiences and develop effective customer retention strategies.

1. Introduction

In the dynamic realm of digital marketing, the phenomenon of anthropomorphism in digital user environments, particularly in relation to user experience and customer loyalty within marketing platforms, has emerged as a compelling and rapidly expanding field of study. Anthropomorphism, defined as the attribution of human traits and characteristics to non-human entities, enhances user engagement by fostering emotional connections between users and digital interfaces. This emotional engagement is of paramount importance, as it can significantly elevate user satisfaction and loyalty—key factors for ensuring the sustainability and success of marketing platforms in today’s competitive landscape. In essence, anthropomorphism, by cultivating empathy and personal connection between users and systems, can enhance user experience and, consequently, bolster customer loyalty and business prosperity.

In the vibrant domain of digital marketing, leveraging human-like characteristics for products and services has become a critical strategy for improving user experience and increasing customer loyalty. The integration of artificial intelligence has rendered interactions more engaging and personalized, fundamentally reshaping how brands connect with their customers. Anthropomorphism involves ascribing human traits, emotions, and intentions to non-human entities. In digital contexts, this is predominantly achieved through AI-driven interfaces such as chatbots and virtual assistants, designed to emulate human behaviors and conversational patterns. The primary objective is to evoke a sense of social presence and deepen user engagement.

Research indicates that anthropomorphism significantly enhances user experience. For instance, chatbots exhibiting human-like behaviors can boost user satisfaction and system acceptance by influencing perceptions of social presence and fostering trust and positive attitudes toward the platform. In other words, when users interact with a digital system that mimics human behavior, they perceive it as a social entity, which enhances their trust and enriches their experience. Consequently, anthropomorphism has been recognized as an effective strategy in digital marketing, enabling brands to forge stronger, more enduring connections with their customers (Bialkova, 2024). Furthermore, embedding anthropomorphism in user interfaces can elevate perceived value,

moderating the relationship between user experience and customer loyalty (Romagia, Indrayani, & Damsar, 2025).

Scientific studies suggest that the effectiveness of anthropomorphism in digital user environments is contingent upon users' demographic characteristics. Specifically, findings indicate that younger users exhibit a greater inclination to engage with anthropomorphic systems, finding such designs more appealing and functional. In contrast, older users generally prefer simpler, less complex interfaces. This variance in preferences underscores the need for a personalized approach to interface design and marketing strategies. To maximize engagement and loyalty, designers and marketers must carefully analyze the demographic profiles of their target audiences and tailor their interfaces and marketing messages accordingly. This necessitates a deep understanding of the needs, expectations, and preferences of diverse user groups to deliver optimally suited products or services (Zhang, 2023).

In digital marketing, the significance of anthropomorphism extends beyond mere aesthetics. It directly influences how users perceive brands and their willingness to engage with them. Brands that effectively integrate anthropomorphic elements into their marketing strategies can cultivate a sense of belonging and community among their audiences, playing a crucial role in nurturing long-term customer loyalty (Akinyi, 2024). In other words, anthropomorphism, by establishing an emotional and human-like connection between brand and customer, can enhance trust, empathy, and, ultimately, loyalty—a critical advantage in today's competitive environment where customers face a multitude of choices (Akinyi, Wanjere, & Simiyu, 2024).

As digital platforms continue to evolve, understanding the nuances of anthropomorphism will be vital for marketers aiming to enhance user experience and build customer loyalty. The interplay between anthropomorphic design, user experience, and customer loyalty—particularly amidst advancing technology and shifting user expectations—offers a rich avenue for further research. Ultimately, integrating anthropomorphism into digital user environments holds immense potential for improving user experience and fostering customer loyalty on marketing platforms. By leveraging human-like features in digital interactions, brands can create more captivating and profoundly impactful experiences that not only attract users but also encourage sustained loyalty over time. This approach aligns with the growing trends in digital marketing, where personalization and emotional connection are increasingly recognized as pivotal drivers of consumer behavior (Budaya, 2024).

This study employs a qualitative research method, utilizing in-depth interviews to develop a comprehensive model elucidating the impact of anthropomorphism in digital environments on user experience and customer loyalty. The objective is to construct a theoretically grounded model based on real-world data, leveraging

human-machine interaction factors to assist digital marketing professionals in designing user-centric systems and enhancing customer loyalty.

2. Literature review

The impact of anthropomorphism in digital user environments on user experience and customer loyalty within marketing platforms constitutes a multifaceted area of study that has garnered significant attention in recent years. Anthropomorphism, the attribution of human characteristics to non-human entities, plays a pivotal role in shaping user interactions with digital interfaces such as chatbots, virtual assistants, and brand avatars. This theoretical framework explores the various dimensions of anthropomorphism and its implications for user experience and customer loyalty.

User experience (UX), in essence, reflects the level of satisfaction and emotions users derive while interacting with a digital platform. Research demonstrates that incorporating human-like features—such as endowing chatbots or brand avatars with human personalities—can enhance user experience by fostering greater engagement and connection with these platforms. This, in turn, can lead to increased user satisfaction and loyalty toward the brand. Put simply, when a digital platform, such as a website or application, exhibits human-like traits, users feel more involved and connected. For example, a chatbot with a friendly and conversational tone can encourage users to engage more readily and ask questions, thereby boosting satisfaction and fostering brand loyalty (Maduku & Zhang, 2024). Emotional engagement is a critical dimension, as anthropomorphism can evoke emotions in users that are essential for building and reinforcing brand loyalty. When users perceive a digital interface as human-like, they are more likely to form an emotional bond, increasing their commitment to the brand (Akinyi, 2024; Chen, 2021). For instance, a digital platform with human-like characteristics can make users feel more engaged, encouraging prolonged interaction and deeper connection. Generational preferences also significantly influence how users respond to anthropomorphic features. Younger consumers, particularly Millennials and Generation Z, are more inclined to favor brands that employ anthropomorphic elements, seeking personalized and relatable interactions. This generational trend highlights the importance of understanding target demographics in crafting marketing strategies (Romagia, 2025; Zhou, 2024). Moreover, the use of anthropomorphic features can enhance trust and credibility in digital platforms. When a brand appears friendly and reliable, users are more likely to trust it, which can translate into greater customer loyalty. This is particularly vital in e-commerce, where trust plays a decisive role in purchase decisions (Budaya, 2024; Huseynli, 2023). While anthropomorphism in digital design can elevate user experience, striking a balance is crucial. Excessive human-likeness may trigger discomfort, a phenomenon known as the "uncanny valley effect," where a digital entity appears almost human but retains

subtle differences, eliciting negative reactions from users. Thus, designers must carefully calibrate the degree of anthropomorphism to avoid alienating users (Cheng, 2023; Gutuleac, 2024). Recent research underscores a meaningful relationship between anthropomorphism, user experience, and customer loyalty across various contexts. For instance, employing anthropomorphic elements in digital marketing strategies can significantly enhance customer engagement and loyalty. Personalized marketing that resonates with users' emotions is more likely to foster enduring relationships (Rowi & Zhao, 2024). In e-commerce, anthropomorphic customer interactions, particularly via chatbots, positively impact user satisfaction and loyalty. Customers are more inclined to return to online stores offering friendly and engaging digital experiences. In other words, human-like customer service—such as a warm and approachable tone—can create a superior shopping experience, converting users into repeat customers (Li, 2024; Mo, 2021). Anthropomorphism influences consumer behavior by enhancing the perceived value of products and services. When users feel connected to a brand, they are more likely to make repeat purchases and recommend it to others (Abbas, 2024; Puzakova, 2018).

Trust is a cornerstone in the relationship between anthropomorphism and customer loyalty. Brands that successfully craft a trustworthy and relatable digital persona can significantly boost user loyalty, emphasizing the need for transparency and reliability in interactions (Ghareeb, 2024; Oh, 2011). Recent findings underscore the importance of integrating anthropomorphic features into digital marketing strategies. Businesses are encouraged to leverage emotional engagement by creating relatable and engaging digital interfaces, fostering emotional connections with users and thereby enhancing loyalty. Understanding generational differences is also critical; tailoring marketing strategies to align with diverse generational preferences can amplify user engagement and satisfaction. Striking the right balance in anthropomorphic design is essential to avoid the uncanny valley effect and ensure positive user experiences. Establishing a credible digital persona can markedly enhance customer loyalty, underscoring the priority of transparency and reliability in interactions. In conclusion, the influence of anthropomorphism in digital user environments is a critical area of study that impacts user experience and customer loyalty. By understanding its theoretical foundations and recent research insights, businesses can effectively harness anthropomorphic features to refine their marketing strategies and cultivate lasting relationships with consumers.

3. Research Methodology

This study is a qualitative, exploratory investigation employing thematic analysis to interpret data. Conducted within an inductive approach and rooted in an interpretive philosophy, the research was carried out in Tehran, Iran. The target

population comprises academic experts—university professors and researchers from Tehran-based institutions with at least 4 years of teaching or practical research experience in fields relevant to the study—and industry experts, including product managers, digital marketing specialists, and developers of chatbots and virtual personas with a minimum of 4 years of professional experience. Participants were selected based on their expertise, academic publications, or contributions in anthropomorphism, user experience, or digital marketing. Sampling utilized the snowball technique, resulting in a total of 16 participants, a number determined by achieving theoretical saturation—where no new codes emerged after the 16th interview. The primary data collection tool was semi-structured interviews.

The interview questions were as follows:

1- In your opinion, which features of anthropomorphism in digital user environments most significantly impact user experience?

Objective: To identify key anthropomorphic features affecting user experience, such as personality traits, natural language, and human-like behaviors.

2- What factors contribute to users' interactions with anthropomorphic digital platforms resulting in a positive or negative experience?

Objective: To explore the antecedents and conditions shaping positive or negative user experiences with anthropomorphism.

3- Does anthropomorphism in digital platforms influence customer trust and loyalty, and if so, how? Please provide examples from your experiences.

Objective: To analyze the relationship between anthropomorphism and customer trust/loyalty, drawing on practical examples.

4- What differences do you perceive between user experiences on platforms with anthropomorphism versus those without it?

Objective: To compare user experiences and assess the distinct impact of anthropomorphism on interactions.

5- What recommendations do you have for improving user experience and enhancing customer loyalty through anthropomorphism in digital platforms?

Objective: To derive practical strategies for enhancing UX design and customer loyalty based on empirical findings.

To ensure the study's validity, triangulation was employed, collecting data from three primary sources: managers from marketing firms, faculty members from Tehran universities, and researchers in business management, alongside digital marketing specialists and chatbot/virtual persona developers. This multi-source approach enabled a more comprehensive and multifaceted understanding of the research topic—namely, identifying the antecedents and consequences of anthropomorphism in digital user environments and its effects on user experience and customer loyalty. Incorporating diverse sources enriched the depth and breadth of the data, facilitating a more nuanced analysis. Additionally, existing theoretical and empirical literature on anthropomorphism was used as a

supplementary resource to enhance analytical rigor. This blend of perspectives provided a robust foundation for examining the topic from multiple angles.

To further validate the findings, a data quality control process was implemented. Following data analysis, summarized results were shared with select interviewees to verify the researcher's interpretations against their intended meanings. Feedback from participants helped identify and correct any discrepancies, refining the findings to better align with their perspectives. This iterative process not only bolstered the validity of the results but also ensured their logical coherence with participants' actual viewpoints, particularly in analyzing anthropomorphism's antecedents and consequences. This method yielded deeper, more expansive insights, enhancing the study's scientific credibility.

To assess the reliability of the research tools, multiple strategies were employed to ensure consistent and dependable outcomes. A key approach was the precise and clear definition of terms and concepts, especially critical in semi-structured interviews—the cornerstone of data collection in this study. Ambiguity in terminology can undermine reliability; thus, efforts were made to craft questions that were comprehensible and straightforward for interviewees. To achieve this:

Questions underwent multiple revisions to ensure clarity and accessibility, with pilot testing conducted to confirm uniform interpretation among participants.

The question, “Do respondents interpret concepts as intended by the researcher?” guided the evaluation process.

Attention was given to the design and tone of the research tools, ensuring questions were engaging and motivating through appropriate wording and structure, fostering an appealing response environment.

To ensure data stability and accurate interpretation:

Initial findings were shared with select interviewees for feedback on accuracy and alignment with their intended meanings, with revisions made based on their input.

Six-Phase Thematic Analysis (Braun & Clarke, 2006):

Familiarization with Data: The researcher actively reviewed the data multiple times to gain a deep understanding, noting initial concepts and patterns for subsequent stages.

Generating Initial Codes: Relevant data segments were identified and coded based on the research focus, using either data-driven or theory-driven approaches depending on the study's objectives.

Searching for Themes: Initial codes were organized into potential themes, with some forming main themes, others sub-themes, and irrelevant codes discarded.

Reviewing Themes: Identified themes were refined at two levels—first, against summarized codes, and second, relative to the entire dataset—adjusting coding and themes as needed.

Defining and Naming Themes: Finalized themes were defined, named, and analyzed, detailing the data within each theme.

Producing the Report: A final analysis was conducted, and the research report was compiled, presenting refined themes and their interpretations.

This structured, flexible process enabled systematic data analysis and reliable findings.

4. Model estimation and results

a Analysis and Findings

In this study, semi-structured interviews were conducted with 16 experts in digital marketing and developers of chatbots and virtual personas to identify the antecedents and consequences of anthropomorphism in digital user environments. Descriptive statistics (Table 1) show that of the 16 participants, 11 were male and 5 were female. Age-wise, 8 were 30–40 years old, 5 were 41–50 and 3 were over 50. Educationally, 7 held master's degrees and 9 had doctorates. Professionally, 6 had 3–5 years of experience, 6 had 6–10 years, and 4 had over 10 years. This diversity in gender, age, education, and experience enhances the credibility and comprehensiveness of the findings.

Table 1. Descriptive Statistics of the Study

Variable	Frequency (Count)	Percentage (%)
Gender	-	-
Male	11	68.75%
Female	5	31.25%
Age Group	-	-
30-40 years	8	50%
41-50 years	5	31.25%
Above 50 years	3	18.75%
Education Level	-	-
Master's Degree	7	43.75%
PhD	9	56.25%
Professional Experience	-	-
3-5 years	6	37.5%
6-10 years	6	37.5%
More than 10 years	4	25%

Analysis of interview data yielded 147 base codes, organized into 21 organizing themes (subcategories), which were ultimately grouped into 6 overarching themes as the antecedents of anthropomorphism in digital user environments.

Table 2. Sample Interview Excerpts

Interview Text	Open Codes
Personalizing the user experience enhances satisfaction and fosters long-term engagement. When the system is tailored to the user's needs, they establish a stronger connection.	User-centered design, personalized settings, use of adaptive algorithms
Accurate simulation of human emotions strengthens user trust and emotional connection. This feature is particularly effective in customer service.	Designing for empathy, empathetic responses, emotional analysis
Fast and precise responses with natural and human-like behavior are the most crucial factors in building user trust. Accurate data analysis also helps optimize the experience.	Using data to build trust, fast and precise responses, human-centered interactions in digital environments

Table 3. Antecedents of Anthropomorphism in Digital User Environments

Main Codes (Core Themes)	Organizing Codes (Subcategories)	Initial Codes
Personalization and Optimization of User Interactions	User Experience Personalization	User-centered design, customized settings, adaptive algorithms, tailored content, unique user experience, data-driven personalization
	Simulation of Human Emotions	Designing for empathy, using emotional reactions, simulating human emotions in responses, emotional avatar design, empathetic responses, emotion-driven interactions, emotional analytics
	Development of Individual and Social Experience	Personalized user interaction, fostering social experiences, social systems in digital interactions, human-like connections, social network-based engagement, expanding social interactions, simulating social interactions
	Simulation of Real-Life Experiences	Mimicking real-world experiences, using real-world data, creating simulated environments, real-data-based interactions, designing personalized experiences, replicating real-world reactions, generating realistic digital experiences
Human Interactions and Natural Communication in Digital Space	Human-Centered Digital Interactions	Simulating human interactions, using natural language, designing human-like interactions, structuring real-life dialogues, fostering human experiences in digital spaces, creating empathetic conversations
	Simulation of Natural Communications	Designing human-like communications, using human-like voice and tone, analyzing body language in digital settings, replicating natural conversations, integrating human-like reactions, providing natural responses, mirroring real behaviors
	Simulating Social Behavior in Digital Environments	Simulating group interactions, behavior-based engagement, modeling collective behaviors, implementing social behaviors, mimicking online human-like engagement, fostering human-like social interactions, using psychological models for behavior replication
	Human-like Avatar Simulation	Designing human avatars, simulating human appearance, creating realistic avatar reactions, utilizing human-like digital avatars, emotional digital avatars, intelligent avatar design, engaging with human-like avatars
Social and Emotional User	Social and Emotional	Emotional engagement in digital spaces, integrating human-like reactions, analyzing social behaviors, using emotional

Experience in Digital Interactions	Interactions	data, designing for emotional reinforcement, strengthening emotional connections, warm and engaging interactions
	Human-like Responsiveness in Digital Interactions	Implementing human-like voice and tone, designing human-like interactions, providing natural feedback, fostering empathy in responses, generating human-like reactions, designing emotional responses, engaging with users' emotions
	Enhancing Trust and Customer Loyalty	Data-driven trust-building, personalized experiences for loyal customers, trust-building via human-centered systems, emotion-based interactions, fostering positive connections, emotionally-driven designs, long-term user engagement
	Social and Emotional Feedback Analysis	Simulating social reactions, collecting positive feedback from interactions, assessing user emotions, applying emotional analytics in design, enhancing satisfaction through emotional feedback, creating positive social connections, analyzing emotional experiences
Intelligent Responsiveness and Optimized Interactions	Fast and Optimized Interactions	Providing quick and precise responses, leveraging smart systems for interaction, ensuring immediate responsiveness, optimizing system efficiency, designing intelligent interactions, integrating optimized algorithms, creating seamless user experiences
	Instant and Smart Responsiveness	AI-driven response mechanisms, fast responses to user inquiries, instant feedback design, real-time response simulations, real-time data integration, designing real-time systems, advanced analytical response optimization
	Simulation of Social Behavior in Digital Environments	Integrating social behaviors in responses, human-like social engagement, designing for social behavior simulation, analyzing social and behavioral trends, mirroring group interactions, fostering collective engagement, developing socially aware designs
Simulation of Human and Psychological Behaviors in UX Design	Simulating Human Behavior in Interactions	Simulating human gestures, analyzing non-verbal behaviors, mimicking natural movements and reactions, utilizing human behavior data, human-centered interaction design, replicating human emotions in responses, generating natural reactions
	Simulating Human-like Responses	Designing human-like responses, generating human-like reactions, simulating emotional responses, providing natural feedback, fostering human-like engagement, using natural language in interactions, designing empathetic responses
	Using Psychological Data in UX Design	Applying psychological analytics, designing based on human behavior, analyzing emotions and feelings, replicating human reactions, creating emotionally attuned designs, leveraging behavioral data for personalization, incorporating psychological insights in responses
Customer Loyalty and Trust Through Human-Centered Interactions	Enhancing Customer Loyalty and Trust	Establishing long-term relationships, designing loyalty programs, trust-building through human-centered interactions, rewarding loyal customers, leveraging social interactions for loyalty, creating emotion-driven designs, fostering emotional experiences
	Developing Loyalty Experience	Designing long-term interactions, providing loyalty-driven experiences, strengthening customer connections, simulating loyalty-driven engagement, reinforcing trust in digital systems, offering exclusive services to loyal customers, creating personalized loyalty experiences

	Strengthening Human Interactions in Digital Spaces	Implementing human-like engagement in digital spaces, creating human-like relationships in digital environments, simulating human interactions, fostering human-centered digital experiences, enhancing human presence in digital interactions, using natural language for engagement, strengthening loyalty through human-centered interactions
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Table 4. Consequences of Anthropomorphism in Digital User Environments

Main Codes (Core Themes)	Organizing Codes (Subcategories)	Initial Codes
Social and Communicative Impacts on User Experience	Social Interactions in Digital Space	Digital group interactions, online discussions, social networks, simulated social interactions, online social behavior, online conversations, personalized group interactions
	Sense of Belonging and Human Connections	Strengthening sense of belonging, human connections in digital space, participation, trust in digital environments, social belonging in digital spaces, online social interactions, fostering human connections
	Simulating Natural Communication in Interactions	Natural tone responses, using body language in digital environments, human-like tone usage, human-like interactions, simulating human emotions, friendly and warm tone, using natural language in interactions
Smart and Optimized Interactions	Intelligent Responsiveness in User Experience	AI-driven responses, user behavior analysis, smart systems in interactions, instant response design, personalized responses, utilizing advanced data for response optimization, implementing intelligent algorithms
	Response Timing	High-speed responsiveness, precise response timing, instant responses, automated systems, interaction time optimization, fast responses to user requests, efficient and quick interactions
	Optimizing User Experience	Seamless interactions, optimizing user experience, utilizing big data, automatic experience adjustment, system efficiency improvement, interaction time optimization, system performance analysis
Emotional and Socially Responsive Interactions	Emotional Responsiveness in Digital Interactions	Generating emotional reactions, designing emotional responses, analyzing emotional responses, emotional interactions in digital environments, fostering empathy in interactions, incorporating emotional reactions in design, using emotional data for responses
	Building Trust in Interactions	Strengthening brand trust, increasing user confidence, leveraging positive feedback, designing interactions for trust-building, positive feedback impacts, strengthening trust through real interactions, using credible recommendations for trust enhancement
	Simulating Real-Life Interactions in Digital Environments	Simulating natural environments, designing interactions similar to real-life conversations, human behavior simulation, real-world-like interactions, using real data for experience design, creating reality-based interactions, simulating human behaviors
Loyalty and Trust Experience	Enhancing Customer Loyalty	Designing for user retention, strengthening relationships with loyal customers, rewarding loyal users, utilizing loyalty-focused designs, simulating loyalty interactions,

		creating exclusive experiences for loyal users, maintaining long-term customer relationships
	Encouraging More Engagement	Designing to increase interactions, motivating customer return, designing incentive-driven interactions, fostering long-term relationships, using personalized offers to encourage engagement, implementing reward systems, increasing user engagement tendency
	Brand Loyalty and Trust Experience	Using effective designs for brand retention, creating distinctive experiences for loyal customers, loyalty system design, reinforcing trust in brand interactions, leveraging valuable designs, analyzing loyal customer data, fostering confidence in loyal customers
Personalized Experience	Designing Personalized Experiences	Designing based on individual preferences, utilizing user data, highly personalized experience, applying adaptive algorithms, custom settings for each user, experience based on user priorities, tailored experience design
	Simulating Individual Behavior	Designing based on individual characteristics, simulating personalized reactions, responding to individual needs, designing personalized systems, analyzing user-specific characteristics, simulating personal preferences, responding to unique experiences
Efficiency and Optimization of Digital Experience	Efficient System Design	Designing fast and efficient systems, optimizing time and energy in interactions, enhancing system efficiency, utilizing efficient system designs, streamlined experience creation, reducing load times, designing for speed and efficiency
	Using Smart Systems for Optimization	Smart systems for experience adjustment, fast and intelligent responsiveness, optimized algorithms for user experience, automated systems for optimization, leveraging AI for experience enhancement, designing with optimized systems, utilizing smart data for experience improvement
	Optimized Experience with Adaptive Algorithms	Adjusting experience based on data analysis, real-time experience optimization, designing self-learning systems, simulating optimized behaviors, using algorithms for efficient interactions, efficiently analyzing data, optimizing user experience with adaptive algorithms
	Simulating Natural Behaviors in Experience	Designing natural interactions, simulating natural reactions, incorporating natural behaviors in responses, designing based on human reactions, human-like interactions in digital systems, simulating natural emotions, human-like reactions in design
	Utilizing User Data for Experience Optimization	Analyzing user data for optimization, leveraging user feedback, designing systems based on real data, optimizing interactions based on data, modifying user experience based on input data, utilizing user feedback for experience enhancement, precise experience design based on user needs
	Designing for Improved Efficiency and Speed in Interactions	Implementing fast systems for interactions, designing with optimized technologies, simulating rapid reactions, optimizing system speed, efficient and fast interactions, designing high-speed systems, improving interaction speed

Analysis of interview data identified 140 base codes, organized into 20 organizing themes (subcategories), ultimately grouped into 6 overarching themes as the consequences of anthropomorphism in digital user environments.

5. Conclusion and Recommendations

In the digital age, the interaction between humans and technology has reached new levels of complexity. A central concept in this domain is anthropomorphism—the attribution of human characteristics to non-human entities such as digital systems, chatbots, and intelligent assistants. This approach evokes a sense of human-like interaction for users, fostering emotional connections and trust in platforms. Designing systems with anthropomorphic features can enhance user experience, strengthen empathy, and ultimately increase customer loyalty. As technology advances and the use of digital platforms grows, understanding anthropomorphism's impact on consumer behavior and identifying its influencing factors are of paramount importance for businesses and digital designers. This concept can lead to personalized experiences, smarter interactions, and more sustainable connections between users and brands, while also presenting challenges such as managing user expectations and maintaining balance in human-like features.

The primary objective of this study was to identify and analyze the antecedents and consequences of anthropomorphism in digital user environments and assess its impact on user experience and customer loyalty. Through qualitative data analysis and semi-structured interviews with experts, the research extracted meaningful patterns demonstrating how anthropomorphism can transform digital interactions. Regarding antecedents, a total of 147 base codes were identified, organized into 21 organizing themes (subcategories), and grouped into 6 overarching themes.

One identified antecedent is personalization and optimization of user interactions, encompassing four concepts: personalization of user experience, simulation of human emotions, development of individual and social experience, and simulation of real user experiences. Personalization of user experience, achieved through tailoring interactions to user needs and behaviors using adaptive algorithms, creates a unique, satisfying experience that boosts engagement. Simulation of human emotions, via empathetic and emotional responses, delivers a more human-like and intimate experience, enhancing user trust and connection. Development of individual and social experience, by facilitating personal and group interactions, expands human connections in digital spaces and fosters a sense of social belonging. Finally, simulation of real user experiences, using real-world data and simulated environments, enhances realistic interactions and bolsters user trust in the system. In this vein, Marouf and Sharma (2024) note that personalizing user experience through adaptive algorithms and emotional

responses significantly increases engagement and satisfaction, with AI-driven personalization meeting individual preferences across sectors like e-commerce and healthcare. Studies also suggest that simulating human emotions and empathetic responses fosters a more human-like interaction, enhancing trust and social belonging (Pappas, 2018; Pilaniwala, 2024). Furthermore, facilitating individual and social interactions in digital environments improves communication and strengthens social bonds (Chandramouli & Ghansawant, 2023). Lastly, simulating real user experiences through realistic environments and data-driven approaches enhances interaction authenticity and user trust (Santhosh, 2024; Kril, 2023).

Another antecedent is human interactions and natural communication in digital space, with four concepts: human-centered digital interactions, simulation of natural communication, simulation of social behavior in digital, and simulation of human avatars. This antecedent revolves around emulating human behaviors and social interactions, enhancing users' sense of real presence in digital environments. Human-centered digital interactions emphasize creating experiences akin to human communication, using natural language and real-conversation-like responses. Simulation of natural communication designs interactions that feel like engagements with real individuals, not automated systems. Simulation of social behavior in digital environments fosters group interactions and a sense of collective presence. Simulation of human avatars involves designing digital personas with human-like appearance and behaviors, enhancing realism and engagement. Research by Wang (2023) and Kuiler (2021) highlights that human-centered digital interactions mimic real communication using natural language processing, boosting engagement and satisfaction. Simulation of natural communication enhances connection by making users feel they are interacting with real people (Riva, 2002; Chou, 2021). Simulating social behavior fosters community and presence (Liu, 2023; Hall, 2016), supported by human-like avatars that enhance realism and engagement (Latoschik, 2017; Oliveira, 2024).

Another antecedent, social and emotional user experience in digital interactions, includes four concepts: social and emotional interactions, human responsiveness in digital interactions, strengthening user loyalty and trust, and analysis and feedback of social and emotional users. This refers to designing systems that deliver natural emotional responses and empathetic interactions, making engagement more enjoyable and meaningful. Analyzing user emotions and tailoring responses deepens human-like connections. Studies by Fischer (2010) and Wallbott (1986) note that dynamic emotional interactions significantly influence user experiences and social behavior. Mahlke (2007) and Petrova (2021) find that human-like responsive systems enhance engagement and connection. Brady (2021) and Ju (2024) show emotional experiences foster

loyalty and trust, while Chen (2024) and Bao (2023) emphasize emotional feedback analysis for improving interaction design.

Another antecedent, intelligent responsiveness and optimized interactions, with three concepts—fast and optimized interactions, instant and smart responsiveness, and simulation of social behavior in digital—highlights leveraging smart technologies for precise, immediate responses. Data analysis and AI optimize user experiences, enhancing efficiency. Madhumita (2024) and Gomes (2024) note smart technology enables fast, efficient interactions, improving experience. Hong (2025) and Shang (2022) highlight AI and data analysis for instant, accurate responses, while Sundstedt (2023) and Fominska (2024) show social behavior simulation enhances engagement.

Another antecedent, simulation of human and psychological behaviors in UX design, with three concepts—simulation of human behavior in interactions, simulation of human responses, and use of psychological data in UX design—focuses on mimicking human and psychological behaviors for realistic, emotionally connected interactions. Volonte (2020) shows emotional simulation enhances engagement, Hong (2018) notes its role in design improvement, and Curtis (2021) links empathetic virtual assistants to better UX. Finally, user loyalty and trust via human-centered interactions, with three concepts—strengthening user loyalty and trust, development of loyalty experience, and enhancing human connections in digital space—emphasizes human-like strategies for trust and satisfaction. Krisprimandoyo and Bashir (2024) link positive brand experiences to loyalty, Kala (2024) and Higashinaka (2008) note human-centered interactions boost satisfaction, and Nwaimo (2024) and Srdanović (2024) highlight immersive technologies for engagement and belonging.

Regarding consequences, 140 base codes were identified, organized into 20 organizing themes, and grouped into 6 overarching themes.

Social and communicative impacts on user experience (three concepts: social interactions in digital space, sense of belonging and human connections, simulation of natural communication in interactions) shows social interactions shape UX, with Cocchia (2024) linking them to satisfaction, Wang (2025) and Kaur (2018) emphasizing emotional belonging, and Dzardanova (2023) and Nunes (2021) noting natural communication's role in authenticity.

Smart and optimized interactions (three concepts: smart responsiveness in UX, response timing, UX optimization) leverages technology for quality interactions, with Khadueva (2025) noting smart responses boost satisfaction, Wang (2024) and Li (2024) emphasizing timing, and Zhang and Wu (2024) highlighting continuous improvement.

Social and emotional responsiveness (three concepts: emotional responsiveness in digital interactions, trust enhancement in interactions, simulation of real

interactions in digital) focuses on human-like connections, with Loveys (2021) linking emotional expression to support, Adjekum (2018) and Shin (2020) emphasizing trust, and Hirskyj-Douglas (2020) and Irlitti (2023) noting real interaction simulation.

Loyalty and trust experience (three concepts: strengthening user loyalty, motivation for increased interactions, loyalty and trust experience with brand) fosters sustained connections, with Artamevia (2025) and Ghimire (2022) linking personalization to loyalty, Jang (2023) and Nilasari (2024) noting incentives, and Akoglu (2021) and Dhea (2025) emphasizing trust.

Personalized experience (two concepts: design of personalized experiences, simulation of individual behavior) tailors interactions to user needs.

Efficiency and optimization of digital experience (five concepts: efficient system design, smart system use, optimized experience with adaptive algorithms, natural behavior simulation, user data use) enhances performance, with Özisikyilmaz (2008) noting efficient design, Garg and Guo (2024) linking smart systems to personalization, and Kumar (2023) emphasizing natural behavior simulation.

Recommendations

Advanced Personalization Based on User Behavior: Digital platforms can use adaptive algorithms and user data analysis to deliver highly personalized experiences, employing advanced AI models to analyze preferences and provide precise, empathetic responses, enhancing engagement and trust.

Simulation of Human Emotions for Empathy: Designing emotional responses and human-like interactions, including smart avatars and human tones, can deepen connections and social belonging, improving UX.

Optimization of Smart Interactions and Response Timing: Leveraging smart technologies and data analysis for fast, accurate responses and minimizing delays can enhance satisfaction and sustained engagement.

Strengthening Loyalty via Human-Centered Interactions: Human-like strategies, such as rewarding loyal users and simulating real relationships, alongside incentives like personalized discounts, can boost trust and loyalty.

Limitations

Limitations are inherent to any study and pave the way for future research. As this study relies on an interpretive paradigm and qualitative data analysis, researcher subjectivity may have influenced component extraction. Despite efforts to minimize bias, preconceptions could have impacted results. Data were collected solely via interviews; future studies could incorporate supplementary methods like document content analysis or questionnaires.

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بررسی پیشینه‌ها و پیامدهای انسان‌نگاری در محیط‌های دیجیتال: «پیامدهایی برای تجربه کاربری و وفاداری مشتری»

چکیده

در عصر دیجیتال، انسان‌وارسازی- نسبت دادن ویژگی‌های انسانی به موجودات یا سامانه‌های غیرانسانی در محیط‌های دیجیتال- نقشی کلیدی در ارتقای تجربه کاربری (UX) و تقویت وفاداری مشتری دارد. با گسترش استفاده از هوش مصنوعی و رابط‌های هوشمند، شبیه‌سازی تعاملات انسانی به ابزاری مؤثر برای ایجاد ارتباطات احساسی و تسهیل تعاملات دیجیتال تبدیل شده است.

این پژوهش با هدف شناسایی عوامل زمینه‌ساز و پیامدهای انسان‌وارسازی و بررسی تأثیر آن بر تجربه کاربری و وفاداری مشتری انجام شده است. مطالعه حاضر با رویکردی کیفی و اکتشافی، بر پایه داده‌های حاصل از مصاحبه‌های نیمه‌ساختاریافته با ۱۶ نفر از خبرگان دانشگاهی و صنعتی، و از طریق تحلیل مضمون صورت گرفته است. نمونه‌گیری به روش گلوله‌برفی انجام شده و اشیاع نظری معیار تعیین حجم نمونه بوده است.

یافته‌ها نشان می‌دهد که انسان‌وارسازی تحت تأثیر شش عامل اصلی شکل می‌گیرد: شخصی‌سازی تعاملات کاربر، ارتباط طبیعی و شبیه‌انسان در محیط‌های دیجیتال، تجربه‌های اجتماعی و احساسی کاربران، پاسخ‌دهی هوشمندانه، شبیه‌سازی رفتارهای انسانی و روان‌شناختی، و اعتماد و وفاداری ناشی از تعاملات انسان‌محور. پیامدهای انسان‌وارسازی شامل افزایش تعاملات اجتماعی، پاسخ‌دهی هدفمند، تجربه‌های شخصی‌سازی شده و ارتقای اعتماد و وفاداری کاربران است. نتایج نشان می‌دهد که انسان‌وارسازی با ایجاد پیوندهای احساسی و تعاملات هدفمند، موجب رضایت بیشتر کاربران و تقویت وفاداری آن‌ها می‌شود. این یافته‌ها می‌تواند راهنمای مؤثری برای طراحان و بازاریابان دیجیتال در بهبود تجربه کاربری و تدوین راهبردهای حفظ مشتری باشد.

کلمات کلیدی: انسان‌وارسازی؛ وفاداری مشتری؛ تعاملات دیجیتال؛ تحلیل مضمون؛ تجربه کاربری.