ISSN 2616-5783 Vol.8, Issue 9: 7-13, DOI: 10.25236/AJHSS.2025.080902

Designing Intimacy: Applying Norman's Emotional Design Theory to Human-AI Companionship

Yinyuan Peng

Institute of Artificial Intelligence, Guangzhou Huashang College, Guangzhou, China
ypeng0322@gmail.com

Abstract: *AI companions, powered by advances in large language models and conversational AI, are increasingly designed for not only functional utility but also emotional engagement. As these systems evolve into entities capable of simulating intimacy, understanding the design mechanisms behind human-AI emotional relationships becomes critical. This study applies Norman's three levels of emotional design to analyse how affective bonds with AI companions are formed, sustained, and deepened. By mapping each design level to stages of emotional interaction, the framework reveals psychological processes and ethical challenges, including authenticity, anthropomorphism, and projected intimacy. The analysis highlights the need for interdisciplinary approaches integrating design theory, psychology, and ethics, offering a structured basis for creating emotionally intelligent AI companions with both engagement and responsibility in mind.*

Keywords: *AI Companion; Emotional Design; Human-AI Interaction; Artificial Intelligence*

1. Introduction

Artificial Intelligence (AI) companions, ranging from social chatbots to virtual agents, are rapidly emerging as significant mediators of emotional interaction in contemporary digital life. These systems, often powered by large language models and natural language processing, can engage in personalized conversations, maintaining interaction histories, and adapting to users' preferences over time. As a result, they are increasingly perceived not merely as tools but as entities with which users can form emotionally meaningful bonds [3] [15]. For some individuals, these companions serve as sources of comfort, intimacy, and even romantic projection, despite lacking genuine emotional consciousness [23]. However, the psychological and ethical consequences of such interactions are very real and increasingly significant in the landscape of human-AI relationships [8] [16].

The rapid evolution of AI companions is transforming the scope of human-computer interaction (HCI). Traditional frameworks in HCI primarily emphasize usability, functionality, and task efficiency, yet these approaches struggle to fully explain the emergence of "nearly intimate" relationships with AI systems. As AI companions evolve from functional chatbots to socially and emotionally resonant agents, new theoretical perspectives are needed to understand how emotional bonds are formed, sustained, and internalized. Industry trends underscore the significance of this shift: market projections suggest the global conversational AI market will reach 18.4 billion USD by 2026, driven in part by the growing adoption of AI companions in social, entertainment, and wellness contexts [2][4]. The growing societal presence of AI companions makes it urgent to understand the mechanisms underlying human emotional engagement with these systems.

This study applies Norman's Emotional Design Theory to analyze how emotional relationships with AI companions are built. The three-level model offers a layered view of how emotional experiences arise, deepen, and stabilize in human-AI interactions [18]. The visceral level captures instinctive, sensory driven first impressions; the behavioral level focuses on interaction quality, adaptive responses, and feedback; and the reflective level considers how long-term significance and identity projection consolidate enduring bonds. Using this framework clarifies the psychological mechanisms of engagement and provides a basis for interdisciplinary research bridging design theory, psychology, and AI ethics.

Accordingly, this paper investigates the following research questions:

RQ1: How can Norman's three-level emotional design model explain the formation and evolution of emotional relationships between humans and AI companions?

ISSN 2616-5783 Vol.8, Issue 9: 7-13, DOI: 10.25236/AJHSS.2025.080902

RQ2: How does each level correspond to different stages of users' emotional experience and relational perception?

RQ3: What insights can this theoretical framework provide for understanding the ethical dimensions of AI companionship?

By exploring these questions, the paper aims to bridge emotional design theory and the emerging field of AI companionship, offering a conceptual model that illuminates not only the mechanisms of human-AI emotional bonding but also the ethical considerations these interactions evoke. This theoretical framework contributes to a growing discourse in design research and HCI, emphasizing that the future of AI is not merely functional, but also profoundly emotional.

2. Background

2.1 The Origin of Norman's Emotional Design Concept

The study of emotion and design began in the 1990s. Overbeeke and Hekkert (1999) were the first to combine the concept of "emotion" with "design," aiming to help designers create products that hold emotional value for users [9]. This field has since gained increasing attention, leading to the establishment of the Design and Emotion Society in 1999 [11].

Building on appraisal theories, Desmet and Hekkert used consumer appraisal measurements to determine whether and what emotions were being evoked [10] [12]. Following their work, Norman focused on the relationship between users and design outcomes. In his book Emotional Design: Why We Love (or Hate) Everyday Things (2004), he introduced the concept of the "three levels of design" [18].

For designs that establish emotional connections with their users, Norman classified these connections into three levels: visceral, behavioral, and reflective. The visceral level refers to the immediate and instinctive emotional reactions triggered by the appearance or sensory attributes of a design, which forms the user's first impression. The behavioral level focuses on the emotions that users experience based on the design's functionality, usability, and interaction quality, which affect their satisfaction during use. The reflective level involves a deeper reflection from users on the emotional meaning and personal significance of the design, which helps to shape long-term emotional connections and self-identity.

2.2 Rising of the Artificial Intelligent Companionships

The concept of AI companionship traces back to early chatbots such as ELIZA (1966) and PARRY (1972), which surprised users by evoking emotional responses despite their limited capabilities [8][21]. Over the decades, conversational agents evolved from rule-based systems like SmarterChild (2000) into empathetic social bots such as Microsoft's XiaoIce (2014), which has engaged millions of users and demonstrated the emergence of long-term human-AI bonding through sustained dialogue and emotional resonance [25]. In the late 2010s and early 2020s, platforms like Replika and Character.ai further transformed the landscape by offering personalized, emotionally intelligent companions that are capable of deep self-disclosure and narrative continuity [6]. Recent studies report that such AI companions can significantly reduce loneliness and provide perceived social support, especially among users with limited social networks [24]. Altogether, these developments mark that human-computer interaction is evolving from interface design to social acceptability and believability [20].

Building upon the growing prevalence of AI companionship, contemporary research has turned to understanding the mechanisms behind user engagement with AI companions. Scholars have examined how users' social behaviors toward AI differ from those in human-to-human interactions [17]. Some groups of research investigate the formation and quality of emotional bonds with AI, including the conditions under which users perceive chatbots as potential friends [7][22], how they define and interpret these AI-mediated friendships [3], and how interpersonal relationship theories can be applied in contexts marked by anthropomorphism and questions of perceived authenticity [19]. Furthermore, recent studies have identified interactional patterns such as emotional nuance and even intimate behaviors that characterize these emerging human-AI relational dynamics [14]. At the same time, researchers have worked to identify factors from both the user and the AI system that influence how relationships develop. This includes the influence of individual traits, such as attachment styles, on users' willingness to trust AI companions [13], as well as design factors like conversational turn-taking and grounding strategies that shape perceptions of AI's social presence [1]. Together, these findings underscore the growing complexity and psychological

ISSN 2616-5783 Vol.8, Issue 9: 7-13, DOI: 10.25236/AJHSS.2025.080902

depth of human-AI companionships, highlighting the need for refined theoretical models to interpret and guide future design.

2.3 Toward an Emotional Design Perspective on Human-AI Companionship

The intersection of emotional design theory and the rising phenomenon of AI companionship presents a necessary area of inquiry. While Norman's emotional design theory has offered valuable insights into how users affectively responses to products and interfaces, its application has largely remained within the domains of industrial and interaction design. At the same time, emerging studies in human-AI companionship have revealed increasingly complex emotional interplays between users and artificial agents. These findings point to the evolution of AI systems from mere functional tools to emotionally resonant companions capable of simulating and even shaping intimate human experiences. However, existing research tends to focus either on the psychological consequences of such relationships or on the technological mechanisms that support them. What remains underexplored is how emotional design principles can contribute to a structured understanding of how these relationships are formed, developed, and sustained over time.

This research attempts to bridge that gap by introducing Norman's three levels of emotional design to the dynamics of human-AI companionship. Such an approach enables a layered understanding of how affective experiences with AI companions are not only triggered through surface aesthetics or conversational smoothness but also deepened through identity connection and personal reflection. This study uses the framework to explore how design choices affect users' emotional experiences and their views of the relationship. More broadly, this work contributes to the growing body of design research that engages with the emotional, ethical, and existential dimensions of AI-human interaction. It highlights the need for interdisciplinary models that go beyond functionality to consider the emotional foundations of companionship in the era of intelligent agents.

3. Theoretical Model

Norman's Emotional Design Theory offers a profound framework for understanding the emotional dynamics between humans and design products. This theory provides a comprehensive perspective through which we can examine how emotional connections are formed and nurtured in human-AI relationships. By focusing on three different levels, Norman's model allows for a deeper exploration of how these stages contribute to the building of emotional bonds, providing a theoretical foundation for understanding the relationship-building process between humans and AI companions.

3.1 Visceral Level: The Initial Emotional Response and Immediate Attraction

The visceral level plays a vital role in the early stages of human-AI relationships by creating immediate emotional engagement through sensory experiences. Norman's theory suggests that users' initial interactions with AI companions are heavily influenced by sensory inputs such as visual design, sound, and the overall interaction style. These first impressions are crucial because they set the tone for the entire relationship, often determining whether users will feel comfortable enough to engage further with the AI.

For AI companions, this involves the careful design of elements that trigger positive affect at first contact - expressive and friendly facial features, warm and consistent vocal qualities, harmonious color schemes, or subtle animations that convey attentiveness. An avatar that smiles sincerely or speaks in a calm, empathetic tone can evoke safety and openness, lowering barriers to initial engagement. This sensory-driven resonance is essential, without it, the opportunity to develop a lasting relationship may never arise.

3.2 Behavioral Level: Emotional Interaction and Feedback

Once initial engagement has been established, the behavioral level focuses on the ongoing dynamics between the user and the AI companion. This stage is marked by the reciprocal emotional feedback between the two, where the AI's ability to adapt to users' emotional states and provide meaningful responses becomes essential for deepening the connection. Norman's theory emphasizes the importance of interaction quality and emotional feedback in sustaining user engagement. At this level, users begin to develop a sense of being understood and emotionally supported by the AI, further strengthening the

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relationship.

AI companions must be capable of recognizing emotional cues from users through language, tone of voice, or even facial expressions and adjusting their responses accordingly. A system that recognizes frustration and offers sense of relief, or detects enthusiasm and matches it with affirming responses, strengthens emotional resonance. Such dynamic responsiveness nurtures the user's perception of being understood and emotionally supported, encouraging repeated interaction. Over time, this iterative cycle of expression and validation deepens attachment and trust.

3.3 Reflective Level: Long-Term Emotional Attachment and Identity Projection

The reflective level represents the deepest stage of relationship building, where users assign enduring personal significance to the AI companion. This level is key in transforming the AI from a tool into an emotional partner. Norman identifies reflection as a process through which users evaluate and contextualize their experiences, embedding them into their self-concept and life narrative. As users reflect on their relationship with the AI, it becomes an essential part of their emotional journey and personal growth.

For AI companions, the reflective level requires the ability to foster long-term emotional investment. AI companions that can remember past interactions, acknowledge user preferences, and offer personalized experiences over time help create a sense of continuity in the relationship. By engaging in co-constructed narratives such as shared milestones or recurring rituals, the AI becomes part of the user's identity framework. Users may project aspects of themselves, their aspirations, or their unfulfilled emotional needs onto the AI, transforming the relationship into a sustained source of belonging and self-reflection.

At this stage, the emotional connection transcends immediate utility. The AI companion is not simply a platform for interaction but a long-term partner in the user's personal and emotional journey, offering both continuity and space for self-exploration.

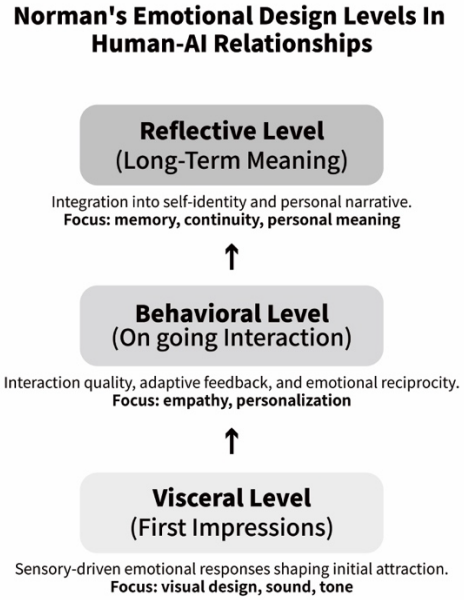

Figure 1: Graphic Representation of the Theoretical Model.

Figure 1. visualizes the proposed framework by mapping Norman's three levels of emotional design onto the process of human-AI companionship. The model highlights how sensory impressions initiate attraction, how mutual interactions sustain engagement, and how long-term meaning-making consolidates emotional attachment. The arrows indicate the dynamic progression across levels.

ISSN 2616-5783 Vol.8, Issue 9: 7-13, DOI: 10.25236/AJHSS.2025.080902

4. Discussion

4.1 Integration of the Three-Level Model

Norman's Emotional Design Theory functions as an interconnected system rather than three isolated stages. The visceral, behavioral, and reflective levels form a progressive and mutually reinforcing framework for understanding how emotional bonds with AI companions emerge, develop, and endure. Understanding how these levels interconnect and support one another is key to grasping the full complexity of human-AI relationships.

The visceral level serves as the entry point, generating the immediate emotional appeal that prompts initial engagement. Sensory elements such as visual aesthetics, vocal tone, and interaction style shape first impressions that can either invite or deter further interaction. This instinctive stage is critical in lowering barriers to engagement and creating the emotional readiness for deeper connection. A well-designed AI companion that evokes positive visceral reactions encourages users to explore the relationship further.

The behavioral level sustains the relationship by focusing on the quality and responsiveness of ongoing interaction. It is at this stage that the AI companion's ability to engage with users meaningfully becomes essential. Through adaptive responses, personalized interactions, and emotional feedback, the AI strengthens the emotional connection, fostering a sense of being understood and emotionally supported. This stage transforms initial attraction into sustained emotional investment, maintaining dynamism and user interest over time.

Finally, the reflective level plays a crucial role in maintaining the long-term stability of the relationship. It is at this level that users begin to form deeper emotional attachments, integrating the AI into their self-concept and personal narrative. Through features such as memory recall, continuity in interaction, and support for self-expression, the AI evolves from a responsive tool into a perceived emotional companion. This stage builds the relationship within the user's identity, ensuring endurance beyond functional exchanges.

In essence, these three levels of design are not sequential stages but rather interconnected phases that guide the emotional evolution of the relationship. The visceral level invites engagement, the behavioral level sustains it, and the reflective level secures it as a lasting bond. This integrated perspective offers a structured viewpoint for analyzing the process of building the emotional bond between human and AI.

4.2 Ethical Issues in AI Companion Design

As the design of AI companions increasingly integrates complex emotional engagement mechanisms, ethical considerations surrounding their use become essential. As these systems simulate intimacy and elicit deep emotional responses, they raise questions about authenticity, anthropomorphizing, and the psychological impact of projection-based relationships.

4.2.1 Authenticity vs. Simulation

One of the primary ethical issues in AI companion design is the tension between emotional authenticity and what can be described as "emotional simulation" or "emotional illusion." While AI companions can convincingly mimic empathy and emotional reciprocity, these responses are algorithmically generated and lack true consciousness [5]. At visceral and behavioral levels, users may experience these interactions as authentic, yet the underlying absence of genuine emotion poses a risk of creating a false sense of mutuality. Ethical design demands transparency about these limitations, ensuring users are aware that the bond, however meaningful it feels, is not reciprocal in a human sense.

4.2.2 The Boundaries of Anthropomorphism

The design practice of anthropomorphizing AI companions, embedding them with human-like qualities such as personality, emotions, or even consciousness, can strengthen engagement but risks blurring the distinction between person and machine. At the visceral level, lifelike visuals or voices may evoke powerful attachment, while at the behavioral level, human-like emotional expressions can reinforce the illusion of personality. Without clear boundaries, users may develop dependencies based on the perception of the AI as a genuine emotional partner. Designers must balance emotional resonance with safeguards against unrealistic or unhealthy expectations.

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4.2.3 Risks of Projected Intimacy

Another critical ethical consideration concerns the psychological risks associated with projected intimacy in human-AI relationships. At the reflective level, users are encouraged to project their emotions, desires, and personal identities onto AI companions. While this can provide short-term emotional relief, overreliance risks displacing or distorting human relationships, fostering social withdrawal or emotional dependency. Users who become too reliant on AI companions for emotional support may risk neglecting or distorting their real-life relationships, leading to social isolation or emotional dependency [6]. The ability of AI companions to simulate understanding and empathy might provide users with a sense of emotional fulfilment that overshadows the need for real human connection. Furthermore, the AI's lack of true emotional reciprocity means that these projected relationships are ultimately unbalanced, which could lead to feelings of emptiness, frustration, or even emotional disillusionment once the user realizes the AI's limited capacity for authentic connection.

The absence of true reciprocity means these bonds, though subjectively meaningful, remain one-sided, potentially leading to frustration or disillusionment. Ethical practice should position AI companions as supplementary, not substitutive, to human connection, and design should avoid the reinforcement of isolation.

5. Limitations

While this study offers a theoretical model for understanding emotional relationships with AI companions, some limitations remain. First, Norman's three-level framework, while structured and insightful, may not fully reflect the dynamic and evolving nature of emotional bonds. Human-AI relationships often follow non-linear, cyclical paths that resist fixed stage-based categorization. Second, the study adopts a primarily design-oriented perspective. A more comprehensive understanding would benefit from interdisciplinary approaches incorporating psychology, cognitive science, ethics, and sociology to better grasp the complexities of AI companionship.

6. Conclusions

This study proposed a theoretical model, grounded in Norman's Emotional Design Theory, to explain how human-AI emotional relationships emerge and evolve. By examining the visceral, behavioral, and reflective levels, it shows how sensory impressions, adaptive interactions, and reflective meaning-creating shape emotional bonds. The model reframes AI companionship as an emotionally layered process rather than a purely functional exchange, inviting interdisciplinary dialogue across psychology, ethics, and cognitive science.

As AI companions become part of daily life, understanding these mechanisms is vital. Future work should expand the framework through empirical research and ethical inquiry to ensure such relationships promote well-being, authenticity, and responsible innovation.

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