Conceptual Frameworks for Conversational Human-AI Interaction (CHAI) in Professional Contexts

Shridhar Marri

PhD Scholar, National Institute of Design, Paldi, Ahmedabad, Gujarat, 380007 India

ABSTRACT: Artificial intelligence (AI) is revolutionizing sectors like financial services, healthcare, and education, driving unprecedented progress and fostering innovation across domains. In this backdrop, basic conversational interface *aka* chat emerged as the predominant way to interact with AI systems. However, the current Human-AI (H2AI) conversations are fraught with a host of challenges necessitating a critical exploration into their design, strategy, and implications. Human-AI interaction design is hindered by fragmented and disjointed technology-driven approaches that lack design-led strategies to address emotional, adaptive, and holistic aspects of the field. This systematic study addressed this issue by developing conceptual models and frameworks integrating emotional, adaptive, and holistic social dynamics into Human-AI conversation design in professional settings. The comprehensive literature review spanning communication studies, user experience frameworks, design process models and conversational AI technologies revealed four research gaps. Through a multiple case study analysis across various industries, we developed four significant recommendations to enhance Human-AI interaction design. First, a typology of 12 Conversational Archetypes was established, providing a framework to inform dynamic and purpose led conversations in professional settings. Second, the Adaptive Conversational Interaction Dynamics (ACID) framework was introduced, integrating five dimensions—Conversation Management, Expertise and Competence, Emotional Intelligence, Trust and Credibility, and Personalization—to improve user engagement and satisfaction. Third, the Dynamic Experience Design (DxD) process emphasized a symbiotic approach with User Resonant Design principles and to create emotionally resilient and adaptable AI systems. Finally, the Conversational Human-AI Interaction (CHAI) framework integrated interactional, emotional, and ethical dimensions, ensuring AI systems are empathetic and ethically grounded. These contributions offer a comprehensive approach to designing advanced conversational AI that is responsive and adaptive. Further research needs to be undertaken to validate these frameworks through qualitative studies to ensure applicability across wider contexts, scenarios and cultures.

KEYWORDS: Adaptive Conversational Interaction Dynamics (ACID), Conversational Human-AI Interaction (CHAI), Conversational AI, Dynamic Experience Design (DxD), Human-AI Interaction Design.

INTRODUCTION

Conversational Human-AI Interaction (CHAI) is an interdisciplinary field that merges advancements from linguistics, natural language processing (NLP), human-computer interaction (HCI), cognitive science, psychology, user experience (UX) design, and ethics, among other fields. Its roots trace back to the 1960s with ELIZA, a rule-based system that pioneered humancomputer dialogue (Weizenbaum, 1966). By the 1990s, statistical methods revolutionized conversational systems, exemplified by IBM's Watson, which used probabilistic models to compete in *Jeopardy!* (Ferrucci et al., 2010). Apple's Siri and Amazon's Alexa further advanced the field through voice recognition and smart home integration. Recent breakthroughs in deep learning, such as Google's BERT (Devlin et al., 2019) and OpenAI's GPT-3 (Brown et al., 2020), and later GPT-4 models have set new standards in text generation. While technology is continually advancing, challenges remain in maintaining dialogue coherence, understanding emotions, and adapting to diverse cultural contexts (Bender et al., 2021). Additionally, the current Human-AI interaction design suffers from fragmented and disjointed approaches. And the conversational AI research is predominantly technology-driven with limited design-led approaches to address emotional, adaptive, and holistic aspects. This research aims to bridge that gap by developing conceptual models and frameworks that integrate these social dynamics, enhancing HumanAI conversation design in professional settings through a more cohesive, design-led approach. Design being a practice led, dynamic, contextual and creative profession, an integrated approach linking research, practice and industry would help study emerging complex design needs in a collaborative manner (Menon, 2015). This research adopts a design-led approach to enhance Human-AI conversations in

professional settings by incorporating emotional, adaptive, and holistic elements. Drawing insights from Human-to-Human (H2H) interactions, it develops frameworks to boost user satisfaction, trust, and engagement, ultimately creating more effective, context-aware, and nuanced AI interactions for diverse professional needs.

LITERATURE REVIEW

This literature review, encompassing four key facets, establishes a strong foundation for developing frameworks for HumanAI (H2AI) interactions. Through systematic analysis, synthesis, and contextualization of existing knowledge in conversational interactions and related fields, it provides a comprehensive basis for advancing future research and design. By highlighting the state of the art, the review identifies key themes, emerging trends, and critical gaps in the current literature, setting the stage for further exploration and innovation in this evolving domain.

The review covered 22 communication theories, 17 UX frameworks, 15 design process models and 17 conversational AI technologies, tracing their core ideas to draw relevant insights for the current study. The figure below outlines a total of 71 diverse studies across four key areas.
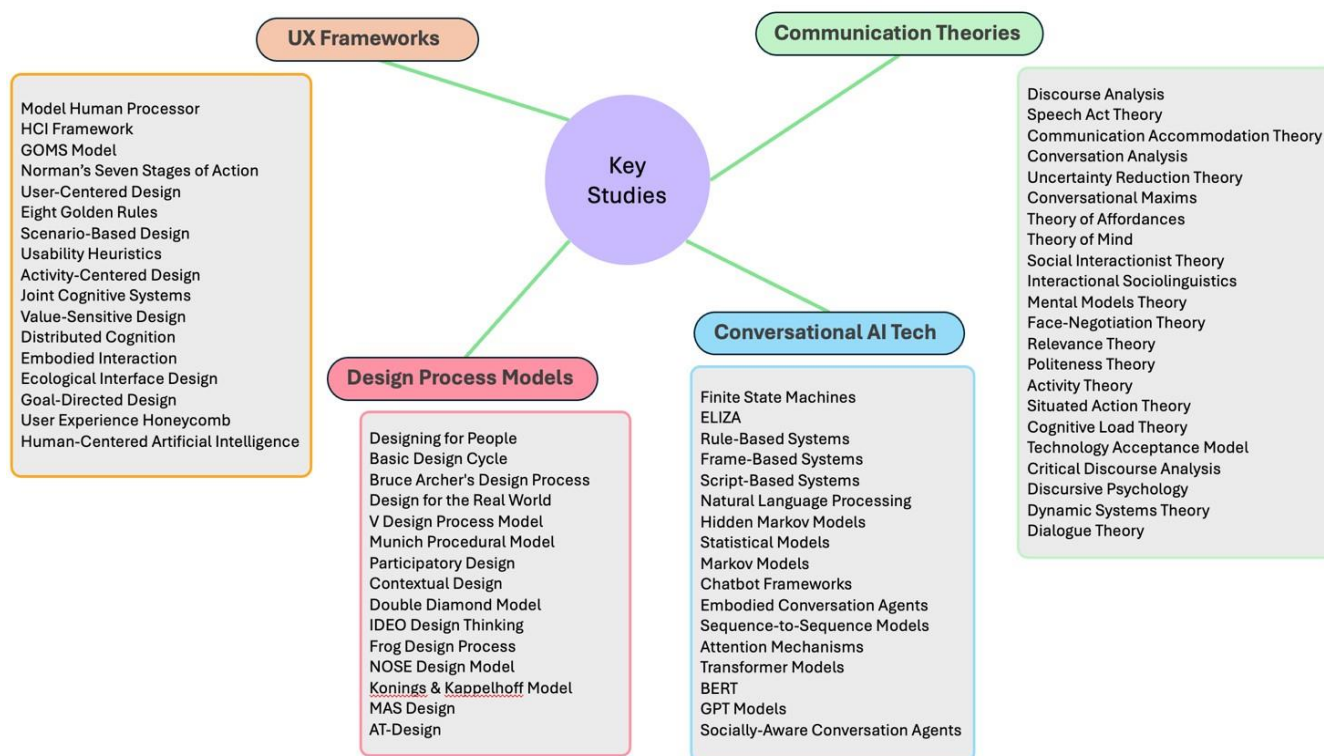

Figure 1: Diverse studies across four key areas

Critical Analysis of Key Studies

This research utilized open coding to analyze literature across four key studies, generating 92 initial codes. From these, 17 key influencing factors were identified, including verbal and non-verbal cues, empathy, power dynamics, contextual understanding, and ethical considerations. A subsequent gap analysis was undertaken to evaluate the strengths, limitations, and areas for improvement within these key studies resulting in 17 critical challenges, such as the need for enhanced emotional engagement, improved replication of human cognition, and more accurate action prediction. Furthermore, a comparative analysis provided further 17 insights into adaptability, collaboration, and context-adaptive responses. The table below compiles the 51 insights drawn from all three types of analyses.
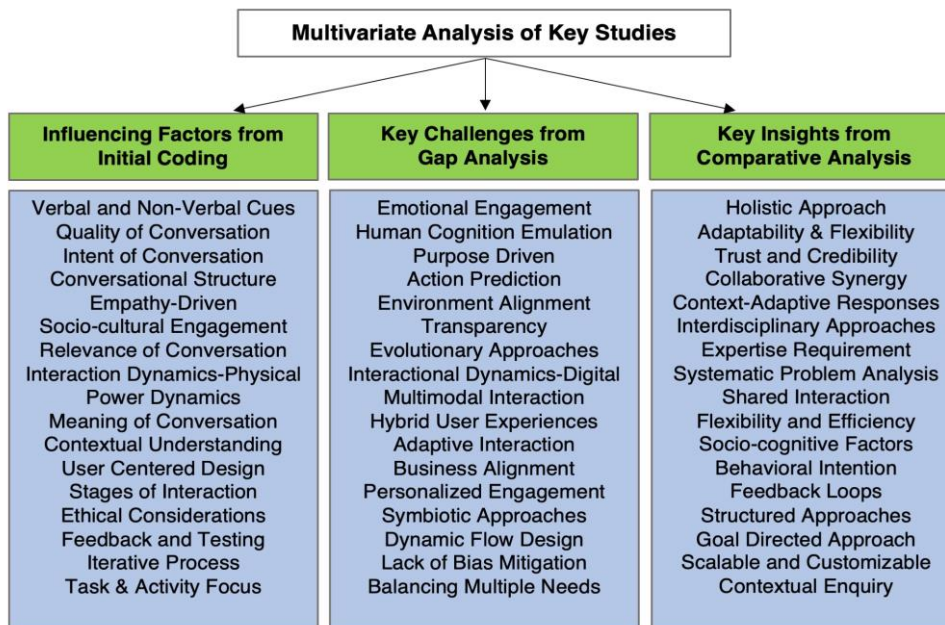
Figure 2: Insights from three types of analyses

Formulation of Unified Concepts

The subsequent thematic analysis categorized the 51 insights into two distinct groups based on their conceptual synergy. The first group, *Human-Centered and Ethical Interaction Dynamics*, emphasized empathy and sociocultural contexts prioritizing the human experience in design. The second group, *Adaptive, Dynamic, and Collaborative Design Strategies*, focused on creating flexible, dynamic experiences through adaptable design approaches.
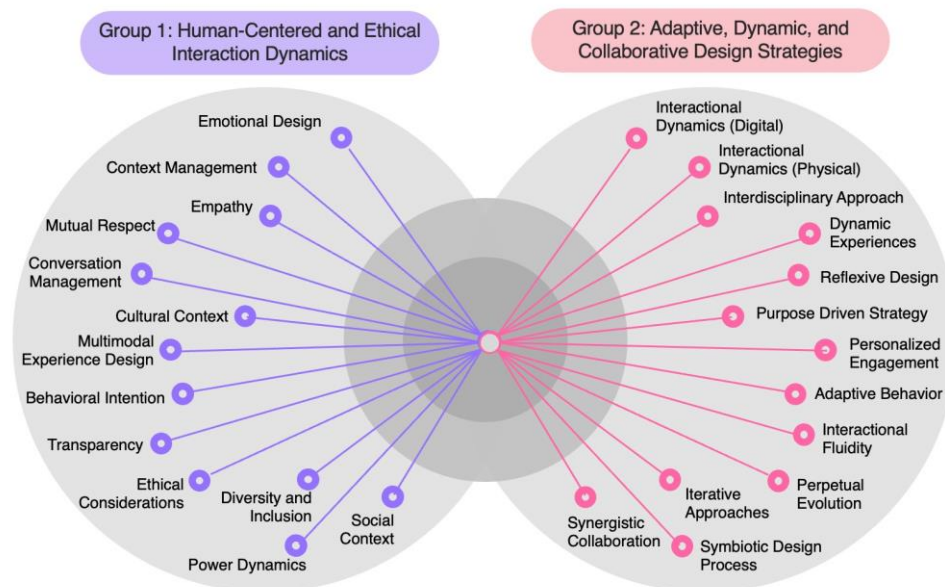

Figure 3: Key findings aligned to two distinct groups

By refining and synthesizing insights from both groups, eliminating redundancies, and merging closely related or intersecting features, a unified set of core concepts was developed. These concepts represent the essential elements required to enhance Human-AI conversations.
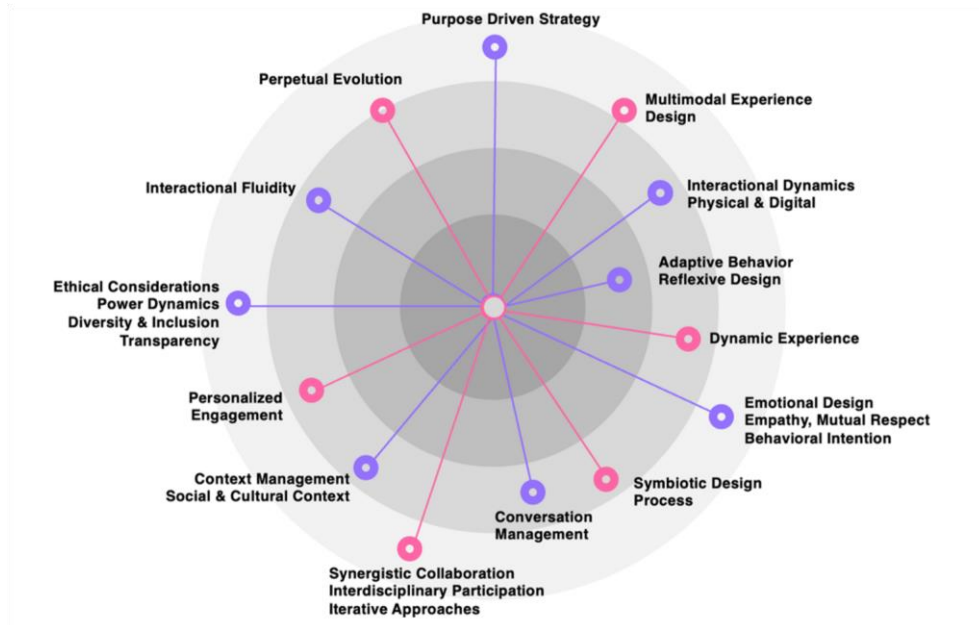
Figure 4: Unified concepts from the two groups

Synthesis of Concepts into Major Themes

The literature review synthesis involved integrating key concepts, resulting in six major themes, namely, purpose-driven strategy, emotional design, dynamic experiences, adaptive behavior, ethical considerations, and multimodal experience design. Each major theme is supported by three sub-themes, forming a structured framework that captures the complex, multidimensional aspects of Human-AI interaction design. The figure below illustrates the alignment of the major themes and sub-themes, providing a comprehensive guide for further research.
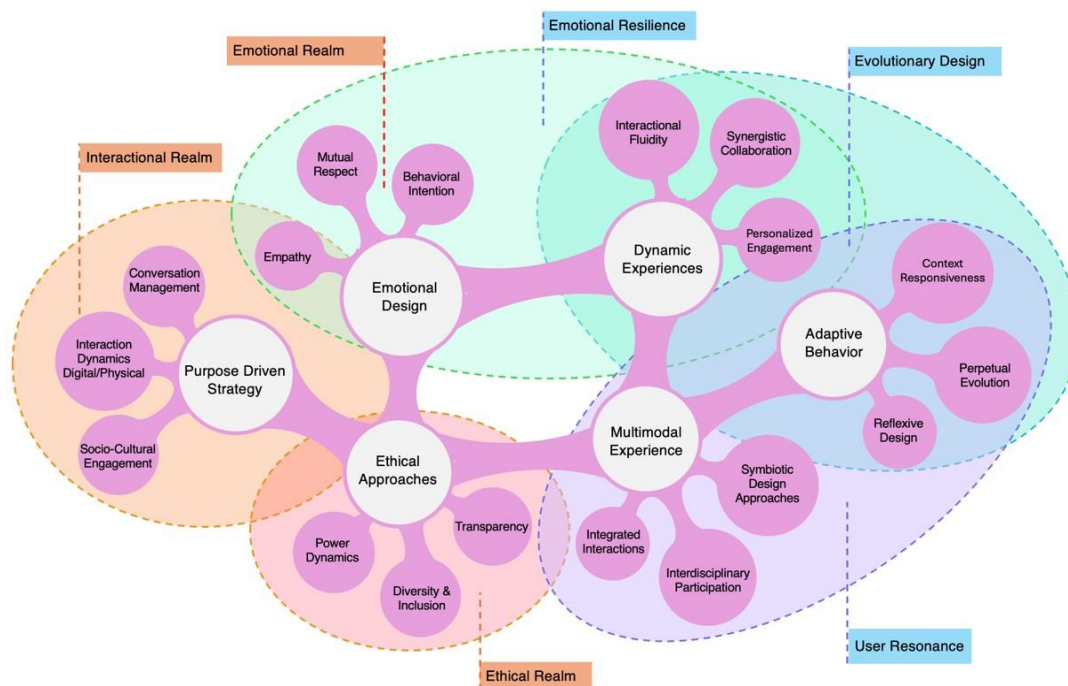

Figure 5: Six major themes and eighteen sub themes emerged from the literature review

Identification of Research Gaps

From the analysis of major themes and subthemes, eight critical research gaps were initially identified. After eliminating overlaps and consolidating related concepts, these were synthesized into four distinct research gaps, offering a clear direction for further exploration and investigation in the field. The four research gaps are outlined below.

1. Lack of purpose driven strategy in conversational Human-AI interaction design in professional settings
2. Lack of emotional, adaptive and holistic approach to conversational Human-AI interaction design
3. Absence of design-led approaches in conversational Human-AI interaction design
4. Lack of a comprehensive conceptual framework to inform conversational Human-AI interaction design

Formulation of Research Questions

To address synthesized research gaps, four corresponding research questions were formulated. The first question explores principles for effective H2AI conversations in professional contexts, while the second investigates the integration of emotional, adaptive, and holistic approaches. The third examines design methodologies and the fourth synthesizes existing studies to establish a cohesive framework.

Table 1: Research gaps mapped to research questions

Research Gaps	Research Questions
Lack of purpose driven strategy in conversational Human-AI interaction design in professional settings	What are the principles of effective and engaging H2AI conversations for different conversational purposes in professional settings?
Lack of emotional, adaptive and holistic approach to conversational Human-AI interaction design	How can emotional, adaptive and holistic approaches be integrated into H2AI conversations in professional settings to improve user satisfaction and trust?
Absence of design-led approaches in conversational Human-AI interaction design	What design approaches can be implemented to create effective and engaging conversational Human-AI interactions?
Lack of a comprehensive conceptual framework to inform conversational Human-AI interaction design.	How can current studies be synthesized into a framework that maps the interrelationships of various factors to guide the design of H2AI conversations?

RESEARCH METHODOLOGY

This section details the research paradigm, research methodology, and research methods, emphasizing how each element aligns with the research objectives and questions. It also provides a rationale for key decisions made throughout the research process, highlighting the logical coherence between the chosen approach and the goals of the study.

Research Paradigm

This research is grounded in pragmatist epistemology in an interpretivist framework. Pragmatism emphasizes practical knowledge and real-world problem-solving (Dewey, 1938), focusing on functional, contextual understanding over universal truths. It views knowledge as a tool for navigating the world, aligning with the study's practice-led approach and contextspecific outcomes. This study employed a qualitative, exploratory, and inductive approach using multiple case studies in specific professional contexts. It emphasizes rich, detailed descriptions and the understanding of experiences, focusing on how these experiences are constructed and interpreted, rather than quantified, making it well-suited for exploring complex, nuanced phenomena (Creswell, 2013).

Multiple Case Study Analysis

This study employs a multiple case study methodology to investigate the research problem in depth, utilizing single case analyses, cross-case analyses, and multiple case analyses. This approach is well-suited for examining complex phenomena in real-life

contexts (Yin, 2018). Typically four to ten cases are advised by experts for depth and comparative analysis while still being manageable. We have chosen six distinct cases distributed various industry sectors, domains, geographies and use cases, allowing a detailed exploration of each case's unique characteristics while facilitating comparisons to identify overarching themes.

Table 2: Case study framework

Case Study 1	Case Study 2	Case Study 3	Case Study 4	Case Study 5	Case Study 6
Use Case: Customer Acquisition	Use Case: Customer Acquisition	Use Case: Customer Support	Use Case: Customer Support	Use Case: Emergency Transactions	Use Case: Emergency Transactions
Actors: Human to Human	Actors: Human to AI	Actors: Human to Human	Actors: Human to AI	Actors: Human to Human	Actors: Human to AI
Domain: Banking	Domain: Banking	Domain: Insurance	Domain: Insurance	Domain: Healthcare	Domain: Healthcare
Country: India	Country: Singapore	Country: USA	Country: Indonesia	Country: India	Country: India
Private Sector: Corporate	Private Sector: Corporate	Private Sector: Mid-Size Org	Private Sector: Mid-Size Org	Private Sector: Small Scale	Public Sector: Government

Multiple data collection and data analysis methods facilitated comprehensive examination of conversational dynamics in Human-to-Human and Human-AI conversations. Data collection methods included recordings and transcripts of H2H and H2AI conversations, writing of the case studies, semi structured interviews, and observations. And the data analysis methods included single case study analyses, cross case study analyses, multiple case study analysis along with interpretative and thematic analyses. Single case analyses yielded rich insights into specific instances, while cross-case analyses revealed similarities and differences in the phenomenon across settings. Finally, multiple case analyses enhanced the generalizability of findings by considering variations across contexts ensuring robust and valid conclusions.

FINDINGS AND RECOMMENDATIONS

This chapter presents the key results of the research, based on the analysis of collected data. It outlines the four major findings in relation to the study's objectives. Firstly, a purpose driven typology comprising 12 Conversational Archetypes was developed delineating individual conversational models for each archetype. Secondly, the study originated the Adaptive Conversational Interaction Dynamics (ACID) framework, which portrays the five critical dimensions to inform Human-AI interaction design. Thirdly, the Dynamic Experience Design (DxD) process was introduced to help designers and developers with a step-by-step methodology. Lastly, the study formulated a Conceptual Framework for Conversational Human-AI Interaction (CHAI), integrating the findings and mapping their interrelationships to guide the design of Human-AI conversations. These findings collectively address the identified research gaps and offer practical solutions in professional environments. By linking findings to the broader context, the study provided actionable insights and suggested ways to address the identified gaps holistically. The figure below depicts the four findings addressing the corresponding research questions. The subsequent sections elaborate each of the findings and their significance.
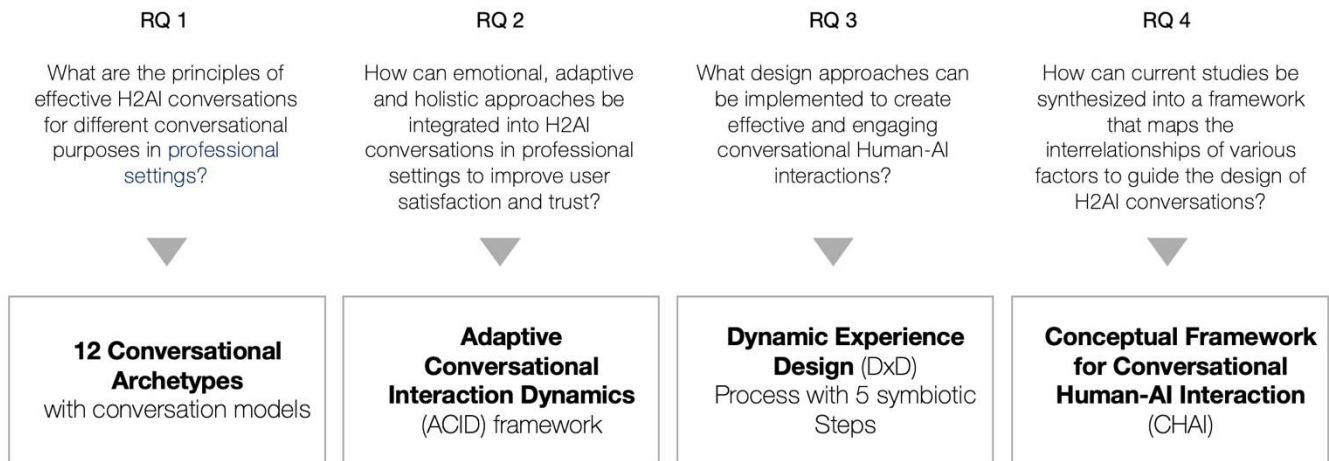
Figure 6: Research questions leading to research findings

Twelve Conversational Archetypes

Discerning the purpose of a conversation upfront exclusively underpins its design, implementation and evaluation. By grasping the purpose of conversations, designers and developers could align intentions with outcomes, crafting experiences that resonate with users at a deeper level. The study yielded insights culminating in the development of a detailed purpose driven conversational typology with 12 Conversational Archetypes. This typology recruits insights drawn from the H2H and H2AI conversations to define and universalize the categories, distilling their essence into 12 archetypes as depicted in the figure below. This typology also offers distinctive models for each archetype, helping designers and developers align their design work upfront. These archetypes, while unique in their own right, regularly converge and blend into each other in our daily conversations.

Figure 7: Twelve Conversational Archetypes

The 12 Conversational Archetypes provide a foundational framework for designing Human-AI interactions by offering universally recognizable patterns that reflect fundamental human experiences, emotions, and behaviors in professional settings. This typology serves as a powerful tool for guiding communication strategies, helping shape and direct interactions in a structured manner, ensuring that conversations are purpose-driven and aligned with specific goals or outcomes. By providing overarching models, the archetypes also enhance the understanding of audience needs, allowing practitioners to tailor experiences to the unique preferences, behaviors, and expectations of various audience types, fostering more meaningful and impactful interactions. Moreover, the use of archetypes significantly reduce cognitive load during the design process by streamlining the flow of conversations. This enables designers and developers to focus more on crafting content and addressing user needs rather than being bogged down by conversation structure. Overall, the 12 Conversational Archetypes offer a comprehensive framework that enhances both the efficiency and effectiveness of conversational design, contributing to the creation of more engaging and contextually relevant Human-AI interactions.

Adaptive Conversational Interaction Dynamics (ACID)

Adaptive Conversational Interaction Dynamics (ACID) framework is developed as a foundational structure for interpreting Human-AI conversations. It offers a coherent set of concepts that guide the design intervention. The framework integrates five key dimensions—Conversation Management, Expertise and Competence, Emotional Intelligence, Trust and Credibility, and Personalization—as key elements to design any kind of humanlike AI interaction. These five dimensions, discovered through the multiple case study analysis, are represented as five spheres in the ACID framework can be adapted to varied professional settings and use cases. Each of the five dimensions have a distinct set of constituent elements, contributes to creating AI systems that are empathetic, knowledgeable, trustworthy, and tailored to individual user needs.
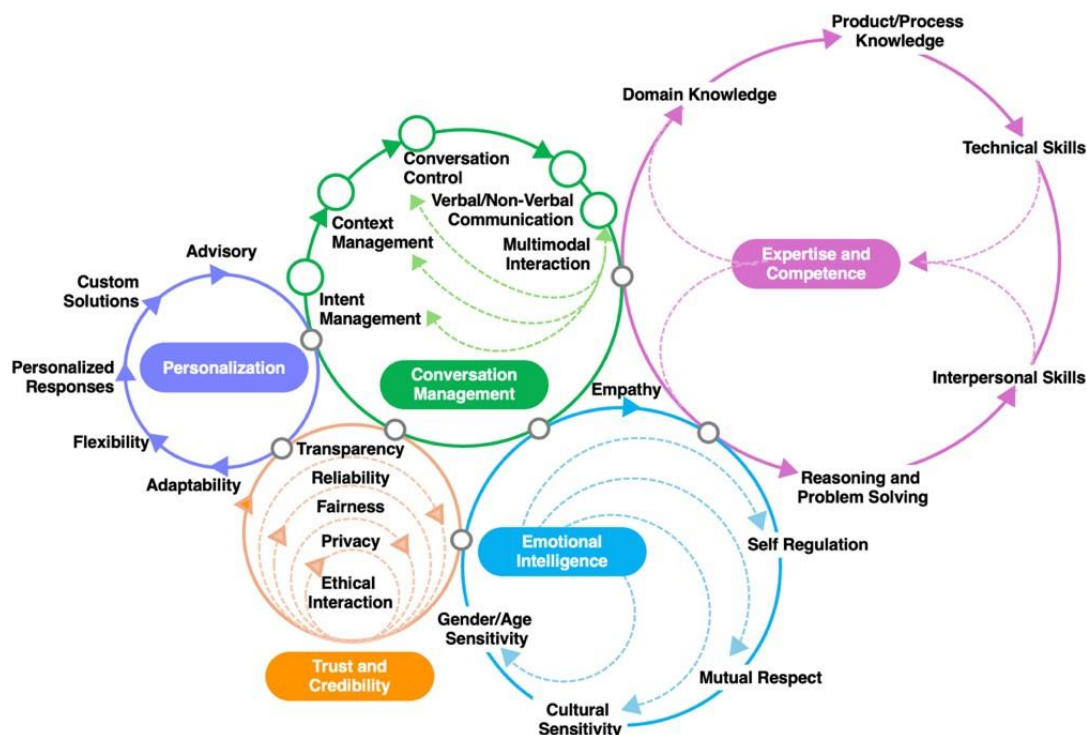

Figure 8: Adaptive Conversational Interaction Dynamics (ACID) framework

The Adaptive Conversational Interaction Dynamics (ACID) framework serves as a comprehensive model for enhancing Human-AI conversations by synthesizing disparate knowledge into a cohesive strategy. By providing a holistic approach, the ACID framework helps guide design interventions, translating theoretical concepts into practical applications for more effective conversational AI experiences. Central to the framework is the mapping of intracomponent dynamics, which surfaces critical

elements in each dimension. For example, dynamics such as Intent Management, Context Management, and Conversation Control within the dimension of Conversation Management govern every interaction. Similarly Domain Knowledge, Product/Process Knowledge, in combination with technical skills and interpersonal skills define the expectations of Human-AI interactions in professional settings. This mapping allows conversational AI systems to not only manage dialogue flow, but also lead to more relevant and meaningful exchanges. The ACID framework works by integrating and balancing multiple dimensions of Human-AI interactions to deliver more natural, engaging conversations. It also fosters cross-dimensional synergy, where Emotional Intelligence combined with Expertise and Competence help in offering Personalization which further leads to the creation of Trust and Credibility. This synergy between dimensions ensures that AI systems can respond contextually, anticipate user needs, and maintain transparency, resulting in more efficient, and adaptive conversational experiences. Furthermore, the ACID framework emphasizes contextual adaptation to 12 Conversational Archetypes, tailoring the design and interaction dynamics to specific audience, use cases or scenarios. Collectively, the ACID framework elevates the effectiveness of conversational AI by providing a structured approach to balancing technical, emotional, and contextual elements in user interactions.

Dynamic Experience Design (DxD)

Dynamic Experience Design (DxD) process emerged as a critical response to the notable absence of design-led processes in the realm of conversational experience design. DxD proposes a symbiotic and elastic design process by integrating core design principles of user-resonance, emotional resilience, and dynamic evolution. User resonance emphasizes interactive fluidity, emotional resilience focuses on personalized emotivity, while dynamic evolution caters real-time learning and continuous improvement. The five-step DxD process—Strategize, Codify, Compose, Implement, and Evolve—ensures that each phase of development is meticulously planned and executed, with the three design principles providing the guardrails from initial user research to continuous improvement post-deployment. DxD process, being a symbiotic approach, enables designers, developers and other professionals to work together seamlessly to ensure that technical solutions align with design principles.
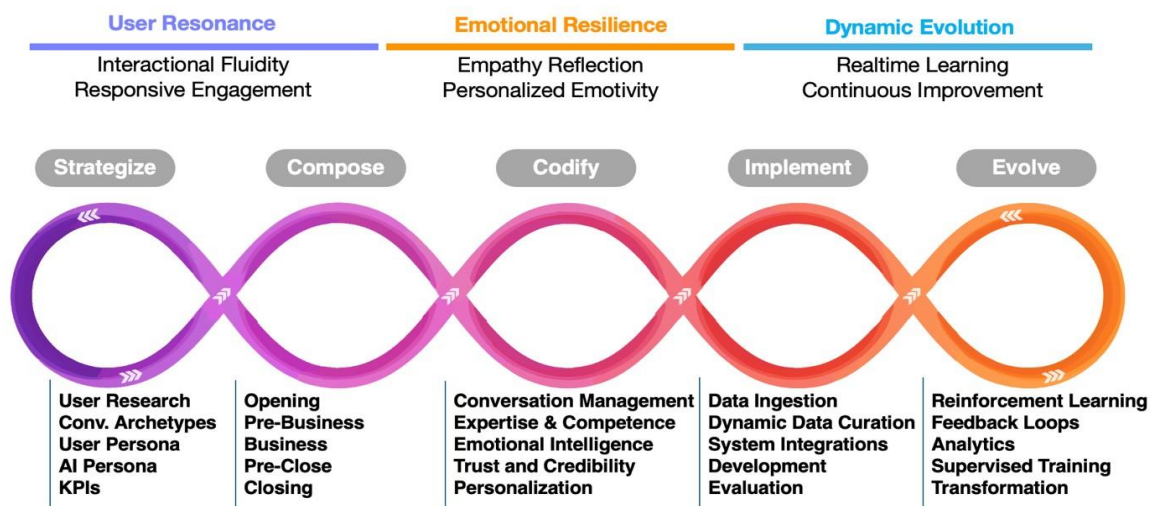

Figure 9: Dynamic Experience Design (DxD) process

The Dynamic Experience Design (DxD) process represents a paradigm shift in designing conversational experiences by prioritizing User Resonant Design over traditional User Centered Design methodologies. This approach acknowledges the fluid, interactive nature of conversations and aims to create experiences that resonate with users on a deeper, more intuitive level, aligning closely with the dynamic flow of human dialogue. Additionally, the DxD process fosters a Symbiotic Multidisciplinary Process, integrating the expertise of designers, developers, linguists, and researchers. This collaboration is essential to crafting relevant and effective conversational experiences, particularly in professional environments, where seamless interaction between humans and AI is critical for success. Another core feature of the DxD process is the Dynamic Evolution of conversations, which allows conversational interfaces to adapt and evolve based on real-time interaction feedback and human oversight. Unlike static user interfaces, these adaptive systems are continuously refined to improve user engagement and performance. Furthermore, the DxD process embraces

the elasticity of conversational interfaces by incorporating Emotional Resilience into the design, supported by empathy mapping and emotion response metrics. This ensures that conversational AI can flexibly respond to the emotional nuances of human communication, enhancing the overall experience and creating more empathetic, contextually aware interactions. Together, these principles form a holistic and adaptive approach to conversation design, paving the way for more meaningful and effective Human-AI interactions.

Conceptual Framework for Conversational Human-AI Interaction (CHAI)

The conceptual framework for Conversational Human-AI Interaction design is built on five foundational planes. Three core concepts—Interactional, Emotional, and Ethical—along with their intersecting dimensions, form the central hub of the framework around which various other planes are aligned. The intersections of core concepts reveal four critical dimensions such as Emotional Integrity, Socio-Emotivity, Power Dynamics, and Moral Ethicacy, which contextualize Human-AI interactions across their latitude. This central hub is encircled by the three design principles—User Resonance, Emotional Resilience, and Dynamic Evolution. These principles focus on responsive engagement, personalized engagement and continuous improvement and act as a guardrail for the central hub. Then the five essential dimensions drawn from the ACID framework—Conversation Management, Expertise and Competence, Emotional Intelligence, Trust and Credibility, and Personalization form the main disc that rotates on a central axis. These dimensions along with their constituent elements act as the gateway to designing successful Human-AI conversations. While the central hub is fixed, the rest of the discs in the framework act as interdependent discs that can be turned and rotated based on need and context. Finally the 12 conversational archetypes are situated at the outer ring of the framework. By integrating the core concepts, their intersections, design principles, and key dimensions, the CHAI framework offers a comprehensive portal with movable control disks for designing HAI interactions that are emotionally aware and responsive. The figure below offers a view of the framework.
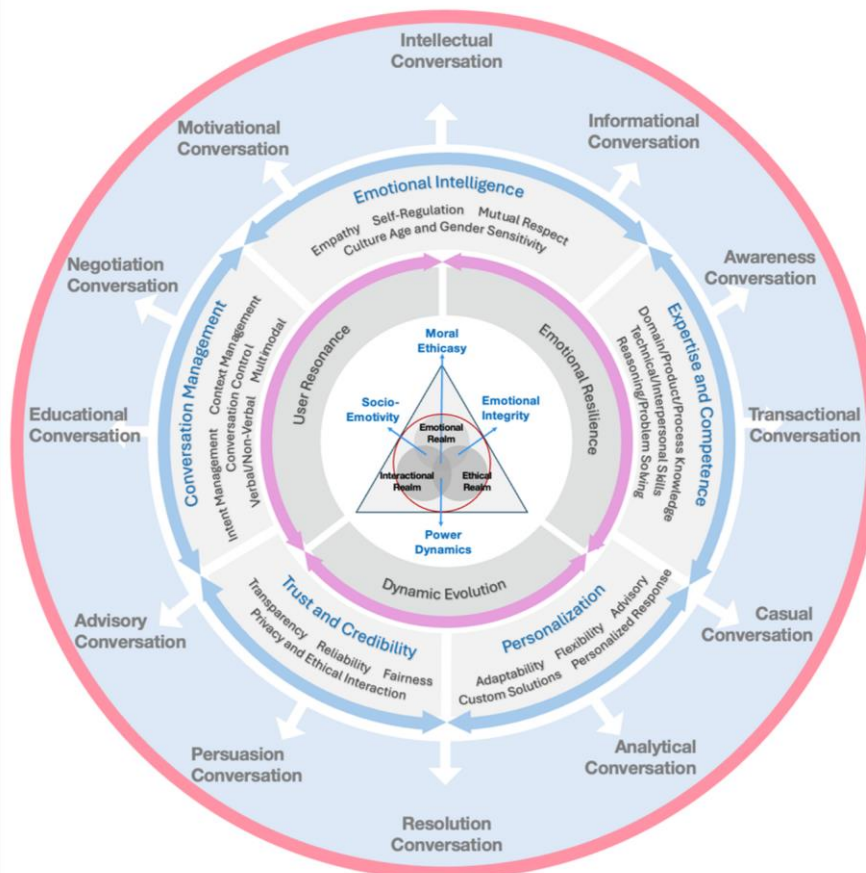

Figure 10: Conceptual Framework for Conversational Human-AI Interaction (CHAI)

Integration and Synthesis

The findings of this study forged eight cross-cutting themes that permeate all the proposed frameworks to enhance Human-AI interactions. Emotional Engagement emphasizes recognizing and responding to user emotions, while User Resonance addresses adapting AI to diverse user preferences. Dynamic Evolution highlights real-time adaptability for relevance, and Moral Ethicacy incorporates socio-emotional considerations and power dynamics. Trust and Credibility stress the importance of transparent, reliable AI interactions. Personalization ensures tailored user experiences, Interdisciplinary Collaboration integrates diverse expertise, and Expertise and Competence require AI systems to possess specialized knowledge. These themes collectively offer a roadmap for emotionally intelligent, adaptive, ethical, and user-resonant AI design.

CONCLUSION

This exploratory study, using qualitative methodologies, uncovered several complex and critical challenges in current HumanAI interactions. A comprehensive literature review identified four major research gaps, which informed the development of corresponding research questions. The research was grounded in a pragmatist epistemology within an interpretivist framework, emphasizing practical knowledge and real-world problem-solving (Dewey, 1938). In line with this approach, multiple case study analysis was selected as the most suitable methodology to explore the phenomenon in real-world settings with a practiceled approach focused on context-specific outcomes. These case studies involved Human-to-Human and Human-AI conversations across various industries, sectors, and geographic regions. Through detailed analysis of these cases, the four identified research gaps were effectively addressed, leading to four key findings.

Summary of the Research

The study identified four significant findings. First, it developed a purpose-driven conversational typology that outlined 12 Conversational Archetypes. While these archetypes are generic in structure, they can be dynamically adapted to various contexts and needs. Second, the Adaptive Conversational Interaction Dynamics (ACID) framework was introduced as a comprehensive framework to enhance human-AI interactions in professional settings. By integrating five key dimensions identified in case study analysis, the framework addresses critical gaps in current Human-AI interaction design. Third, the Dynamic Experience Design (DxD) process emphasizes a design-led approach, integrating user resonance, emotional resilience, and dynamic evolution through a five-step methodology—Strategize, Codify, Compose, Implement, and Evolve. Finally, the study proposes a cohesive conceptual framework for Conversational Human-AI Interaction (CHAI) design, integrating interactional, emotional, and ethical realms, thereby ensuring AI systems are responsive, empathetic, and ethically grounded.

12 Conversational Archetypes	ACID Framework	DxD Process	CHAI Framework
Offers a nuanced purpose driven typology	Synthesizes and integrates knowledge.	Introduces a symbiotic, user-resonant approach	Offers a comprehensive framework
Enhances understanding of dialogue structures in professional settings	Translates theoretical concepts into a cohesive strategy	Emphasizes real-time, adaptive design with emotional resilience	Integrates emotional, adaptive, and holistic approaches
Provides a valuable tool for diverse interaction scenarios	Offers a structured model to analyze conversational dynamics	Offers a 5-step process with feedback loops for dynamic evolution	Provides a foundation for developing advanced Human-AI conversations.

Figure 11: Summary of Research Contribution

These models and frameworks together provide a systematic approach for understanding, analyzing and designing conversational Human-AI interactions and thereby guide interventions and improve interaction outcomes.

Limitations

This research study acknowledges several limitations. First, while both text and voice inputs were analyzed in the case studies, non-verbal forms of communication, such as gesture and body language, were excluded due to the wide geographic dispersion of the participants. Additionally, the case studies focused on specific organizations in certain domains and sectors, thus excluding scenarios in aggregator or marketplace contexts. Such settings could have provided valuable insights into advisory interactions involving multiple product or service options. Furthermore, due to privacy concerns, especially in professional environments, logged-in scenarios were not examined, limiting the scope of user-specific interactions to non-logged in scenarios. Longitudinal studies were also beyond the scope of this research, preventing the examination of conversational dynamics over extended periods. As a result, emotional variations or behavioral changes across multiple interactions with the same subjects were not assessed. These limitations suggest areas for future research to broaden the understanding of HumanAI interactions across different contexts and timeframes.

Future Work

Future research should focus on qualitative studies to validate and refine the models and frameworks proposed in this study. Conducting cross-cultural research will be crucial to ensure their universality and applicability across diverse contexts. Additionally, expanding research to cover a broader range of professional settings within each industry will strengthen the robustness of these frameworks. The development of standardized evaluation metrics and modularization of the frameworks will facilitate easier adoption by organizations of various sizes, minimizing the need for substantial resource investment. While the current models address conversational Human-AI interactions in professional environments, further studies exploring nonprofessional contexts and AI-to-AI interactions would extend their applicability. Moreover, targeted research could investigate how the proposed models and frameworks can be leveraged to improve large language models (LLMs).

REFERENCES

1. Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency, 610-623.
2. Brown, T., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., ... & Amodei, D. (2020). Language models are few-shot learners. arXiv preprint arXiv:2005.14165.
3. Creswell, J. W. (2013). Qualitative inquiry and research design: Choosing among five approaches (3rd ed.). SAGE Publications.
4. Devlin, J., Chang, M.-W., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of deep bidirectional transformers for language understanding. Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long and Short Papers), 4171-4186. https://doi.org/10.18653/v1/N19-1423
5. Dewey, J. (1938). Logic: The theory of inquiry. Henry Holt and Company.
6. Ferrucci, D., Brown, E., Chu-Carroll, J., Fan, J., Gondek, D., Kalyanpur, A. A., ... & Welty, C. (2010). Building Watson: An Overview of the DeepQA Project. AI Magazine, 31(3), 59-79. https://doi.org/10.1609/aimag.v31i3.2303
7. Menon, Gayatri (2015). Design research model: establishing a link between design education, practice and theory, In: ICoRD'15 – Research into Design Across Boundaries Volume 1 (pp 61-69) edited by Chakrabarti,A., Springer India pvt ltd.
8. Weizenbaum, J. (1966). ELIZA—a computer program for the study of natural language communication between man and machine. Communications of the ACM, 9(1), 36-45.
9. Yin, R. K. (2018). Case study research and applications: Design and methods (6th ed.). Sage Publications.