

Defining Dialogues: Tracing the Evolution of Human-Machine Communication

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Abstract

This introduction to the volume discusses the evolving field of Human-Machine Communication (HMC), drawing on insights from the philosophy of science. We explore critical debates in the field, underscoring the importance of challenging assumptions, embracing interfield work, and fostering dialogue in shaping our understanding of HMC. Moreover, we celebrate the vibrant collaboration between disciplines that drives progress in HMC. This piece serves as an invitation to join the exploration of this collection and contribute to shaping the future of HMC.

Introduction

Introducing Volume 6 of *Human-Machine Communication* provides an opportunity to check how our field is evolving: Is it narrowing or growing in scope, converging toward theoretical uniformity, solving problems, or discovering new challenges? We explore these questions at a critical time for Human-Machine Communication. The public release of LLMs and generative AI tools (e.g., ChatGPT, Co-Pilot, Midjourney) in late 2022 is fueling a surge of interest in the opportunities and risks of machines that communicate. We stand before an exhilarating vista of social and scientific importance. At the same time, we must also heed the call of Hepp et al. (this volume) to maintain a critical and reflexive stance amidst the hype. As we look past the fanfare and aim to place this volume's contents into context, we anchor ourselves in the dialogue exploring the emergence and evolution of

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scientific fields. Thomas Kuhn's (1962) *The Structure of Scientific Revolutions* is likely the best-known work within the philosophy of science genre, but scores of other authors have explored the reasons new disciplines fail or succeed. Immersing ourselves in this literature, we find much in this volume to suggest that our discipline is evolving in a healthy way. We witness the active debate of core concepts, the use of interfield theories, and new dialogues that redefine relationships in the novel contexts where human-machine communication (HMC) occurs.

Progress Through Challenging Assumptions

In this volume's lead article, van der Groot and Etzrodt ask tough questions about one of the paradigms most central to our discipline: Computers Are Social Actors (CASA). Or, perhaps we have misspoken here. Should we have said *Computers As Social Actors*? This small difference in wording is how Van der Groot and Etzrodt organize their discussion on a much larger and unsettled debate in our field that they express as "Media Equivalence" versus "Media Evocation." Their explication of the differences between these perspectives weaves in many ideas that feel familiar to us in the Human-Machine Communication field but have nevertheless always felt slightly on edge as if they were built on assumptions that were yet to fully bake. For example, are people *really* just "mindlessly" responding to machines like they do humans, or do people interact with careful consideration of the "paradox state" of machines? Alternatively, are people *inspired* by machines as social partners, or are they *deceived* by machines? Van der Groot and Etzrodt offer a fascinating history of these competing views in which they step beyond the bounds of a literature review to chart an etymology of the media equivalence and evocation perspectives. Here, the words of philosopher Stephen Toulmin, who wrote extensively about the philosophy of science, resonate: "The novelty of the conclusion comes, not from the data, but from the inference: by it we are led to look at familiar phenomena in a new way, not at new phenomena in a familiar way" (Toulmin, 1972, p. 20). Van der Groot and Etzrodt's articulation of these perspectives compels us to reexamine our own bedrock assumptions. Van der Groot and Etzrodt rarely present any idea in their piece without a rebuttal to consider—forcing us to name, revisit, challenge, and reflect on our latent presuppositions about the social relations between people and communicative technologies.

It is easy to see such challenging questions as a fracturing force within our young discipline. Must we choose a side in each literature review, operationalization, and conference presentation? Toulmin (1972) would instead suggest that such debates that cut to the core of our field are commendable, "[We] demonstrate our rationality, not by a commitment to fixed ideas, stereotyped procedures, or immutable concepts, but by the manner in which, and the occasions on which, we change those ideas, procedures, and concepts" (p. 5). Van der Groot and Etzrodt's article provides one of those occasions by offering a sparkingly clear partitioning heuristic. Moreover, their article is not only characterized by repeated contrasts; Van der Groot and Etzrodt also offer some paths to resolving these competing views, echoing Toulmin's suggestion that the *way* in which we challenge concepts is important. Toulmin (1972) also cautions, however, that "[when] a set of concepts achieves unchallengeable authority in any field of enquiry, that discipline no longer faces 'scientific' problems" (pp. 189–190). In a similar vein, Kenneth Gergen (1978) reminds us that

“the labeling of any given action is forever open to negotiation among interested parties, and the legitimacy of any observation statement is continuously open to change” (p. 1350). This holds particularly true considering that “patterns of human activity are themselves in a continuous state of emergence, *aleatoric* in the sense that they may largely reflect contemporary contingencies” (p. 1353), an issue underlined by HMC researchers (Edwards et al., 2019; Fortunati & Edwards, 2021; Gambino et al., 2020; Lombard & Xu, 2021) that is honored and extended in the present article. Thus, while Van der Groot and Etzrodt’s work brings us closer to reconciling competing perspectives, we hope that the spirit of looking at fundamental ideas in new ways persists; in doing so we ensure the continued evolution and health of our field.

Following Van der Groot and Etzrodt’s provocative lead article, Marco Dehnert provides a calming refrain in the second article of this volume. Dehnert uses the archipelago metaphor to grasp our field’s current state and plot a forward path. Dehnert suggests that rather than rush to congeal around certain beliefs, the HMC community should *embrace* conceptual ambiguity, viewing different subjects, methods, and conceptualizations as a chain of islands ripe for exploration. Dehnert explicates his vision of the HMC field as archipelagic and “made up not of a coherent subject or a cohesive body of literature, but rather entails a variety of islands differing in shape, size, location, and proximity to one another” (p. 32).

Dehnert’s archipelago metaphor also emphasizes the diversity in HMC. Many disciplines and methodological approaches have lent their insights to the burgeoning understanding of HMC. Dehnert emphasizes that in HMC, no single theoretical, methodological, or technological island takes precedence over others. Instead, what comes “first” in HMC is an appreciation for the multitude of approaches to our field of study and a realization that conflicts (like those explored in the lead article) are the strength of HMC. What strikes us about Dehnert’s analogy is that HMC scholarship’s joy lies not in guarding our islands but in navigating between them. In turn, Dehnert’s approach inspires us to be bridge-builders, to add to the rich tapestry of our islands’ linkages and differences. We are reminded here of D’Agostino’s (2012) study of how disciplines expand through fostering the infusion of diverse perspectives and maintaining “incentives for individuals not to converge on some canonical articulation of the abstract and concrete (and hence multiply interpretable) features of their ‘code’” (p. 347). This notion resonates with the essence of Dehnert’s vision: to nurture diversity and foster dynamic connections. Thus, it is not the destination but the journey itself—the exploration, the rich diversity, the connections—that truly defines the vibrant evolution field of HMC.

With the recent innovations in generative AI and the public release of AI tools, this journey is fast becoming dizzying. Offering reprieve, this volume’s third article by Hepp et al. provides a counterpoint to the techno-hype. The message? Not to drown in the hyperbole but to see systems like ChatGPT, LaMDA, and Luminous as harbingers of a new communicative era. Hepp et al. urge us to consider the new communication wave seriously and avoid blind acceptance. Their words echo Van der Groot, Etzrodt, and Dehnert: Don’t cling to the familiar, don’t submit to the allure of conformity; do embrace the debate. Hepp et al. steer us back to reflexivity, and we remember Toulmin’s (1953) words: “One can distinguish, in any science, between the problems which are currently under discussion, and those earlier problems whose solutions have to be taken for granted if we are even to state our current problems” (p. 81). As such, we reflect upon Hepp et al.’s reminder that the study of

automated communication is not new (Fortunati & Edwards, 2020, 2022). A long and rich history of research in cybernetics, for example, has confronted and foreseen the problems of machine communicators. But, heeding both Toulmin's words and Hepp et al.'s reflexivity, we stop short of accepting previous "solutions" to these problems. As we confront the reality of automated communication, we should recognize this as an opportunity to reflect, question, and reimagine our understanding of HMC. Hepp et al. effectively join the same hymn with Van der Groot, Etzrodt, and Dehnert: Challenge the status quo. Pay attention to our perspective. Step into the unknown. Here is the lifeblood and future of the HMC field.

Progress Through Interfield Work

As encouraging as the opening articles were in questioning the familiar, there are other indications of the health of the HMC field in this volume. In reading many of this volume's articles, a critical paradigm of scientific advancement comes into focus: interfield work. Interfield work is a merging of theories, methods, and perspectives from different scientific fields. Lindley Darden and Nancy Maull (1977) present a compelling vision in *Interfield Theories*, arguing that interfield theory, and thus interfield work generally, is not just academic cross-pollination but an essential catalyst for scientific progress.

Against this backdrop, we come to the fourth article by Stephens et al. They study an aspect of human-machine communication that is rarely featured but is nevertheless critical: the humans who train machines. "Humans are involved in many steps of a machine learning system's pipeline, but the most common is in labeling data to create a training set for supervised machine learning" (p. 66). Stephens et al. highlight what is easy to forget: machines themselves are the product of human-machine communication. Situated in this early stage of machine development, their work has a compellingly symphonic feel as they unshroud a human-machine relationship that can be both harmonious and discordant. In this dance between human and machine, the partners exchange leading roles via subtleties of feedback and correction.

The dance gets even more fascinating when Stephens et al. venture into the territory of human emotions within these interactions. They reflect on how more involved training processes should consider ". . . how the humans feel and experience this more involved type of interaction" (p. 66). Stephens et al.'s investigation of the emotional landscape of human-machine communication—paired with the efficiencies studied by business scholars and development processes studied in the information systems field—bears a resemblance to Darden and Maull's (1977) insight that "interfield theories are likely to be generated . . . when questions arise about that phenomenon within a field which cannot be answered with the techniques and concepts of that field" (p. 50). Thus, Stephens et al.'s study exemplifies the interfield work that leads to the expansion of scientific horizons. Stephens et al. also offer a clever insight into the position of HMC, specifically in this convergence of disciplines: noting that human-machine communication places greater emphasis on the relationships between humans and machines, as opposed to the narrowing focus on human-machine interaction. This broader perspective offered by HMC underlies Stephens et al.'s findings and shows the benefits of the interfield work that the HMC perspective fosters. This is excellent news for our young discipline. As the pace of advancement in human-machine

communication accelerates, interfield work becomes not only a theoretical endeavor but also a practical necessity for HMC.

The nascent importance of interfield work is just as evident in the volume's next article by Concannon, Roberts, and Tomalin. As Concannon et al. point out, the intense development of empathetic agents ("systems capable of responding appropriately to emotional content") is reflected in the recent marketing of many AI "companions" and "assistants," perhaps skewing human expectations of system capabilities. In this context, Concannon et al. signal a different kind of interfield work, merging computational advances with insights from social sciences, effectively extending the reach of the interfield contributions that result from HMC inquiry.

As examined by Concannon et al., empathy in human-machine communication is not about replicating human affective processes but attending appropriately to the emotional expressiveness of an utterance. Interestingly, as articulated in the article, the need to understand empathetic communication is anchored in a wider conversation about how language is used in ways perceived as empathetic, a perspective that draws heavily from interactional linguistics. Although the agents do not possess empathy in the human sense, they can use language to display empathetic concern. Thus, Concannon et al. invite the incorporation of interactional linguistics into the broader study of HMC. This approach reflects Darden and Maull's (1977) suggestion that interfield work flourishes when "A field may investigate the structure of entities or processes, the function of which is investigated in another field" (p. 49). As such, Concannon et al.'s linguistic analysis allows for the investigation of the structure of language in human-machine communication, but their analysis of the function of these words draws upon literature and theory from HMC. Consider, as just one small slice of their rich analysis, Concannon et al.'s examination of the strategies machines use to emulate empathetic communication, some of which (e.g., discussing a "shared" experience) hinge on a distinctly human factor: the suspension of disbelief. However, this suspension of disbelief is by no means a given; it is a highly individual process. If a user cannot suspend their disbelief, the machine's attempt at empathy invariably fails. This nuanced point, though just one facet of Concannon et al.'s study, underscores the complex issues intrinsic to the field of HMC. It highlights the imperative for scholars in HMC to grapple with profoundly human constructs like empathy, and it signals to the broader academic and industrial communities that the creation of empathetic machine agents isn't only the purview of engineers. Scholars from a multitude of fields all have essential roles to play. This collective interfield effort is both the challenge and the opportunity that HMC offers—a testament to the enduring importance of interfield work in HMC.

As we navigate further into this volume, the influence and necessity of interfield work continue to be evident and increasingly significant. The upcoming triptych formed by the sixth, seventh, and eighth studies brings together disparate but complementary academic disciplines to investigate the intricacies of human-machine interactions. We find ourselves witnessing human exclusion from the conversation between physical robots, interacting with virtual bots in an online chat, and engaging in real-life interactions with physical robots. The human experience across these contexts prompts us to observe, infer, and model bot behaviors in our minds, further blurring the lines between human-human and human-machine interactions. In the sixth article, Rosenthal-von der Pütten and Bock

interweave robotics and social psychology to study human feelings of social exclusion caused by machines. It is an idea as fascinating as it is unexpected. In exploring this peculiar terrain, the research strays from the well-beaten path of studying how humans can feel *closer* to machines. One of the pioneers of interdisciplinary thought and practice, Julie Thompson Klein, writes about how this creativity is an integral part of pushing boundaries in science; and is characteristic of interdisciplinary (interfield) work (1996). As Rosenthal-von der Pütten and Bock's study unfolds, it is difficult not to recall Klein's (1996) assertion, "Interdisciplinary work is critical in that it exposes the inadequacies of the existing organization of knowledge to accomplish given tasks" (p. 14). Likewise, through an impressive fusion of fields, Rosenthal-von der Pütten and Bock build an experimental environment that probes this uncharted territory, teasing out surprising human emotional responses linked to the quintessential human need for inclusion. When machines engage in exchanges amongst themselves, employing silence or a coded language unfathomable to human listeners, they provoke fundamental questions about our social condition. Can a human feel left out by a discussion held in code? Can a mere machine, a contraption of wires and circuits, trigger feelings of social isolation within us? And as we grapple with these seemingly surreal questions, we also wonder how this perceived exclusion may alter our trust in our tech-based counterparts. By posing these questions, Rosenthal-von der Pütten and Bock set the stage for a deeper exploration into this captivating realm of research that transcends disciplinary boundaries; it is an unconventional investigation that aligns remarkably with Klein's vision of breaching disciplinary silos to pursue new knowledge.

The concept of "communicative anthropomorphization," as proposed by Laaksonen, Laitinen, Koivula, and Sihvononin in this volume's seventh article, is a compelling contribution to the field of Human-Machine Communication (HMC). Laaksonen et al. redefine anthropomorphization as more than just a design or psychological process; they present it as an intrinsic characteristic of the human-machine communicative process. Klein's (1996) claim that boundaries can be redrawn as interdisciplinary connections are made and solidified aptly captures Laaksonen et al.'s transformative approach that redraws the conceptual boundaries of anthropomorphization. For Laaksonen et al., it's not just about understanding how chatbots are programmed to mimic human conversation or how humans psychologically perceive bots. Rather, it's about converging these and other insights to examine their interaction and mutual influence within the sociotechnical realm of HMC. As Darden and Maull (1977) posited, "Interfield theories explain and make explicit the relationships between different domains of knowledge." (p. 48). In their explication of communicative anthropomorphization, Laaksonen et al. construct an interfield concept that can be built upon and perhaps serve as the foundation for an interfield theory. "Communicative anthropomorphization" gives us a tantalizing glimpse into the field's future, where the boundaries between disciplines dissolve when integrated into the HMC perspective and where knowledge is a vibrant tapestry woven from countless interconnected threads. We should celebrate this progression in HMC.

Following the theme of interfield exploration in HMC research, Stein and Banks, in the volume's eighth article, bring forth a detailed study that deftly weaves elements of parasocial contact theory, social psychology, and media studies, among others, delivering a multidimensional analysis of human-robot interactions. It's a paradigmatic example of how interfield theories are formulated: by explaining and articulating the relationships between

different knowledge domains (Darden & Maull, 1977). Recognizing the oft-overlooked influence of mass media representations of robots, Stein and Banks incorporate the concept of parasocial contact—an idea that biases toward dissimilar others, such as humanoid robots, can be alleviated through positive media exemplars. In another instance of interdisciplinary melding, Stein and Banks engage with social psychology literature, bringing insights from intergroup dynamics research to build their rationale. They consider how humans engage with robots as if they were part of an outgroup while at the same time acknowledging the ontological differences that separate them. Stein and Banks's work is reminiscent of the idea expressed by Klein that boundaries can be redrawn as interdisciplinary connections are made and solidified. With this boundary-breaking research, Stein and Banks broaden the horizons of HMC in a way that enhances our understanding of human-machine interactions and opens new avenues for exploration moving forward.

Dynamic Dialogues

With the stage set for discovery, we delve into the last two articles, which present us with a compelling aspect that bolsters the vitality of the discipline and holds an essential role in human-machine communication: dialogue. Not only does dialogue serve as a bridge between paradigms and fields, as demonstrated in the preceding articles, but it also forms the very essence of social existence. Adopting a dialogic perspective is recognizing the interactive, dynamic, and contextual nature of communication and meaning-making processes. This aligns with the tenets of critical realism, introduced by Roy Bhaskar (1975), which suggests the “real” differs from our subjective experiences of it and is largely unobservable. The best approach to science, according to him, is to study how people experience and interact in the world. Bhaskar's view is that scientific progress is synonymous with rethinking existing knowledge in different, more timely contexts. This view of progress is highly pertinent to the discussion in the last two articles in this volume (Vitak et al.; Youk & Park). These articles rejuvenate theories of human interaction born from dialogism and dialectics as relational processes are reimaged in the new contexts of navigation and voice-based assistants.

Transitioning into the latter part of the 20th century, theories like Baxter and Montgomery's and Rawlins' relational dialectics—downstream descendants of dialogism—infused fresh perspectives into stale debates by asserting that relational processes resisted linear explanation. Should we tell our intimate partners everything or hold back? Should we prioritize togetherness or maintain independence? Is it good to be predictable or spontaneous? The dialectics approach answered with an enthusiastic “both/and,” contending that each apparently contradictory need or discourse is simultaneously valued, communicatively constructed, and constantly evolving. It highlights the complex, dialogic nature of relational processes, suggesting human activity requires constant negotiation and adaptation. Dialogism's potential to transform social theory and practice call to mind what Kenneth Gergen (1978) terms the “generative capacity” of theory “to challenge the guiding assumptions of the culture, to raise fundamental questions regarding social life, to foster reconsideration of that which is ‘taken for granted,’ and thereby to furnish new alternatives for social action” (p. 1346). And it's the generative spirit of dialogue that the final two articles deliver as they extend dialogue-based theories into the context of HMC. They shine fresh light on

important, dynamic, and fraught contexts of HMC: navigating privacy with voice-based assistants (VBAs; Vitak et al.) and determining blame in navigation technology (Youk & Park). Both articles illustrate how, in the vibrant dialogic sphere, understanding social life and relationships becomes a generative process.

In the ninth article Vitak, Kumar, Liao, and Zimmer employ Communication Privacy Management theory to assess the dynamics of boundary regulation and privacy issues in using VBAs, technologies that “blur boundaries between public and private spaces.” We learn, for instance, that VBA users often conceived of privacy as futile and trained their gaze instead on usefulness, a perceived opposition that may be uniquely significant in HMC. Conversely, non-users stressed the need for trustworthy providers and control over access to their information prior to adoption. The results elucidate the potential of dialogue-based theories to highlight the tension-infused experience of engaging in HMC.

Choice and tension also assume a starring role in Youk and Park’s final article, exploring why users are more likely to adopt some driving navigation technologies over others. To investigate drivers’ use intentions, Youk and Park orchestrate a beautiful collision between the Theory of Communicative Responsibility and the Technology Adoption Model. Given that human-human interaction involves autonomous entities with the ability to comprehend and formulate messages in complex contexts—and machines only simulate communicative competence—Youk and Park anchor their research squarely in the process of meaning-making, unafraid to challenge theoretical assumptions in a new navigational interaction context. Results highlight, for example, the necessity of considering the purpose and role of the machine in our HMC research alongside the context, an aspect which has been highlighted persuasively in earlier volumes, as well (Gambino & Liu, 2022). This kind of theoretical work marks a pivotal moment for the field of HMC by advancing the dialogue between users and machines in exciting, transformative ways ripe with the generative capacity to “provoke debate, transform social reality, and ultimately reorder social conduct” (Gergen, 1978, p. 1346).

With the final two articles illustrating the potential of dialogism to challenge, clarify, and recast how we understand and explain HMC and the wisdom of Bhaskar’s critical realism woven into our explorations, we are reminded of the interfield nature of our discipline that informs related communities of design, policy, and public concern. Returning to relational processes, we imagine them in the context of HMC: Are communicative machines essentially tools or social actors? Should we reveal or conceal our private information when talking to virtual agents? Are agency and responsibility affixed to the human or the machine? Dialogism’s reminder is that we may not have to choose. Just as Van der Groot and Eztrodt, and Dehnert remind us in the opening articles, we should instead question the binary status quo and find jewels of comprehension in studying how ordinary people, as well as scholars, grapple with the tensions in human-machine communication (see, e.g., Abendschein et al., 2022; Westerman et al., 2020). Moreover, we should remember that we, as researchers, are part of the dialogue. Horczyk et al., (2013) note that “. . . critical realist data analysis will have a significantly distinctive transforming influence on the researcher” (p. 22). Mutual shaping captures the essence of the intertwined journey of discovery: As we seek to understand HMC, we are not mere observers but are also active participants within the dialogic process.

Moving Forward

Reflecting on this volume of *Human-Machine Communication*, we revel in the progress our field is making. Whether it is Toulmin's (1972) call to question assumptions, Darden and Maull's (1977) interfield collaborations, or Gergen (1978) and Bhaskar's (1975) plea to reimagine interaction, there are numerous indications that the emergent field of HMC is healthy and promises to deliver more theoretical, methodological, and practical breakthroughs going forward. The ever-present interdisciplinary and dialogic nature of the work in this volume is a reminder of the multiplicity of voices and discourses that together constitute the HMC processes and phenomena we study. In fact, it appears to us that a good number of the formative debates (or should we say dialogues?) in the field may be explored as communication-based tensions best understood in their wholeness. As such, this volume, in its wholeness, stands as a testament to the vibrant dialogue between disciplines, co-authors, editorial staff, and all the scholars who reviewed manuscripts for this issue—to whom we are endlessly grateful for nurturing the spirit of collaboration driving progress. With open minds and engaged hearts, we invite you to join us in exploring this collection and shaping the future of Human-Machine Communication.

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