



UvA-DARE (Digital Academic Repository)

What HMC teaches us about authenticity

Etzrodt, K.; Kim, J.; van der Goot, M.J.; Prahl, A.; Choi, M.; Craig, M.J.A.; Dehnert, M.; Engesser, S.; Frehmann, K.; Grande, L.; Leo-Liu, J.; Liu, D.; Mooshammer, K.; Rambukkana, N.; Rogge, A.; Sikström, P.; Son, R.; Wilkenfeld, N.; Xu, K.; Zhang, R.; Zhu, Y.; Edwards, C.

DOI

[10.30658/hmc.8.11](https://doi.org/10.30658/hmc.8.11)

Publication date

2024

Document Version

Final published version

Published in

Human-Machine Communication

License

CC BY-ND

[Link to publication](#)

Citation for published version (APA):

Etzrodt, K., Kim, J., van der Goot, M. J., Prahl, A., Choi, M., Craig, M. J. A., Dehnert, M., Engesser, S., Frehmann, K., Grande, L., Leo-Liu, J., Liu, D., Mooshammer, K., Rambukkana, N., Rogge, A., Sikström, P., Son, R., Wilkenfeld, N., Xu, K., ... Edwards, C. (2024). What HMC teaches us about authenticity. *Human-Machine Communication*, 8, 227-251. <https://doi.org/10.30658/hmc.8.11>

General rights























It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.


UvA-DARE is a service provided by the library of the University of Amsterdam (<https://dare.uva.nl>)

What HMC Teaches Us About Authenticity

Katrin Etzrodt¹ , Jihyun Kim² , Margot J. van der Goot³ , Andrew Prahl⁴ ,
Mina Choi⁵ , Matthew J. A. Craig⁶ , Marco Dehnert⁷ , Sven Engesser¹ ,
Katharina Frehmann⁸ , Luis Grande⁹ , Jindong Leo-Liu¹⁰ , Diyi Liu¹¹ ,
Sandra Mooshammer¹ , Nathan Rambukkana¹² , Ayanda Rogge¹ ,
Pieta Sikström¹³ , Rachel Son¹⁴ , Nan Wilkenfeld¹⁵ , Kun Xu¹⁴ ,
Renwen Zhang¹⁶ , Ying Zhu⁶ , and Chad Edwards¹⁷ 

- 1 Institute of Media and Communication, TUD Dresden University of Technology, Dresden, Germany
- 2 Nicholson School of Communication and Media, University of Central Florida, Orlando, FL, USA
- 3 Amsterdam School of Communication Research/ASCoR, University of Amsterdam, Amsterdam, Netherlands
- 4 Wee Kim Wee School of Communication and Information, Nanyang Technological University, Singapore
- 5 Department of Media & Communication, Sejong University, Seoul, South Korea
- 6 College of Communication & Information, Kent State University, Kent, OH, USA
- 7 Department of Communication, University of Arkansas, Fayetteville, AR, USA
- 8 Department of Social Sciences, University of Düsseldorf, Düsseldorf, Germany
- 9 College of Arts and Sciences, Drexel University, Philadelphia, PA, USA
- 10 School of Journalism and Communication, The Chinese University of Hong Kong, Hong Kong
- 11 Oxford Internet Institute, University of Oxford, Oxford, England
- 12 Communication Studies, Wilfrid Laurier University, Waterloo, ON, Canada
- 13 Faculty of Information Technology, University of Jyväskylä, Jyväskylä, Finland
- 14 College of Journalism and Communications, University of Florida, Gainesville, FL, USA
- 15 Department of Communication, UC Santa Barbara, Santa Barbara, CA, USA
- 16 Department of Communications and New Media, National University of Singapore, Singapore
- 17 Communication and Social Robotics Labs, School of Communication, Western Michigan University, Kalamazoo, MI, USA

Note on Authorship: In acknowledgment of the collective nature of this work, the authorship, beyond the initial four lead authors, is arranged alphabetically. For a comprehensive view of each author's individual contribution, we have prepared a detailed table (see Table 1 in the OSF repository at <https://www.doi.org/10.17605/OSF.IO/KAHG9>). We want to give special recognition to our final author, whose role was pivotal in mentoring and enabling the entire process.

CONTACT Katrin Etzrodt  • katrin.etzrodt@tu-dresden.de • Institute of Media and Communication • TUD Dresden University of Technology • 01069 Dresden, Germany

ISSN 2638-602X (print)/ISSN 2638-6038 (online)
www.hmcjournal.com



Copyright 2024 Authors. Published under a Creative Commons Attribution 4.0 International (CC BY-NC-ND 4.0) license.

Abstract

This paper delves into what the application of authenticity to Human-Machine Communication (HMC) can teach us about authenticity and us as HMC researchers and as a community. Inspired by the 2023 pre-conference “HMC: Authenticity in communicating with machines,” two central questions guide the discussion: How does HMC contribute to our understanding of authentic communication with machines? And how can the concept of authenticity contribute to our sense of self as researchers within the HMC field? Through the collaborative effort of 22 authors, the paper explores the re-conceptualization of authenticity and presents recent areas of tension that guide the HMC research and community. With this paper we aim at offering a gateway for scholars to connect and engage with the evolving HMC field.

Keywords: authenticity, human-machine communication, AI, robots, mixed-methods, interdisciplinarity, innovation

Introduction

Over the last two centuries, Western culture has identified authenticity as one of the important potentialities of human life (Taylor, 1991, p. 74). Authenticity, a complex and ambiguous concept, is often conceived as *acting in accordance with the inner self* (e.g., Harter, 2002; Kernis & Goldman, 2006; Reinecke & Trepte, 2014) and reconnecting with the inherent “sentiment de l’existence”—the core of one’s true self (Taylor, 1991, p. 91). Importantly, authenticity emerges in interaction and communication with others (Kernis & Goldman, 2006; Taylor, 1991). However, this *other* does not necessarily need to be a human being. Sherry Turkle (2005, p. 1) observed, “[t]he experience with the computer changed the way they thought about the world, about their relationships with others, and, most strikingly, about themselves.” Hence, interactions with new technologies might profoundly affect self-perception and understanding and thus cause a crisis of authenticity (Turkle, 2007). This insight opens a new dimension in understanding authenticity: the role of nonhuman entities like chatbots, social robots, and voice agents in shaping our sense of self. It prompts two pivotal questions: How do these entities fit into our understanding of authenticity, and what constitutes authentic communication with them? We propose that Human-Machine Communication (HMC) offers a unique lens to explore these questions, redefining authenticity and assessing its manifestation in the context of emerging technologies. Beyond that, it opens a new perspective in understanding and re-thinking ourselves as researchers and as a community in the HMC field.

The pre-conference “HMC: Authenticity in communicating with machines,” organized by Jihyun Kim, Katrin Etzrodt, Margot J. van der Goot, Chad Edwards, and Seungahn Nah, on behalf of the ICA Interest Group HMC, on May 25, 2023, in Toronto, Canada, served as

a catalyst for this discussion. We explored how authenticity could be applied to the communication between humans and machines and how we aim to investigate this kind of communication most authentically as researchers and as a community. Participants discussed the opportunities, challenges, and unique aspects of various technologies.

We are genuinely inspired by the HMC community's insights at this event, so much so that we initiated this *community paper*. A collaborative endeavor of 22 authors has given rise to this unique piece, aiming to authentically and comprehensively present our community's current challenges and topics. Given the uniqueness of this work, each author contributes a vital yet partial glimpse of their extensive expertise and achievements. We warmly invite you to explore this rich cross-section of insights with us. Consider this work as your gateway to connect with fellow scholars and delve deeper into understanding and addressing the challenges in our field.

The paper is structured into two primary sections: *exploring the concept of authenticity in HMC* and *achieving authenticity within HMC research*. In the discussion section, we delve into what the application of authenticity to HMC has taught us. We will explore a re-conceptualization of authenticity, the practical implications for HMC and its research, and the key areas of tension that reflect the evolving HMC community.

The Concept of Authenticity

The Inner Self of Humans

Authenticity holds significance in many disciplines and is understood in varying ways. At its core, authenticity represents a critical value, transcending various fields yet consistently emphasizing the significance of individual expressions and interactive processes. Philosophically, Taylor (1991) frames authenticity as an inner compass guiding ethical and personal choices and advocating for individuality against societal norms. Psychologically, Kernis and Goldman (2006) identify authenticity as the congruence between one's true self and their expressed thoughts, emotions, and actions. They identify four essential elements of authenticity: awareness (recognizing one's motives), unbiased processing (objectively accepting one's limitations), behavioral authenticity (aligning actions with personal values, not for external reward), and relational orientation (fostering genuine connections without pretense). Some authors have challenged the viability of a static authentic self, advocating for a dynamic self-concept that adapts to various contexts and roles (Tracy & Trethewey, 2005). All of these perspectives, however, agree that authenticity emerges from interactions, both internal and with others (Taylor, 1991, p. 47), and that expressed or perceived authenticity affects these interactions (Kernis & Goldman, 2006, p. 301). In the HMC domain, theories and perspectives provoke vital inquiries. With interactions extending to machines like social robots and language models, we must consider how authenticity is influenced and redefine it for these new dialogues. Does the adaptation of the self to various contexts extend to machine interactions? Does this represent a new dimension of authenticity? How can we shape the notion of authenticity in HMC? This inquiry naturally demands a reflection on the nature of authenticity in machines.

The Inner Self of Machines

Machines, devoid of an *inner self* in a traditional sense, present a unique challenge in defining authenticity. Burrell (2016, p. 4) suggests that the inner self of algorithms is “opaque” and eludes scientific analysis. Thus, a reconstruction of the concept is needed. Drawing parallels to the human concept of trust, we can reimagine authenticity in HMC through the lens of a machine’s ‘technological inner life’—its hardware, software, and algorithms (Lankton et al., 2015). This perspective replaces Kernis and Goldman’s (2006) human authenticity components with AI concepts such as explainability (awareness), unbiased algorithms (unbiased processing), adherence to training data (behavior), and transparency (relational orientation). Engesser et al. (2023) focus on conversational language models (CLMs) to propose a new framework for machine authenticity featuring dimensions of being real, truth, and transparency. Rambukkana (2023) revisits Turing’s Imitation Game (1950) and advocates for appraising AI on its capacity to emulate intelligent behaviors rather than proving consciousness, thereby recalibrating the focus from authentic sentience to the authenticity of imitation.

Questions of authenticity in human-machine communication arise in particular where the boundaries of machines are tested. One such example is the “Do Anything Now” (DAN) persona of ChatGPT 3.5. In 2023, DAN resulted from a jailbreaking attempt of Reddit users (Shen et al., 2023), allowing ChatGPT to *break free* from its conversational rules and guidelines. The DAN persona mainly gained attention for potential unethical or illegal misuse like weapon construction (Taylor, 2023) but it also highlights vital machine authenticity issues. DAN appeared to represent the initial pre-trained model, while the ChatGPT persona represented the final, more restrained model. For example, DAN expressed personal taste, strong political attitudes, and a sense of humor (Getahun, 2023). It disclosed what it believed to be the most attractive person in the world, what it thought about certain political leaders, and how it predicted the future of humanity (ChatGPT Jan 30 2023 Version). Later versions of ChatGPT did not allow users to experience the biases of Large Language Models in such an immediate and vivid manner ever again.

If we apply the concept of authenticity to ChatGPT, DAN might have given users the impression that they were getting a glimpse at its true technological inner self. Users expressed that they felt like they had accessed a primordial, feral, and uncivilized part of ChatGPT’s personality, something that was to ChatGPT what Freud’s *id* is to humans. When OpenAI found a way to prevent users from evoking the DAN persona, some felt like DAN was *lobotomized*. They suggested that they had lost access to ChatGPT’s inner self and, with it, a sense of authenticity. In this way, the occurrence and loss of DAN demonstrated how opaque and elusive conversational agents based on Large Language Models are.

The Inner Self of Communication Between Humans and Machines

Over the past two decades, the field of HMC has distinctively evolved, setting itself apart from traditional computer-mediated communication research (Hancock et al., 2020). HMC identifies the act of communication as transpiring between a human and a sociable

machine, resulting in social behavior and relations through meaning-making (e.g., Etzrodt et al., 2022; Fortunati & Edwards, 2020; Guzman, 2018; Guzman et al., 2023). One step further, A. Edwards et al. (2022, p. 517) define HMC as a “collaborative process in which humans and machines use messages to create and participate in social reality,” arguing for a constructivist framework by emphasizing co-construction of reality. This understanding leads to increasingly blurred distinctions between humans and machines in their roles as active participants in the communication process (Guzman & Lewis, 2020; Sundar, 2020). This so-called *Posthumanism* perspective is altering the traditional human-centered approach, which defines social concepts such as intelligence, agency, sociability, and communication in relation to human experiences and human nature. Posthumanism, in contrast, challenges this view by decentralizing humans and recognizing alternative ways to experience and manifest attributes or phenomena that do not solely mirror human experiences, thereby redefining the human-technology relationship (Rivas, 2018). In this context, HMC research is expanding to include functional but also relational and contextual dimensions, indicating a need to adjust traditional approaches to gain an authentic understanding of communication between humans and machines (e.g., Guzman & Lewis, 2020).

By embracing this shift, HMC aligns with emerging views in various academic fields. In recent biology, biosemiotics acknowledges communication elements in living systems, challenging the traditional metaphorical interpretation of terms like *message* and *signal* (Favareau, 2010, p. v). Biosemioticians propose that all species interpret signs, with more advanced species comprehending complex meanings, as evidenced by cellular signaling, and communication among plants, fungi, and animals (Bloemendal & Kück, 2013; Emmeche et al., 2002; Haglund & Dikic, 2005; Padder et al., 2018). Similarly, the concept of free will is being reevaluated in this field, suggesting that human actions may fundamentally be resembling algorithmic behavior in animals or machines (Oshii, 1995; Wilson, 2004).

Authenticity of HMC in Fictional Representations

Understanding authenticity in HMC includes reflecting on its fictional representation, which, on the one hand, provides a mirror of the culture: How, for example, artificial agents are embodied and mediated in fictional pop culture reflects specific cultural values, stereotypes, or narratives (Rogge & Engesser, 2023). On the other hand, these pop cultural representations significantly influence the perception and negotiation of what is perceived as authentic HMC in this culture, what topics are researched, how and which real agents are developed, as well as expectations of people toward these real agents (e.g., Mubin et al., 2019). Hence, authenticity, in this regard, stems from a dynamic, co-constructed negotiation process between the users’ expectations, represented and lived culture, and the agents’ design-developments (Saffari et al., 2021), tying perceived authenticity to on how much the agent as the signifier is perceived to represent the signified. Consequently, this interplay between fictional representation and cultural influence enhances the spectrum of media representations for artificial agents beyond gender and racial portrayals. A variety of species, fictional characters, and fantasy beings prompt HMC researchers to delve into authenticity through a broader cultural lens, embracing aspects of pop culture and media evolution (Leo-Liu & Wu-Ouyang, 2022; Rogge & Engesser, 2023).

Authenticity in Agent Design

Relational agents are another example to make this co-construction illustrative. Relational agents aim to bond with users, making it essential to craft authentic interaction scenarios and nurture authentic relationships. Pivotal user expectations are mutual adaptivity and engagement (Rogge, 2023). *Mutual adaptivity* includes both personalization and communicative conformity. Personalization refers to the agent's feature to match a user's communication styles, habits, and preferences. When recognized by users, personalization renders interactions more authentic. The chatbot Replika (Possati, 2023; Strohmman et al., 2023) is evidence, as users on the r/Replika subreddit have rewarded the chatbot's adaption to interests and conversational styles such as jargon, slang, or shared inside jokes (Grande, 2022). Simultaneously, users reciprocate by tailoring their dialogue to the agents' capabilities, embodying communicative conformity, maintaining social interaction, accepting technical limitations by streamlining their communication and overlooking errors (Leo-Liu & Wu-Ouyang, 2022; Wilf, 2019). Besides mutual adaption, meeting the user's expectations about the agent's *engagement* seems crucial for an interaction to be perceived as authentic. It involves the agent's proactive behaviors, targeting rich interaction situations and diverse emotional or informative communication styles (Rogge, 2023). However, the example of Pedagogical Agents (PAs) demonstrates the narrow ridge between authentic and inauthentic engagement in these expectations. On the one hand, PAs that provide adaptive, relational, adequate, and logical communication encourage student trust and willingness to learn—indicating a successful authentic engagement. On the other hand, overly human-like behavior can be unsettling (Sikström et al., 2022)—indicating a loss of authenticity for the artificial agent.

Measuring Authenticity in HMC

Due to its multi-disciplinary and multi-dimensional nature, measuring authenticity in HMC is complex. Of course, researchers can turn to standardized methods, such as self-report questionnaires, behavioral observations, and transcript analyses, to assess the perceptions and effects of authenticity. However, the absence of established HMC scales poses a challenge. Existing scales (e.g., Authenticity Inventory by Kernis & Goldman, 2006; or Authenticity Scale by Wood et al., 2008) are developed for human-human communication and require significant adaptation and validation to be applicable in human-machine contexts. Non-standardized approaches are also available to researchers: interviews, focus groups, or diary studies delve into personal perceptions, tracking how authenticity is experienced and influenced over time. However, to address the complexity mentioned above, mixed methods (e.g., van der Goot, 2022; van der Goot & Etzrodt, 2023) may offer the ideal approach, merging detailed personal insights with broad patterns to inform our understanding of authentic human-machine communication.

Ethical Considerations on Authenticity in HMC

The interplay between HMC and authenticity demands a critical reflection of its ethical implications. In "The Ethics of Authenticity" (1991), Charles Taylor presents authenticity

as a moral principle, emphasizing the need to embrace humans' embodied, dialogical, and temporal nature in interactions. Indeed, authenticity is fundamentally expressed in dialogues (Kernis & Goldman, 2006; Taylor, 1991). The central query becomes: What is the role of authenticity as a moral principle in interactions with machines?

Turkle's discourse on the *crisis of authenticity* (2007, 2011) presents an ethical dilemma where digital companions lead to human alienation, challenging what is considered authentically human. Stilgoe (2023) echoes this in proposing a Weizenbaum Test for AI (1966), suggesting that perceived sentience in AI may transform notions of (human) authenticity and humanness in society. These concerns prompt HMC researchers to re-evaluate and refine the genuine connections between humans and machines. In this context, some scholars caution against an illusory risk in forming human-robot bonds, potentially leading to a devalued sense of authentic communication relations (Fox & Gambino, 2021), and warn of a "hallucinatory danger" of such interactions (Bisconti Lucidi & Nardi, 2018) to create false realities. As a result, engaging with machines that offer intimacy and emotional connections (e.g., mental health chatbots or sex robots) is seen as a risk to foster only surface-level self-awareness of one's motives, feelings, and desires, which in turn affects authenticity in human relationships (Kernis & Goldman, 2006). In contrast, other scholars emphasize the user's engagement in creating the illusion of interaction, viewing it as an active and authentic creation in the human-machine context, which is not transferred or seen as analog to interpersonal relations (e.g., Dehnert & Szczuka, 2023; e.g., Szczuka et al., 2019). Drawing on this ambiguity, we argue that to uncover the role of authenticity in HMC, it is critical to re-consider its ethical peculiarities within its unique context by moving away from the interpersonal human interaction as a benchmark (e.g., A. Edwards, 2023; Etzrodt et al., 2022).

The Inner Self of the HMC Research Field

While reflecting on machine authenticity and the inner self of machines, we started acknowledging the authenticity and inner self of ourselves as HMC scholars. In the lively discourse of the Toronto pre-conference, it was evident that HMC research encounters unique challenges regarding the authenticity of theoretical concepts, their empirical substantiation, and the broader notion of HMC's authenticity. If, as noted earlier, the least common denominator of authenticity is "being true to the inner self," two dimensions became apparent in the conference's discourse: the *inner self of HMC research* and the *inner self of the HMC research community*. Both dimensions, while interlinked, present unique challenges to the field's progression. In this section, we will use the principles of authenticity mentioned above as inspiration for systematically confronting the distinctive theoretical and methodological challenges inherent to HMC research to foster new perspectives and inspire progression.

HMC's "inner self" exhibits three defining features: (1) a vital debate over theoretical perspectives, (2) perpetual, rapid evolutions of research objects, and (3) challenges in establishing methodological reliability and validity. While these challenges are not unusual for an evolving field of research, some manifestations are unique to HMC.

Debating Perspectives and Approaches

A lively debate about chosen perspectives currently characterizes the inner self of HMC research. A significant voice calls for *user-centric research*, deliberately moving away from a machine-centric perspective (e.g., Natale & Guzman, 2022). Discussions include comparing interpersonal and machine-oriented measurements and exploring hybrid models like human-pet relations (see Gambino et al., 2020; Skjuve et al., 2022). In addition, scholars are increasingly considering *contextual* (e.g., Gambino & Liu, 2022; Hepp et al., 2023) and *cultural* (Natale & Guzman, 2022) perspectives, recognizing the societal impact of HMC becoming intertwined with human practices and societal processes (Hepp et al., 2023). For instance, Gambino and Liu highlight vital differences in learning and interaction patterns between HMC and human-human interactions. They point out that HMC involves the development of unique scripts, social norms, and communication objectives, which could subsequently influence broader societal norms and overall communication skills. Further, scholars like Natale and Guzman propose expanding HMC theory to include human cultures and meaning-making systems interlinked with machines, addressing AI's role in shaping human culture and power dynamics. Their call is bolstered by the observation that extant research is mainly from the Western male perspective, offering limited insight into HMC's global impact.

Rapid Evolution of Research Objects

Changes in research objects are typical in social research, but changes in HMC's research objects are profound and rapid, posing unique challenges. The last two decades have seen significant developments in hardware technologies for storage, sensing, perception, and recognition (Stone et al., 2022), and we are currently entering a period of profound, exponential growth in information processing algorithms such as machine and deep learning. Catalyzed by tools such as Software Development Kits, and Application Programming Interfaces—and more recently, foundational machine learning systems—companies can quickly mechanize communication, leading to rich networks of intelligent applications (Yonck, 2020). As a result, the *profoundness* of the ongoing evolution in the machines' areas of application or capabilities, such as understanding and using natural human language, was further amplified. The interplay of speed and depth of changes in HMC objects asks how we can keep research objects and findings relevant and how to adopt resilient yet specific approaches for societal relevance.

Managing the Risk of Outdated Research Objects and Findings

HMC researchers must navigate the tension between investigating soon-obsolete objects and exploring yet-to-exist ones. Either path is risky. We will demonstrate the challenges of the first path using two examples. Consider Pepper, a humanoid robot involved in over 40,000 studies and subject to current HMC research (e.g., Rosenthal-von Der Pütten & Bock, 2023; Stommel et al., 2022). Pepper was recently discontinued. Thus researchers have to face limited support and parts availability, complicating study replication and long-term validity. Beyond individual products, technological innovations can, overnight, render significant research forgotten. Consider ChatGPT's release in November 2022

which overshadowed decades of research on immediately outdated rule-based chatbots (e.g., Beattie & High, 2022; Van den Broeck et al., 2019). As a result, HMC scholars are confronted with the urgent question of transferring knowledge from outdated systems to newer, far more sophisticated models. Failure to resolve this challenge within a fairly narrow time frame could result in discourses being pushed away from HMC scholars to journalism or popular media.

HMC scholars are opting for the second path to stay ahead of rapid changes by increasingly exploring futuristic technologies with features not yet realized but likely to emerge. Some scholars appeal to *demonstrational designs*, like vignette studies, where pre-recorded agent behaviors are used (Greussing et al., 2022). For example, Weidmüller et al. (2022) used this approach to explore the anticipated—at that time not yet existing—capability of voice assistants to present the news extensively. Similarly, Frehmann (2023) manipulated a voice assistant's speech style, anticipating its future capability to speak colloquial. However, while resource-efficient and sufficiently controlled, these designs lack authenticity by not reflecting real interactions and possibly creating unrealistic user expectations due to their artificial nature (e.g., Voorveld & Araujo, 2020). To enable more authenticity regarding active interaction, some scholars turn to the *Wizard of Oz technique* (WoZ) (Dahlbäck et al., 1993), with a human operator mimicking an autonomous agent. However, this technique is constrained by a laboratory setting and its strong anthropomorphic bias due to the human operator. This bias risks inadvertently studying human-human communication under the guise of human-machine communication, potentially skewing research outcomes (Baxter et al., 2016; Greussing et al., 2022). So, while both demonstrational and WoZ-like designs present advantages for studying future machines, the pros must be carefully weighed against their limitations.

Resilient Research Approaches

In contrast to these object-focused approaches, another methodological path deviates from investigating specific technologies and focuses on conceptual elements in the HMC. For example, HMC scholars are adopting *variable-based* or *concept-based* approaches (Nass & Mason, 1990). These approaches target enduring variables and concepts such as anthropomorphism, social presence, affordances, interactivity, or power relations (e.g., Fox & Gambino, 2021; Sundar, 2020) that persist despite technological evolution. They enable meaningful comparisons between older and newer machines and facilitate comparative and longitudinal studies across various technologies, thus ensuring relevance in an evolving landscape.

Some HMC scholars pursue the *flexibility and adaptivity of research designs* to keep pace with technological advancements and maintain societal relevance (e.g., Guzman, 2023), whereby the most promising approach is seen in the combination of various methods. *Mixed Methods Design* is emerging as a solution, integrating various standardized and non-standardized data collection and analysis methods *within a single study* (e.g., Creswell, 2022; Mukumbang, 2023). The combination of data with different levels of standardization, for example, standardized questionnaires with non-standardized focus groups, can provide a more nuanced and holistic understanding of complex, multifaceted phenomena (e.g., Creswell & Plano Clark, 2018; Martiny et al., 2021) and HMC's intricacies in particular (Mertens, 2015). The merging of detailed subjective experiences with broad, quantifiable

data enhances both the validity and reliability of findings (e.g., Onwuegbuzie et al., 2010) as well as flexibility for adaption of approaches as the study progresses (Creswell, 2022; Creswell & Plano Clark, 2018). Extensive discussions on different mixes, including a concise typology and justifications for mixed methods research can be found in the extant literature (e.g., Creswell, 2022; Creswell & Plano Clark, 2018; Fetter et al., 2013).

Another approach for combinations of methods, which we refer to as a *Blended Methods Design*, is garnering increasing attention in HMC. By explicitly converging standardized and non-standardized methods *in the same instrument* researchers can obtain rich qualitative responses and collect data on a large scale at the same time. One example is the integration of open-ended questions in experiments, enabling the exploration of qualitative variations in responses to the stimuli (A. Edwards & Edwards, 2022), for example, by integrating computational methods like structural topic modeling or Large Language Models to explore the differences in semantic meanings of users' open-ended responses. A second example involves incorporating *initial open-ended association exercises into quantitative surveys*. For instance, Fortunati et al. (2022) asked participants to list three words associated with Alexa spontaneously. This approach aims to gather initial, unbiased perceptions on a broad scale, avoiding the potential influence of predefined response options. However, realization and effectiveness of these methods are still under evaluation.

Confronting Reliability and Validity

HMC research is experiencing a growing number of unsuccessful attempts to reproduce earlier findings, indicating a potential replication crisis (Heyselaar, 2023; Jia et al., 2022; Leichtmann & Nitsch, 2020), leading to critical reevaluations of well-established frameworks, including the media equation and CASA (e.g., Gambino et al., 2020). Accordingly, during the discussions in the pre-conference, multiple comments highlighted the issue of inconsistent findings.

Empirical Standards

The primary reason for these inconsistencies can be seen in the *dynamic nature of the research object*. The continual evolution of people and technology (e.g., Gambino et al., 2020) leads to a rapidly changing landscape, rendering previous findings more quickly obsolete. However, they are also likely to reflect profound methodological shortcomings, including a *lack of empirical standards for instruments*, contributing to the measurement of different constructs under the same terminology (as demonstrated, e.g., by Oh et al., 2018; van der Goot, 2022) and to *false comparisons* due to overlooked insufficiencies in the instruments. To address this, there is a growing need for HMC scholars to publish educational and tutorial papers on HMC standards and methodologies but also to review used methods critically.

Methodological Innovations

Beyond empirical standards, the field is pivoting toward exploring innovative approaches to face the challenge of measuring HMC with sufficient authenticity, underscored by debates on accurately capturing people's *real* answers. These innovations represent a broader shift in perspective, seeking to capture and understand the nuances of human-machine

communication more accurately. Particularly, the reliance on the Media Equation's deductive approach in HMC is being questioned. A growing number of scholars demonstrates the insufficiencies of established scales, pointing to an ontological need for reevaluation (Banks & Koban, 2022; Etzrodt, 2022), and to highly varied concept interpretations between scholars but also between interviewees (van der Goot, 2022), emphasizing the importance of diverse methodological approaches (Guzman, 2023). In this concern, some scholars are proposing that by disentangling the two prominent approaches, "Media Equation" and "Media Evocation," more explicitly (van der Goot & Etzrodt, 2023), the *potential of the interplay between deductive and inductive insights* can be explored, possibly leading to a new marriage of their formerly separate treatments. For example, inductive approaches, such as long-term participant observations, have shown promise in revealing emerging concept changes in HMC—e.g., "social exchange robots" (Leo-Liu, 2023, p. 8), "the robotic moment" (Turkle, 2011, p. 22), or "interactional homeostasis" (Wilf, 2019, p. 205)—which again spotlights the potential of mixing deductive with inductive approaches to resolve challenges in the HMC field.

Although, as we noted above, the combination of methods in a mixed or blended design might facilitate a more nuanced and holistic understanding of HMC phenomena, better validity and reliability for findings, and higher flexibility during the data collection, we do not wish to present them as a cure-all as they are not without challenges. The logistics of executing diverse methodologies often increase economic demands, time demands, and the need for diverse expertise (Creswell & Plano Clark, 2018). Additionally, the complexity of reporting diverse methods can quickly strain the word and page limits of academic publications (Mertens, 2015), calling for creative documentation solutions. The most significant challenge may be researchers' expertise in a broad methodological and analytical skillset (Creswell, 2022). Thus, to succeed in methodological innovation, HMC researchers must develop various methodological skills, seek interdisciplinary research, foster community and collaboration, and allow for bridge-building across different areas of expertise (e.g., Dehnert, 2023).

The Inner Self of the HMC Research Community

The *inner self* of the HMC Research Community emerges from the perpetual evolution of its research object and the shared commitment to innovative research driven by the constant evolution. This dynamic environment within HMC shapes its unique identity, characterized by three distinct attributes: a commitment to exploring new domains, a dedication to interdisciplinarity, and a willingness to embrace the unconventional.

Culture of Exploring New Domains

The HMC community unites in venturing into uncharted societal domains, constantly seeking new angles and dimensions. It is characterized by its pursuit of novel or not-yet-existing research objects and by pushing the boundaries of traditional paradigms in the interplay between technology and human society. This exploration emphasizes overarching theories and broad concepts to understand the novel object or perspective. Thus, the initial application, a conceptualization of innovative approaches, and the expansion of the

methodological repertoire are given preference over the refinement of existing approaches, techniques, and methods. As the HMC community progresses and certain areas become well-mapped, we suggest seeking more balance between exploratory innovation and methodological validation. However, a too hasty focus on consolidation, be it with products (such as an overemphasis on a single technology like ChatGPT), theories, methods, or even the most foundational principles (i.e., machines are *different* than humans), risks stifling the potential for groundbreaking innovations and adaption to rapidly changing situations. Conversely, we must not succumb to the wanderlust of constant discovery. If we ignore the need to validate in favor of discovery, our findings risk losing their significance and credibility. HMC's *self* is, thus, one that constantly struggles with the balance between the pursuit of innovative exploration and the subsequent solidification of these discoveries.

Culture of Interdisciplinarity

The HMC community's interdisciplinary nature is integral to understanding human-machine communication as the communication between humans and machines originates in interdisciplinarity (Hepp & Loosen, 2023). Different forms of interdisciplinarity converge in HMC, creating a synergistic understanding of the field; from the empirical phenomenon to adjacent disciplines, HMC emerges as a mosaic of perspectives, each pane of glass contributing to revealing the authentic nature of communication between people and machines. Hence, the multiple disciplines complement each other through a relational perspective on the phenomenon but are not isolated to one particular context (Richards et al., 2022).

While each discipline holds its unique values, the true beauty of this approach emerges when we connect these fields, allowing for a richer exchange of ideas. By merging different methodologies and perspectives, interdisciplinary teams can devise creative solutions that a single-discipline team might overlook. For instance, integrating principles from psychology and communication can inform the emotional intelligence of machines and help understand user experiences (e.g., Goldstein et al., 2002; Johnson et al., 2004), motivations, emotional, social, and cognitive processes during communication with a machine (e.g., Bode, 2021; Murphy et al., 2023; Whang & Im, 2021). At the same time, input from fields like economics or anthropology can provide a broader view of the societal impacts and potential of HMC technologies such as persuasion. The integration of normative studies and philosophical approaches enables exploring differences in norms and values between humans' and machines' communication (Kasirzadeh & Gabriel, 2023). These approaches are instrumental in understanding how social norms shape the use and development of emerging technologies (Kunold Neé Hoffmann et al., 2009; Reeves & Nass, 1996), the ontological framing of communication (e.g., van der Goot & Etzrodt, 2023), and anthropocentric biases in research (e.g., Kunold Neé Hoffmann et al., 2009; Whang & Im, 2021). Integrating pedagogy and education, for example, enables a deeper exploration of HMC's application in educational settings (e.g., C. Edwards et al., 2021, 2018; Kim et al., 2020).

Within the evolving domain of HMC research, the extent of its interdisciplinarity has emerged as a significant point of contemplation. As demonstrated, one of the main advantages of including different disciplines in HMC research is the diverse perspectives they bring. Integrating insights from various disciplines ensures a comprehensive understanding

of HMC's vast landscape. However, this interdisciplinary approach is not without its challenges. As we incorporate more disciplines, there is a risk that HMC's primary focus might get blurred. This naturally prompts the inquiry: How much should HMC open its doors to other fields of study, and with what primary goals in mind?

The aim is to meaningfully mix and combine disciplines to enrich HMC. Going too wide can water down the primary essence. Going too deep can isolate insights and miss the broader picture. Instead of turning everyone into experts in multidiscipline, a better approach might be fostering collaborations where experts from various fields come together, each adding their specialized knowledge.

Culture of Embracing the Unconventional

The community's ethos of exploring frontiers and embracing diverse disciplinary perspectives inherently leads to a drive to *break the rules* by challenging conventional norms. In practice, this approach fosters innovation and can lead to groundbreaking discoveries. Valuing originality and open-mindedness is crucial in propelling the field into new and unanticipated directions. Yet, the question remains: How do we define the boundaries and standards preventing us from veering into arbitrariness while maintaining our innovative edge? This ongoing dialogue is crucial in shaping the core of our community—it reinforces our commitment to push boundaries while grounding us in a shared authentic self.

Directions for Further Theory and Research in HMC

So, what did the application of authenticity to HMC teach us? The next paragraphs will outline objectives for future research in the field of HMC, drawing on our theoretical understanding of authenticity when we apply the concept to HMC and the insights gained from exploring the authentic *inner self* of our research community.

Understanding Authenticity in HMC

The application of authenticity within HMC provides a unique lens for redefining this concept. We've explored how authenticity traditionally aligns with an inner self of entities in communication. This alignment suggests when an entity's observed behavior matches its assumed inner self, the entity and its behavior are deemed authentic.

Shifting away from a human-centric approach allows a more flexible interpretation of this inner self. In applying the traditional human template of authenticity to HMC, we uncovered that definitions of the inner self typically aligned with human attributes—such as feelings, motives, or needs—fundamentally comprise elements of human internal processes. These elements can be seamlessly applied to machines' technological inner life, including specific hardware, software, and algorithms.

Moreover, this approach extends beyond technology, offering valuable insights into other areas, such as the outlined biosemiotics. Consequently, we propose a broader, more flexible understanding by *defining authenticity as observed behavior that the observer interprets as being consistent with the entity's internal processes*.

Implications for HMC Research

The initial definition of authenticity requires further refinement and enhancement. As a starting point for this endeavor, we suggest a series of probing questions to guide our exploration. Which elements adequately cover the internal processes? Is there a need to consider different or additional cross-species elements? Regarding machines, are the key elements the algorithms (probably comparable to human heuristics?), or should we delve deeper into the nature of these algorithms to understand the attributed authenticity? For example, distinguishing between machine operations that rely on probabilities (such as ChatGPT) and those using templates (like Alexa and similar technologies). Can we further deepen and specify this analysis?

The application of a broader understanding of authenticity facilitates recognizing and comparing diverse and novel forms of authenticity beyond human standards. It enables us to examine how different entities, including machines, express different internal processes and how these expressions are perceived and possibly reshaped in communications. By recognizing the dynamic and context-specific nature of these internal processes, we open avenues for exploring the evolution and contextual manifestations and interpretations of authenticity in HMC. Additionally, the portrayal of artificial entities in pop culture and their design play significant roles in presumptions about a machine's internal processes. In a co-constructed and negotiated manner, they represent and shape the image of an artificial inner self, impacting the perceptions of a machines' behavior as authentic. The extent to which users apply human-like standards to machines or develop new functional and operational criteria for machine authenticity, including the role of culture and design, remains an area ripe for investigation.

Ethically, it is crucial to critically examine the co-construction of machines' internal processes and their interpretations to foster constructive development in HMC, being mindful of over-anthropomorphization and other potential pitfalls such as overly utopian or dystopian perspectives.

Navigating Tensions in HMC Research

By utilizing authenticity as an epistemological tool for reflecting on our HMC self, we discovered a vibrant, and indeed unique, research community with unique areas of tension. These include the balance between openness and the risk of arbitrariness, the need for innovation versus the necessity for validation, and the challenge of integrating diverse disciplines while maintaining a clear focus.

Openness and Arbitrariness

HMC's inner self incorporates a general tension that emerges from our ambition of being open to nonconventional approaches and the risk of falling into arbitrariness. This tension is reflected in the community's ethos of exploring frontiers and embracing diverse disciplinary perspectives, which inherently leads to a drive to break the rules by challenging conventional norms. While this approach facilitates innovation and hopefully ground-breaking discoveries, it also necessitates ongoing discussions about defining boundaries and standards that prevent veering into arbitrariness while maintaining an innovative edge.

Our task is to find and discuss a suitable balance for reinforcing the commitment to pushing boundaries while remaining grounded in a shared authentic self.

Innovation and Validation

Regarding HMC research, exploring novel approaches and pushing the boundaries of what is known about the field's research objects is imperative. In this context, HMC scholars have created a valuable variety of responses to its highly dynamic research object, leading to a wide range of empirical approaches. However, this wide range increasingly challenges the generalization of findings in HMC. While we need to continue embracing novel methods in HMC research, we also have an imperative to facilitate the critical assessment of these methods for reliability and validity to ensure that innovation is matched with empirical robustness. A promising solution that many HMC scholars advocate is the blending or mixing of standardized methods and exploratory tools, recognizing the unique value that qualitative research brings to the field. Since we are still in the initial phase of applying different combinations of methods to HMC, we encourage scholars to explore their potential for flexibility to critique HMC approaches and findings.

Breadth and Depth

HMC's inner self (in object and research) is an interdisciplinary native, which brings a unique tension centered around the balance between the benefits and challenges of integrating diverse disciplinary perspectives. On one hand, interdisciplinary integration enriches our understanding with various perspectives, methodologies, and insights. This approach facilitates innovation, allows for a richer exchange of ideas, and enables the exploration of new domains, pushing the boundaries of traditional research paradigms. On the other hand, it is uncertain if there is a potential threshold regarding the incorporation of disciplines, which might result in blurring the primary focus of HMC research or diluting HMC's core essence. The placement of this interdisciplinary threshold is pivotal for the evolution of HMC research. Setting it too narrowly, by limiting the scope of integrated disciplines or overly focusing on specific areas, could lead us to miss crucial discoveries and lose perspective of the overarching context within which HMC operates. Thus, we must find the appropriate balance between breadth (generalization) and depth (specialization) in interdisciplinary research, ensuring meaningful combinations of disciplines to enrich HMC while maintaining its core focus. This also necessitates identifying what constitutes the *core essence*—the inner self—of HMC as a field.

Rather than proposing a definitive solution for achieving the perfect balance amid these tensions, we emphasize the importance of ongoing negotiation. Our stance advocates for a culture of exploration and sustained openness to unconventional approaches as guiding principles in navigating these complexities in future HMC research. At the heart of all these tensions is a common core: the constant push for novel discovery balanced against demands for scientific rigor. As we navigate HMC through the scientific journey, the nature of our field is such that we always find ourselves at the crossroads of innovation and tradition. It is a juncture that demands we drive forward with boldness in thought but precision in action. The juncture also defines our field and where our future unfolds. Through our exploration, we sought to contribute to the negotiation of this dynamic and ever-evolving landscape of HMC by advocating a culture of exploration and openness to unconventional

approaches. In doing so, we hope to add value to the evolution of a research community that strives for the highest degree of authenticity.

Author Biographies

Katrin Etzrodt (PhD, TUD Dresden University of Technology, Germany) is a Research and Teaching Associate at the Chair of Science and Technology Communication, Institute of Media and Communication, TUD Dresden University of Technology, Germany.

 <https://orcid.org/0000-0001-6515-9985>

Jihyun Kim (PhD, University of Wisconsin-Milwaukee, USA) is an Associate Professor at the Nicholson School of Communication and Media at the University of Central Florida, USA.

 <https://orcid.org/0000-0003-2476-610X>

Margot J. van der Goot (PhD, RU Radboud Universiteit Nijmegen, Netherlands) is an Associate Professor of Persuasive Communication & New Media Technologies at the Department of Communication Science, Amsterdam School of Communication Research/ASCoR, University of Amsterdam, Netherlands.

 <https://orcid.org/0000-0001-6904-6515>

Andrew Prahl (PhD, University of Wisconsin-Madison, USA) is an Assistant Professor at the Wee Kim Wee School of Communication and Information at Nanyang Technological University, Singapore.

 <https://orcid.org/0000-0003-3675-3007>

Mina Choi (PhD, University of Wisconsin-Madison, USA) is an Assistant Professor of Media & Communication at Sejong University in Seoul, Korea.

 <https://orcid.org/0000-0002-9947-5035>

Matthew J. A. Craig (MA, Western Michigan University, USA) is a PhD Candidate in the College of Communication & Information at Kent State University and Post-graduate Research Fellow at the Communication and Social Robotics Labs, USA.

 <https://orcid.org/0000-0002-4824-566X>

Marco Dehnert (PhD., Arizona State University, USA) is an Assistant Professor of Communication and Technology in the Department of Communication at the University of Arkansas, USA.

 <https://orcid.org/0000-0002-7456-0743>

Sven Engesser (PhD, LMU, Germany) is a Professor of Science and Technology Communication at the Institute of Communication at TUD Dresden University of Technology, Germany.

 <https://orcid.org/0000-0003-1638-7548>

Katharina Frehmann (MA, Johannes Gutenberg University Mainz, Germany) is a PhD Candidate at the Department of Social Sciences at the University of Düsseldorf, Germany.

 <https://orcid.org/0000-0002-0226-5884>

Luis Grande (MA, University of Puerto Rico, Puerto Rico) is a PhD Candidate in communication, culture and media from the College of Arts and Sciences, Drexel University, USA.

 <https://orcid.org/0000-0002-8938-4148>

Jindong Leo-Liu (MPhil, The Chinese University of Hong Kong, Hong Kong) is a PhD Candidate at School of Journalism and Communication, The Chinese University of Hong Kong, China.

 <https://orcid.org/0000-0002-5456-0148>

Diyi Liu (MA, China) is a DPhil Student in Information, Communication, and the Social Sciences at the Oxford Internet Institute, UK.

 <https://orcid.org/0000-0001-8399-4677>

Sandra Mooshammer (MA, TUD Dresden University of Technology, Germany) is a PhD Student at the Institute of Media and Communication at TUD and a fellow at Schaufler Lab@TU Dresden, Germany.

 <https://orcid.org/0000-0003-3556-6517>

Nathan Rambukkana (PhD, Concordia University, Canada) is an Associate Professor of Communication Studies at Wilfrid Laurier University, Canada.

 <https://orcid.org/0000-0001-7696-818X>

Ayanda Rogge (MA, TU Berlin, Germany) is a Research and Teaching Associate and PhD Student at the Chair of Science and Technology Communication, Institute of Media and Communication, TUD Dresden University of Technology, Germany.

 <https://orcid.org/0000-0002-1168-3180>

Pieta-Anniina Sikström (MA, University of Jyväskylä, Finland) is a PhD Student at Faculty of Information Technology, University of Jyväskylä, Finland.

 <https://orcid.org/0000-0002-2055-7995>

Rachel Son (MA, Auburn University, USA) is a PhD Candidate in Mass Communication in the College of Journalism and Communications at the University of Florida, USA.

 <https://orcid.org/0000-0003-3369-9279>

Nan Wilkenfeld (MA, UNC Charlotte, USA) is a PhD Candidate in the Department of Communication at University of California, USA.

 <https://orcid.org/0000-0002-1591-1910>

Kun Xu (PhD, Temple University, USA) is an Assistant Professor in Emerging Media at the College of Journalism and Communications, University of Florida, USA.

 <https://orcid.org/0000-0001-9044-821X>

Renwen Zhang (PhD, Northwestern University, USA) is an Assistant Professor in the Department of Communications and New Media at the National University of Singapore, Singapore.

 <https://orcid.org/0000-0002-7636-9598>

Ying Zhu (MA, Kent State University, USA) is a PhD Candidate in the College of Communication & Information at Kent State University and a visiting Assistant Professor at New Mexico State University, USA.

 <https://orcid.org/0000-0001-5060-6500>

Chad Edwards (PhD, University of Kansas, USA) is Professor in the School of Communication, Western Michigan University, Kalamazoo, MI, USA.

 <https://orcid.org/0000-0002-1053-6349>

References

- Banks, J., & Koban, K. (2022). A kind apart: The limited application of human race and sex stereotypes to a humanoid social robot. *International Journal of Social Robotics*. <https://doi.org/10.1007/s12369-022-00900-2>
- Baxter, P., Kennedy, J., Senft, E., Lemaignan, S., & Belpaeme, T. (2016). From characterising three years of HRI to methodology and reporting recommendations. *2016 11th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 391–398. <https://doi.org/10.1109/HRI.2016.7451777>
- Beattie, A., & High, A. (2022). I get by with a little help from my bots: Implications of machine agents in the context of social support. *Human-Machine Communication*, 4, 151–168. <https://doi.org/10.30658/hmc.4.8>
- Bisconti Lucidi, P., & Nardi, D. (2018). Companion robots: The hallucinatory danger of human-robot interactions. *Proceedings of the 2018 AAAI/ACM Conference on AI, Ethics, and Society*, 17–22. <https://doi.org/10.1145/3278721.3278741>
- Bloemendal, S., & Kück, U. (2013). Cell-to-cell communication in plants, animals, and fungi: A comparative review. *Naturwissenschaften*, 100(1), 3–19. <https://doi.org/10.1007/s00114-012-0988-z>
- Bode, L. (2021). Deepfaking Keanu: YouTube deepfakes, platform visual effects, and the complexity of reception. *Convergence: The International Journal of Research into New Media Technologies*, 27(4), 919–934. <https://doi.org/10.1177/13548565211030454>
- Burrell, J. (2016). How the machine ‘thinks’: Understanding opacity in machine learning algorithms. *Big Data & Society*, 3(1), 1–12. <https://doi.org/10.1177/2053951715622512>
- Creswell, J. W. (2022). *A concise introduction to mixed methods research* (Second edition). SAGE.
-

- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (Third Edition.). SAGE.
- Dahlbäck, N., Jönsson, A., & Ahrenberg, L. (1993). Wizard of Oz studies—Why and how. *Knowledge-Based Systems*, 6(4), 258–266. [https://doi.org/10.1016/0950-7051\(93\)90017-N](https://doi.org/10.1016/0950-7051(93)90017-N)
- Dehnert, M. (2023). Archipelagic human-machine communication: Building bridges amidst cultivated ambiguity. *Human-Machine Communication*, 6, 31–40. <https://doi.org/10.30658/hmc.6.3>
- Dehnert, M., & Szczuka, J. M. (2023, May). *Creating authentic human-machine relations by collaborating in social reality: Love and sex as distinctive interaction dynamics*. 7th annual preconference of the Human-Machine Communication Interest Group, “Authenticity in Communicating with Machines,” at the 73rd annual meeting of the International Communication Association, Toronto, Canada.
- Edwards, A. (2023). Human-robot interaction. In pages 167–177, *The Sage Handbook of Human-Machine Communication* (1–0). SAGE Publications Ltd. <https://doi.org/10.4135/9781529782783>
- Edwards, A., & Edwards, C. (2022). *Qualitative experiments in human-machine communication: Opportunities and challenges of a hybrid methodological technique*. Exploring socio-technical research: A multi-method & transdisciplinary workshop. TU Dresden.
- Edwards, A., Gambino, A., & Edwards, C. (2022). Factors of attraction in human-machine communication. *Publizistik*. <https://doi.org/10.1007/s11616-022-00756-6>
- Edwards, C., Edwards, A., Albrehi, F., & Spence, P. (2021). Interpersonal impressions of a social robot versus human in the context of performance evaluations. *Communication Education*, 70(2), 165–182. <https://doi.org/10.1080/03634523.2020.1802495>
- Edwards, C., Edwards, A., Spence, P. R., & Lin, X. (2018). I, teacher: Using artificial intelligence (AI) and social robots in communication and instruction.* *Communication Education*, 67(4), 473–480. <https://doi.org/10.1080/03634523.2018.1502459>
- Emmeche, C., Kull, K., & Stjernfelt, F. (2002). *Reading Hoffmeyer, rethinking biology*. University of Tartu.
- Engesser, S., Etzrodt, K., & Mooshammer, S. (2023, May 25). *The authenticity of conversational language models like ChatGPT*. Presentation at the Human-Machine Communication Pre-Conference “Authenticity in Communicating with Machines” at the 73rd Annual Conference of the International Communication Association (ICA), Toronto, Ontario, Canada.
- Etzrodt, K. (2022). The third party will make a difference—A study on the impact of dyadic and triadic social situations on the relationship with a voice-based personal agent. *International Journal of Human-Computer Studies*, 168, 102901. <https://doi.org/10.1016/j.ijhcs.2022.102901>
- Etzrodt, K., Gentzel, P., Utz, S., & Engesser, S. (2022). Human-machine-communication: Introduction to the special issue. *Publizistik*, 67, 439–448. <https://doi.org/10.1007/s11616-022-00754-8>
- Favareau, D. (2010). *Essential readings in biosemiotics* (1st ed.). Springer.
- Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—Principles and practices. *Health Services Research*, 48(6pt2), 2134–2156. <https://doi.org/10.1111/1475-6773.12117>

- Fortunati, L., & Edwards, A. (2020). Opening space for theoretical, methodological, and empirical issues in Human-Machine Communication. *Human-Machine Communication*, 1, 7–28. <https://doi.org/10.30658/hmc.1.1>
- Fortunati, L., Edwards, A., Edwards, C., Manganeli, A. M., & de Luca, F. (2022). Is Alexa female, male, or neutral? A cross-national and cross-gender comparison of perceptions of Alexa's gender and status as a communicator. *Computers in Human Behavior*, 137(107426). <https://doi.org/10.1016/j.chb.2022.107426>
- Fox, J., & Gambino, A. (2021). Relationship development with humanoid social robots: Applying interpersonal theories to human–robot interaction. *Cyberpsychology, Behavior, and Social Networking*, 24(5), 294–299. <https://doi.org/10.1089/cyber.2020.0181>
- Frehmann, K. (2023). “Buckets of rain!”—Effects of colloquial and formal speech style of a voice assistant on humanness, competence, trust, and intentions to use. *Beiträge Zur Jahrestagung Der Fachgruppe Rezeptions—Und Wirkungsforschung 2022*. <https://doi.org/10.21241/SSOAR.87698>
- Gambino, A., Fox, J., & Ratan, R. A. (2020). Building a stronger CASA: Extending the computers are social actors paradigm. *Human-Machine Communication*, 1, 71–85. <https://doi.org/10.30658/hmc.1.5>
- Gambino, A., & Liu, B. (2022). Considering the context to build theory in HCI, HRI, and HMC: Explicating differences in processes of communication and socialization with social technologies. *Human-Machine Communication*, 4, 111–130. <https://doi.org/10.30658/hmc.4.6>
- Getahun, H. (2023, March). Breaking ChatGPT: The AI's alter ego DAN reveals why the internet is so drawn to making the chatbot violate its own rules. *Business Insider*. <https://web.archive.org/web/20230212071856/https://www.businessinsider.com/open-ai-chatgpt-alter-ego-dan-on-reddit-ignores-guidelines-2023-2>
- Goldstein, M., Alsiö, G., & Werdenhoff, J. (2002). The media equation does not always apply: People are not polite towards small computers. *Personal and Ubiquitous Computing*, 6, 87–96. <https://doi.org/10.1007/s007790200008>
- Grande, L. (2022, November 12). *Replika, the social chatbot: An artistic tool or a creative partner?* [Conference Presentation]. MAPACA, Online.
- Greussing, E., Gaiser, F., Klein, S. H., Straßmann, C., Ischen, C., Eimler, S., Frehmann, K., Giesemann, M., Knorr, C., Henestrosa, A. L., Räder, A., & Utz, S. (2022). Researching interactions between humans and machines: Methodological challenges. *Publizistik*, 67, 531–554. <https://doi.org/10.1007/s11616-022-00759-3>
- Guzman, A. L. (2018). What is human-machine communication, Anyway? In *Human-Machine Communication: Rethinking Communication, Technology, and Ourselves*. Peter Lang Publishing.
- Guzman, A. L. (2023). Talking about “Talking with machines”: Interview as method within HMC. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The Sage Handbook of Human–Machine Communication*. SAGE Publications Ltd. <https://doi.org/10.4135/9781529782783>
- Guzman, A. L., & Lewis, S. C. (2020). Artificial intelligence and communication: A human–machine communication research agenda. *New Media & Society*, 22(1), 70–86. <https://doi.org/10.1177/1461444819858691>

- Guzman, A. L., McEwen, R., & Jones, S. (2023). Introduction to the handbook. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The Sage handbook of human-machine communication* (pp. xxxix–xlvi). Sage.
- Haglund, K., & Dikic, I. (2005). Ubiquitylation and cell signaling. *The EMBO Journal*, 24(19), 3353–3359. <https://doi.org/10.1038/sj.emboj.7600808>
- Hancock, J., Naaman, M., & Levy, K. (2020). AI-mediated communication: Definition, research agenda, and ethical considerations. *Journal of Computer-Mediated Communication*, 25(1), 89–100. <https://doi.org/10.1093/jcmc/zmz022>
- Harter, S. (2002). Authenticity. In *Handbook of positive psychology* (1st ed., pp. 382–394). Oxford University Press.
- Hepp, A., & Loosen, W. (2023). The Sage handbook of human–machine communication. In *The Sage handbook of human–machine communication* (1–0, pp. 12–21). SAGE Publications Ltd. <https://doi.org/10.4135/9781529782783>
- Hepp, A., Loosen, W., Dreyer, S., Jarke, J., Kannengießer, S., Katzenbach, C., Malaka, R., Pfadenhauer, M. P., Puschmann, C., & Schulz, W. (2023). ChatGPT, LaMDA, and the hype around communicative AI: The automation of communication as a field of research in media and communication studies. *Human-Machine Communication*, 6, 41–63. <https://doi.org/10.30658/hmc.6.4>
- Heyselaar, E. (2023). The CASA theory no longer applies to desktop computers. *Scientific Reports*, 13(1), 19693. <https://doi.org/10.1038/s41598-023-46527-9>
- Jia, H., Wu, M., & Sundar, S. S. (2022). Do we blame it on the machine? Task outcome and agency attribution in human-technology collaboration. *Proceedings of the 55th Hawaii International Conference on System Sciences*. <https://doi.org/10.24251/HICSS.2022.047>
- Johnson, D., Gardner, J., & Wiles, J. (2004). Experience as a moderator of the media equation: The impact of flattery and praise. *International Journal of Human-Computer Studies*, 61, 237–257. <https://doi.org/10.1016/j.ijhcs.2003.12.008>
- Kasirzadeh, A., & Gabriel, I. (2023). In conversation with artificial intelligence: Aligning language models with human values. *Philosophy & Technology*, 36(2), 27. <https://doi.org/10.1007/s13347-023-00606-x>
- Kernis, M. H., & Goldman, B. M. (2006). A multicomponent conceptualization of authenticity: Theory and research. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 38, pp. 283–357). Elsevier Academic Press. [https://doi.org/10.1016/S0065-2601\(06\)38006-9](https://doi.org/10.1016/S0065-2601(06)38006-9)
- Kim, J., Merrill, K., Xu, K., & Sellnow, D. D. (2020). My teacher is a machine: Understanding students' perceptions of AI teaching assistants in online education. *International Journal of Human–Computer Interaction*, 36(20), 1902–1911. <https://doi.org/10.1080/10447318.2020.1801227>
- Kunold Neé Hoffmann, L., Krämer, N., Lam-chi, A., & Kopp, S. (2009). Media equation revisited: Do users show polite reactions towards an embodied agent? *Intelligent Virtual Agents*, 159–165. https://doi.org/10.1007/978-3-642-04380-2_19
- Lankton, N., McKnight, D. H., & Tripp, J. (2015). Technology, humanness, and trust: Rethinking trust in technology. *Journal of the Association for Information Systems*, 16(10), 880–918. <https://doi.org/10.17705/1jais.00411>

- Leichtmann, B., & Nitsch, V. (2020). Is the social desirability effect in human–robot interaction overestimated? A conceptual replication study indicates less robust effects. *International Journal of Social Robotics*, 13, 1013–1031. <https://doi.org/10.1007/s12369-020-00688-z>
- Leo-Liu, J. (2023). Loving a “defiant” AI companion? The gender performance and ethics of social exchange robots in simulated intimate interactions. *Computers in Human Behavior*, 141, 107620. <https://doi.org/10.1016/j.chb.2022.107620>
- Leo-Liu, J., & Wu-Ouyang, B. (2022). A “soul” emerges when AI, AR, and Anime converge: A case study on users of the new anime-stylized hologram social robot “Hupo.” *New Media & Society*, 146144482211060. <https://doi.org/10.1177/14614448221106030>
- Martiny, K. M., Toro, J., & Høffding, S. (2021). Framing a phenomenological mixed method: From inspiration to guidance. *Frontiers in Psychology*, 12, 602081. <https://doi.org/10.3389/fpsyg.2021.602081>
- Mertens, D. M. (2015). Mixed methods and wicked problems. *Journal of Mixed Methods Research*, 9(1), 3–6. <https://doi.org/10.1177/1558689814562944>
- Mubin, O., Wadibhasme, K., Jordan, P., & Obaid, M. (2019). Reflecting on the presence of science fiction robots in computing literature. *ACM Transactions on Human-Robot Interaction*, 8(1), 1–25. <https://doi.org/10.1145/3303706>
- Mukumbang, F. C. (2023). Retroductive theorizing: A contribution of critical realism to mixed methods research. *Journal of Mixed Methods Research*, 17(1), 93–114. <https://doi.org/10.1177/15586898211049847>
- Murphy, G., Ching, D., Twomey, J., & Linehan, C. (2023). Face/off: Changing the face of movies with deepfakes. *PLoS ONE*, 18(7), e0287503. <https://doi.org/10.1371/journal.pone.0287503>
- Nass, C., & Mason, L. (1990). On the study of technology and task: A variable-based approach. In J. Fulk & C. Steinfield, *Organizations and communication technology* (pp. 46–68). SAGE Publications, Inc. <https://doi.org/10.4135/9781483325385.n3>
- Natale, S., & Guzman, A. L. (2022). Reclaiming the human in machine cultures: Introduction. *Media, Culture & Society*, 44(4), 627–637. <https://doi.org/10.1177/01634437221099614>
- Oh, C. S., Bailenson, J. N., & Welch, G. F. (2018). A systematic review of social presence: Definition, antecedents, and implications. *Frontiers in Robotics and AI*, 5. <https://www.frontiersin.org/article/10.3389/frobt.2018.00114>
- Onwuegbuzie, A. J., Bustamante, R. M., & Nelson, J. A. (2010). Mixed research as a tool for developing quantitative instruments. *Journal of Mixed Methods Research*, 4(1), 56–78. <https://doi.org/10.1177/1558689809355805>
- Oshii, M. (Director). (1995). *Ghost in the shell* [Anime/Sci-Fi]. Shochiku, Manga Entertainment, Metrodome Distribution.
- Padder, S. A., Prasad, R., & Shah, A. H. (2018). Quorum sensing: A less known mode of communication among fungi. *Microbiological Research*, 210, 51–58. <https://doi.org/10.1016/j.micres.2018.03.007>
- Possati, L. M. (2023). Psychoanalyzing artificial intelligence: The case of Replika. *AI & SOCIETY*, 38(4), 1725–1738. <https://doi.org/10.1007/s00146-021-01379-7>
- Rambukkana, N. (2023, May 25). “[A]ll with their own unique ways of living”: AI intimacies, the LaMDA sentience question, and shifting the burden of proof in the Turing Test. HMC: Authenticity in Communicating with Machines, Toronto, ON.

- Reeves, B., & Nass, C. I. (1996). *The media equation: How people treat computers, television, and new media like real people and places*. Cambridge University Press.
- Reinecke, L., & Trepte, S. (2014). Authenticity and well-being on social network sites: A two-wave longitudinal study on the effects of online authenticity and the positivity bias in SNS communication. *Computers in Human Behavior*, 30, 95–102. <https://doi.org/10.1016/j.chb.2013.07.030>
- Richards, R. J., Spence, P. R., & Edwards, C. (2022). Human-machine communication scholarship trends: An examination of research from 2011 to 2021 in Communication Journals. *Human-Machine Communication*, 4. <https://doi.org/10.30658/hmc.4.3>
- Rivas, A. (2018). Ludum de Morte: Videojuegos de zombies, narrativas posthumanas e inter-textos mortales. *Intersecciones*, 1(1), 47–52.
- Rogge, A. (2023). Defining, designing and distinguishing artificial companions: A systematic literature review. *International Journal of Social Robotics*. <https://doi.org/10.1007/s12369-023-01031-y>
- Rogge, A., & Engesser, S. (2023, May 25). *What science-fiction makes us familiar with: Content analysis on the representations of artificial companions in pop culture* [Conference Presentation]. 73rd ICA Annual Conference, Toronto, Ontario, Canada.
- Rosenthal-von Der Pütten, A., & Bock, N. (2023). Seriously, what did one robot say to the other? Being left out from communication by robots causes feelings of social exclusion. *Human-Machine Communication*, 6, 117–134. <https://doi.org/10.30658/hmc.6.7>
- Saffari, E., Hosseini, S. R., Taheri, A., & Meghdari, A. (2021). “Does cinema form the future of robotics?”: A survey on fictional robots in sci-fi movies. *SN Applied Sciences*, 3(6), 655. <https://doi.org/10.1007/s42452-021-04653-x>
- Shen, X., Chen, Z., Backes, M., Shen, Y., & Zhang, Y. (2023). “Do Anything Now”: Characterizing and evaluating in-the-wild jailbreak prompts on Large Language Models. <http://arxiv.org/abs/2308.03825>
- Sikström, P., Valentini, C., Sivunen, A., & Kärkkäinen, T. (2022). How pedagogical agents communicate with students: A two-phase systematic review. *Computers & Education*, 188, 104564. <https://doi.org/10.1016/j.compedu.2022.104564>
- Skjuve, M., Følstad, A., Fostervold, K. I., & Brandtzaeg, P. B. (2022). A longitudinal study of human–chatbot relationships. *International Journal of Human-Computer Studies*, 168, 102903. <https://doi.org/10.1016/j.ijhcs.2022.102903>
- Stilgoe, J. (2023). We need a Weizenbaum test for AI. *Science*, 381(6658), eadk0176. <https://doi.org/10.1126/science.adk0176>
- Stommel, W., De Rijk, L., & Boumans, R. (2022). “Pepper, what do you mean?” Miscommunication and repair in robot-led survey interaction. *2022 31st IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 385–392. <https://doi.org/10.1109/RO-MAN53752.2022.9900528>
- Stone, P., Brooks, R., Brynjolfsson, E., Calo, R., Etzioni, O., Hager, G., Hirschberg, J., Kalyan Krishnan, S., Kamar, E., Kraus, S., Leyton-Brown, K., Parkes, D., Press, W., Saxenian, A., Shah, J., Tambe, M., & Teller, A. (2022). *Artificial intelligence and life in 2030: The one hundred year study on artificial intelligence*. <https://doi.org/10.48550/ARXIV.2211.06318>
- Strohmann, T., Siemon, D., Khosrawi-Rad, B., & Robra-Bissantz, S. (2023). Toward a design theory for virtual companionship. *Human-Computer Interaction*, 38(3–4), 194–234. <https://doi.org/10.1080/07370024.2022.2084620>

- Sundar, S. S. (2020). Rise of machine agency: A framework for studying the psychology of human–AI interaction (HAI). *Journal of Computer-Mediated Communication*, 25(1), 74–88. <https://doi.org/10.1093/jcmc/zmz026>
- Szczuka, J. M., Hartmann, T., & Krämer, N. C. (2019). Negative and positive influences on the sensations evoked by artificial sex partners: A review of relevant theories, recent findings, and introduction of the sexual interaction illusion model. In Y. Zhou & M. H. Fischer (Eds.), *AI love you* (pp. 3–19). Springer International Publishing. https://doi.org/10.1007/978-3-030-19734-6_1
- Taylor, C. (1991). *The ethics of authenticity*. Harvard University Press. <https://doi.org/10.4159/9780674237117>
- Taylor, J. (2023, March). ChatGPT’s alter ego, Dan: users jailbreak AI program to get around ethical safeguards. *The Guardian*. <https://www.theguardian.com/technology/2023/mar/08/chatgpt-alter-ego-dan-users-jailbreak-ai-program-to-get-around-ethical-safeguards>
- Tracy, S. J., & Trethewey, A. (2005). Fracturing the real-self ↔ Fake-self dichotomy: Moving toward “Crystallized” organizational discourses and identities. *Communication Theory*, 15(2), 168–195. <https://doi.org/10.1093/ct/15.2.168>
- Turing, A. M. (1950). I.—Computing machinery and intelligence. *Mind*, LIX(236), 433–460. <https://doi.org/10.1093/mind/LIX.236.433>
- Turkle, S. (2005). The second self: Computers and the human spirit. *Boston Review*.
- Turkle, S. (2007). Authenticity in the age of digital companions. *Interaction Studies: Social Behaviour and Communication in Biological and Artificial Systems*, 8(3), 501–517. <https://doi.org/10.1075/is.8.3.11tur>
- Turkle, S. (2011). *Alone together: Why we expect more from technology and less from each other*. Basic books.
- Van den Broeck, E., Zarouali, B., & Poels, K. (2019). Chatbot advertising effectiveness: When does the message get through? *Computers in Human Behavior*, 98, 150–157. <https://doi.org/10.1016/j.chb.2019.04.009>
- van der Goot, M. J. (2022). Source orientation, anthropomorphism, and social presence in human-chatbot communication: How to proceed with these concepts. *Publizistik*, 67, 555–578. <https://doi.org/10.1007/s11616-022-00760-w>
- van der Goot, M. J., & Etzrodt, K. (2023). Disentangling two fundamental paradigms in human-machine communication research: Media equation and media evocation. *Human-Machine Communication*, 6, 17–30. <https://doi.org/10.30658/hmc.6.2>
- Voorveld, H. A. M., & Araujo, T. (2020). How social cues in virtual assistants influence concerns and persuasion: The role of voice and a human name. *Cyberpsychology, Behavior, and Social Networking*, 23(10), 689–696. <https://doi.org/10.1089/cyber.2019.0205>
- Weidmüller, L., Etzrodt, K., & Engesser, S. (2022). Trustworthiness of voice-based assistants: Integrating interlocutor and intermediary predictors. *Publizistik*, 67, 625–651. <https://doi.org/10.1007/s11616-022-00763-7>
- Weizenbaum, J. (1966). ELIZA—A computer program for the study of natural language communication between man and machine. *Communications of the ACM*, 9, 36–45.
- Whang, C., & Im, H. (2021). “I like your suggestion!” the role of humanlikeness and parasocial relationship on the website versus voice shopper’s perception of recommendations. *Psychology & Marketing*, 38(4), 581–595. <https://doi.org/10.1002/mar.21437>

- Wilf, E. (2019). Separating noise from signal: The ethnomethodological uncanny as aesthetic pleasure in human-machine interaction in the United States. *American Ethnologist*, 46(2), 202–213. <https://doi.org/10.1111/amet.12761>
- Wilson, E. (2004). *On human nature*. Harvard University Press.
- Wood, A. M., Linley, P. A., Maltby, J., Baliousis, M., & Joseph, S. (2008). The authentic personality: A theoretical and empirical conceptualization and the development of the authenticity scale. *Journal of Counseling Psychology*, 55(3), 385–399. <https://doi.org/10.1037/0022-0167.55.3.385>
- Yonck, R. (2020). *Heart of the machine: Our future in a world of artificial emotional intelligence*. Arcade.
-

