Volume 7, 2024 ISSN 2638-602X (print)/ISSN 2638-6038 (online)

Human-Machine Communication

ISSN 2638-602X (print)/ISSN 2638-6038 (online)

www.hmcjournal.com

Human-Machine Communication (HMC) is an annual peer-reviewed, open access publication of the Communication and Social Robotics Labs (combotlabs.org), published with support from the Nicholson School of Communication and Media at the University of Central Florida. Human-Machine Communication (Print: ISSN 2638-602X) is published in the spring of each year (Online: ISSN 2638-6038). Institutional, organizational, and individual subscribers are invited to purchase the print edition using the following mailing address:

Human-Machine Communication (HMC)
Communication and Social Robotics Labs
Western Michigan University
1903 W. Michigan Ave.
300 Sprau Tower
Kalamazoo, MI 49008

Print Subscriptions: Regular US rates: Individuals: 1 year, $40.
Libraries and organizations may subscribe for 1 year, $75.
If subscribing outside of the United States, please contact the Editor-in-Chief for current rate. Checks should be made payable to the Communication and Social Robotics Labs.

Human-Machine Communication

Volume 7

Mediatization

CONTENTS

HUMAN-MACHINE
COMMUNICATION

HUMAN-MACHINE COMMUNICATION

Human-Machine Communication
Special Edition, Volume 7, 2024
https://doi.org/10.30658/hmc.7.1

Mediatization and Human-Machine Communication: Trajectories, Discussions, Perspectives

Andreas Hepp,[1] Göran Bolin,[2] Andrea L. Guzman,[3] and Wiebke Loosen[4]

1 Centre for Media, Communication and Information Research (ZeMKI), University of Bremen, Germany
2 Media and Communication Studies, Södertörn University, Huddinge, Sweden
3 The Human-Machine Communication Lab, Northern Illinois University, DeKalb, IL, USA
4 Leibniz Institute for Media Research, Hamburg, Germany

Abstract

As research fields, mediatization and Human-Machine Communication (HMC) have distinct historical trajectories. While mediatization research is concerned with the fundamental interrelation between the transformation of media and communications and cultural and societal changes, the much younger field of HMC delves into human meaning-making in interactions with machines. However, the recent wave of "deep mediatization," characterized by an increasing emphasis on general communicative automation and the rise of communicative AI, highlights a shared interest in technology's role within human interaction. This introductory article examines the trajectories of both fields, demonstrating how mediatization research "zooms out" from overarching questions of societal and cultural transformations, while HMC tends to "zoom in" to approach the concrete situatedness of the interaction between humans and machines. It is argued that we need to combine both perspectives to better understand how the automation of communication transforms the social construction of culture and society. This article offers an overview of the key themes explored in this thematic issue, highlighting the productive intersection of HMC and mediatization within each article. Additionally, it identifies potential avenues for future research emerging from this fruitful intersection.

Keywords: human-machine communication, mediatization, communicative AI, media theory

CONTACT Andreas Hepp • hepp@uni-bremen.de • Centre for Media • Communication and Information Research (ZeMKI) • University of Bremen, Linzer Str. 4-6, 28359 Bremen • Germany

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

1. Looking at Trajectories

Despite their distinct approaches and traditions, mediatization and HMC research share a key area of interest: the role of technology in human communication. The ongoing discussion surrounding communicative AI exemplifies this shared ground. In engaging with this emerging class of technologies, both fields offer valuable and complementary contributions. While taking into account various kinds of mediated communication, the core principal of mediatization research is to investigate the broader relationship between the transformation of media and communications on the one hand and culture and society on the other (Couldry & Hepp, 2013; Hjarvard, 2017; Lundby, 2014). Despite varied approaches and empirical foci, both mediatization research and HMC share the core tenet that "the media"—encompassing organizations, communication technologies, and symbolic systems—do set their mark on society, and give character to the cultural environments in which we live (Bolin & Hepp, 2017; Ekström et al., 2016; Hjarvard, 2013; Krotz, 2009). HMC, a younger field, emerged in response to the increasing ability of machines to act independently or simulate human-like behavior. It focuses on how humans create meaning in communication with such machines and the implications for both individuals and society (Guzman, 2018b; Guzman et al., 2023b; Spence, 2019). HMC centrally involves rethinking the ontological assumptions surrounding the nature of communication and media theory (Gunkel, 2012a; Guzman & Lewis, 2020). As this special issue demonstrates, the contrasting approaches of mediatization research and HMC can serve as a starting point for a productive mutual enrichment. To understand this better, a brief look back at the trajectories of both research fields is helpful.

Mediatization research originally grew out of a media environment dominated by the mass media—the printed press, radio, and television. The original idea of mediatization theory, emerging from its origins in mass communication research, was to understand media as an independent domain, with its own "media logic" (Altheide & Snow, 1979; Asp, 1990; Mazzoleni, 2008), increasingly influencing other societal domains, systems, or fields, often in tension with other logics. According to a frequently quoted definition, media logic is understood as a "shorthand for the various institutional, aesthetic, and technological modus operandi of the media, including the ways in which the media distribute material and symbolic resources, and operate with the help of formal and informal rules" (Hjarvard, 2013, p. 17). Beyond its theoretical development, mediatization research received a significant boost through its institutionalization when incorporated into a working group in 2011 and then a section (2016) of the European Communication Research and Education Association (ECREA), maintaining research-led links with Latin American mediatization scholars (Scolari & Rodriguez-Amat, 2018).

Given its focus on the media's role in social and cultural change, it is unsurprising that mediatization theory itself adapts alongside the evolution of media technologies and communication forms. In response to these developments, mediatization research underwent a fundamental reformulation over the years. After initial criticism for not sufficiently integrating the digitization of media into its own analysis (Finnemann, 2011), the original concepts of mediatization theory, originating from mass communication research, were increasingly called into question (Couldry & Hepp, 2016; Lundby, 2014). The rapid rise of social media and digital platforms necessitated a closer examination of the relationship between media

and communication, and their role for culture and society. However, the evolving media landscape demanded analytical concepts beyond those tailored for traditional mass media. Consequently, the concept of a singular "media logic" was called into question as it failed to capture the diverse forms and functionalities of digital media's institutionalizations and materializations (Hepp, 2020b, pp. 59–67; Lundby, 2009). Arguably there was never one media logic, but a plurality of media logics (Thimm et al., 2018; van Dijck & Poell, 2013). The assumption that digital media existed as a distinct sphere of society became increasingly tenuous as it became deeply integrated into the production of journalistic content. The spread of platforms, for example, has fundamentally transformed journalism as a specific social domain (Kramp & Loosen, 2018; Loosen, 2018), and similar impacts are felt across various other domains such as health care and sports, although the specific dynamics of change differ in each case. Digital media and their infrastructures uniquely "weave" themselves into all domains of society, with varying transformation dynamics in each case. Additionally, since these media inherently generate data and that parts of their cultural and social influence are based on the processing of this data, the examination of datafication became an integral part of mediatization research (Bolin & Schwarz, 2015; Couldry & Hepp, 2016; Kaun, 2023; Livingstone, 2019). Expanding its scope, mediatization research now delves into a wider range of cultural and societal domains, including fashion, war, sports, finance, and everyday life (Kopecka-Piech & Bolin, 2023a).

Within mediatization research, the technologies, interactions, and implications of human-machine communication have largely played a subordinate role. This might be attributed to the field's inherent focus on "media" rather than "communication" (see Bolin in this issue). However, this has also changed with the evolving understanding of media that has emerged with digitalization. Reflecting this shift, mediatization research has begun engaging with the concept of "communicative machines," which share some clear parallels with the field of HMC. Even in the early days of mediatization research, with the first mentions emerging in the mid-1990s, individual scholars explored the communicative role of robots (Krotz, 2014; Nowak, 1996). A concrete example is Friedrich Krotz's investigation into the appropriation of a Sony robot dog AIBO and the Tamagotchi. Krotz argued that communication with such systems involves the "projection of the [. . .] interacting human" that deviates from typical human to human communication (Krotz, 2007, p. 147). Krotz saw both as "interactive media," which he described as a manifestation of the progressing mediatization of everyday life. Building on this foundation, mediatization research has expanded to understand "communicative robots" within the broader context of automated communication (Hepp, 2020a; Hepp, 2020b, pp. 77–82), a term that encompasses various systems including artificial companions, social bots, and workbots used in automated journalism. These examples demonstrate that mediatization research approaches HMC's field of interest with two key distinctions: first, by contextualizing automated communication within long-term societal transformations; and second, by emphasizing its connections to wider societal changes like individualization and commercialization. While proceeding along different trajectories, with mediatization following a much longer arch given its status as a more established line of inquiry, both mediatization and HMC meet in the technological advances of "communicative AI" (Guzman & Lewis, 2020; Hepp et al., 2023; Natale, 2021; Ng, 2022; Stenbom et al., 2023).

Human-machine communication as a recognized area of research within the study of communication is much newer than mediatization. Mediatization research dates back to the 1920s (Averbeck-Lietz, 2014),[1] while Human-Machine Communication traces its origins to 2015 when efforts began to formalize it as a distinct field within communication[2] (Guzman et al., 2023a, p. xl). However, as demonstrated in reviews of the developing field (e.g., Fortunati & Edwards, 2021; Guzman, 2018a; Makady & Liu, 2022; Mays & Katz, 2023; Richards et al., 2022), research within HMC is influenced by and builds upon rich scholarly trajectories within communication and media studies dating back to the mid-20th century, including cybernetics (e.g., Wiener, 1948), medium theory (e.g., McLuhan, 1994), computer-mediated communication (e.g., Walther, 1996), and Human-Computer Interaction (HCI) research (e.g., B. Reeves & Nass, 1996; Sundar, 2008). It also builds upon foundational works in cognate fields such as HCI and Science and Technology Studies (e.g., Latour, 2007; Suchman, 1987) as well as computing and engineering (e.g., Weiser, 1991) which, interestingly, have, in part, the same historical origin (Tinnell, 2023).

The techno-cultural context in which HMC was formed and has begun to evolve is different from that of mediatization; although both find their roots in historical moments of significant and inextricably intertwined media, technology, and cultural change. It was the interactive elements of computers that prompted scholars to shift their thinking toward computers as a type of message source (e.g., Nass et al., 1994; Rafaeli, 1988). As applications and devices became increasingly agentic, scholars began to theorize media more fully in the role of a communicator, closer to the human sense of the term, while also considering the larger disciplinary, philosophical, and cultural implications of such a shift from people as communicators and machines as channels to machines as channel and communicator (e.g., Gunkel, 2012a; Jones, 2014; Zhao, 2006). Efforts to develop HMC as a subfield of communication were in response to advances in artificial intelligence and robotics that enabled the development of technologies with sophisticated and increasingly human-like communicative abilities and their integration into everyday life (Guzman, 2018a; Spence, 2019).

HMC has positioned itself as a subfield that values philosophical, theoretical, and methodological diversity, including research that spans the social sciences and humanities. The chapters of the recently published *SAGE Handbook of Human-Machine Communication* reflect the significant breadth of this currently institutionalizing area of media and communication, which results not least from the diversity of its interdisciplinary relations (Hepp & Loosen, 2023). As HMC is evolving, certain approaches and theories are more pronounced than others (Makady & Liu, 2022; Richards et al., 2022). The Computers Are Social Actors, or CASA, paradigm (Nass et al., 1994) and the media equation (B. Reeves & Nass, 1996) have been particularly influential as HMC scholars consider new ways of theorizing interactions with more sophisticated forms of media (e.g., Gambino et al., 2020; Lombard & Xu, 2021). In line with CASA's influence are a focus on social science theories and methods, particularly experiments, investigating a myriad of aspects regarding people's use and perceptions of chatbots, robots, and related technologies (Makady & Liu, 2022; Richards et al., 2022). Interpretivist and qualitative approaches are valued but are represented to a lesser degree, leading some scholars to advocate for their increased presence given their potential to provide insights into people's everyday encounters with communicative technologies (e.g., Fortunati & Edwards, 2020; Guzman, 2023; Richards et al., 2022). The need to understand the critical and cultural implications of the "automation of communicative labor"

(J. Reeves, 2016, p. 150), the development of human-machine relationships (e.g., Gehl & Bakardjieva, 2016), and to consider the larger philosophical and ethical questions (e.g., Ess, 2018; Gunkel, 2012b) also served as a key motivator in the establishment of HMC. While a preponderance of HMC scholarship focuses on direct encounters between people and technology, scholars working from feminist and critical cultural paradigms also are examining larger societal questions and issues (e.g., Coleman, 2023; Iliadis, 2023).

Considering their historical development and research trajectories in relation to one another, we can say that while mediatization research is concerned with "zooming out" to overarching questions of societal and cultural transformations, HMC has largely formed around "zooming in" to an examination of the concrete situatedness of the interaction of humans and machines. And while mediatization research has developed particularly in the European and Latin American tradition of media and communication research, HMC emerged particularly in the Anglo-American context.

Our descriptions up to this point make clear where research on mediatization and HMC differ, but above all, where they can complement each other productively. Both formed in response to significant technological and cultural change and seek to illuminate the implications of media in everyday life as it gains a greater and more powerful presence. In both traditions, we share the argument that "communicative AI" stands for a comprehensive current thrust of change in our media environment and is evident in the increasing automation of communication—which is why we need an intensive dialog between the two areas of media and communication research. From mediatization research, we need the perspective on and the competence to critically investigate the long-term transformation of culture and society. From HMC, we need the perspective on and the competence to investigate human-machine interactions. And, indeed, at certain points, we can already identify shared roots from which to bridge the gaps between. If we combine both—which is advocated here—then we will be able to better understand how the automation of communication transforms the social construction of culture and society.

2. Themes of Discussions

If we look at the contributions to this thematic issue, they converge in the argument that communicative AI and the automation of communication point to the need to further advance the conceptual tools of mediatization research. HMC offers great potential for achieving this goal. A total of five concepts are introduced into the academic discussion or accentuated anew by the articles: That of the "human fix" as a characteristic of the current deep mediatization; "machine agency" as an experiential dimension of the mediatization of family; arguments to develop an approach of "technological mediatization"; an understanding of "artificial sociality" in automated communication not as its property but as a human attribution; and the urge for "mediatized immediacy" in the use of systems. Each article elaborates on these themes at the intersection of HMC and mediatization.

The article "Smoothing Out Smart Tech's Rough Edges" by Christian Katzenbach, Christian Pentzold, and Paloma Viejo Otero ties in directly with current research on deep mediatization and the discussion regarding the automation of communication. The main argument of the contribution at this point is that although mediatization research has

generally pointed to the revelation gain of automated communication, there is also "a lack of understanding with respect to the practical implications of automated media." The objective of this article is to be a step toward filling this gap. To this end, two case studies are combined that from a HMC perspective focus on interactions with machines and from the tradition of mediatization research concern completely different domains: the front end of self-service checkouts and the back end of content moderation. Such a comparison shows first of all that what is described as the automation of communication is subject to different dynamics in each case, which refer to the respective situational and social context. At the same time, however, three overarching patterns also become clear: the ad-hoc sociality in situated practices of automation, the capture of mundane expertise, and the inverted assistance of humans to machines. In this sense, the so-called "human fix" is not a temporary repair of malfunction, but a permanent and constitutive feature of automated systems and therefore a characteristic of a deeply mediatized society.

Giovanna Mascheroni explores whether smart speakers in family life are mere interfaces or if they begin to represent new family members. As she argues, today, voice assistants and other conversational agents are common, and human-machine communication is "domesticated" into family settings, which makes questions of communication, and how the activity of communication should be understood, defined, and theorized, unavoidable. Mascheroni analyzes how family members, that is, young families with small children, communicate *through* as well as *with* smart speakers in the home, and how the family figurations change with the domestication of these technologies. On this basis, she reflects on what this means for our understanding of "machine agency" as a characteristic of deep mediatization. She comes to the conclusion that smart speakers acquire a form of agency by intensifying the datafication and algorithmization of everyday life, thus entailing a shift in the power dynamics between humans and machines.

The concept of the "machine" also plays a role in the article "Communicative AI and Techno-Semiotic Mediatization: Understanding the Communicative Role of the Machine" by Göran Bolin; although, he gives it a different twist in the context of mediatization research. His argument is that mediatization research has so far focused primarily on an institutional or social-constructivist approach, which means that the focus has been more on "the media" rather than on "communication." By contrast, Bolin locates his arguments more strongly in an approach that focuses on the technology itself and its communicative affordances and limitations. He argues that this will make it possible to integrate findings from HMC research into mediatization research to a much greater extent than before. Using the example of an automated recruitment interview, it is shown what this could look like. In parallel to social constructivist approaches, Bolin argues that mediatization research should focus much more on questions of communication instead of overemphasizing an institutional perspective. Including the HMC perspective, however, is particularly about an appropriate examination of the automation of communication. All this could be better understood in a framework of "techno-semiotic mediatization" (i.e., in situations where technology and the semiotic codes and procedures of communication are taken into account).

The central concept of Simone Natale and Iliana Depounti's contribution is "artificial sociality." Unlike existing literature focused on new forms of machinic sociality, their research delves into the emergence of a new type of social interaction, one that takes on new "appearances." It is therefore about "mechanisms of projection" that encourage users

to assign social meanings to interactions with social robots and communicative AI. To make their case, Natale and Depounti employ several examples of the anthropomorphization of automated communication systems: the public discourse around Alphabet/Google's LaMDA-based chatbot that is supposed to have reached sentience, the use of humanlike voices for voice assistants, and the functionality of the GPT-4-based chatbot Replika, to name a few. Working from these examples, Natale and Depounti conclude that "artificial sociality" is an important dimension of today's broader mediatization processes, the analysis of which should also consider questions of anthropomorphization.

Drawing on their expertise in HMC, Fortunati, Edwards, and Edwards offer a distinct perspective in their contribution. Under the title "The Perturbing Contribution of Virtual Assistants to Mediatization," they deal with the case of Alexa. The empirical basis of the article is a survey of 655 university students in the US and Italy on how they use Alexa to access news. This empirical evidence opens up a new perspective on current mediatization processes. Their findings highlight the desire for "mediatized immediacy" in Alexa's news delivery that is expressed in expectations on virtual assistants to function as reliable providers of news and information "in an instantaneous, personalized, and potentially interactive manner." This type of direct real-time interaction with a voice-based assistant's news delivery service may have implications for the representational dimensions of human-machine communication that adds another mediatized layer to social reality.

3. Future Perspectives

As demonstrated in the contributions to this thematic issue—"human fix," "machine agency," "technological mediatization," "artificial sociality," and "mediatized immediacy"—reveal that the intersection of mediatization research and HMC is indeed highly productive. But what further-reaching perspectives result from these individual points? In our view, raising this question leads to three perspectives, into which the individual arguments of the articles in this thematic issue can also be integrated. These perspectives result from the combination of "long-term" and "in-depth" approaches, from relating "sensitizing" and "definitive" concepts to one another, and from the fusion of research on "domain-specificity" and "actor-relatedness."

The first *perspective emerges by combining "long-term" and "in-depth" approaches on automated communication*. Mediatization research has gradually come to move toward a long-term view on media and communication-related transformations (Bolin, 2014; Krotz, 2001; Lunt & Livingstone, 2016; Nowak, 1996; Petersen, 2023), something that can also be said to have influences from Latin American mediatization research where a "the longer the better" (Verón, 2014, p. 164) position dominates. Current phenomena are therefore contextualized in a much broader historical perspective. With regard to communicative AI this means that the changes associated with this phenomenon can be seen in a sequence of "waves of mediatization" (Couldry & Hepp, 2016, p. 34), starting with mechanization, across electrification culminating ultimately with digitalization—which has subsequently made the datafication and automation of communication possible, for example in the form of GPT-4 and comparable large language models (Hepp et al., 2023, pp. 44–45). From the perspective of mediatization research, it would therefore be a matter of embedding the study of automated communication in broader historical processes, and slightly refocusing

to more clearly include aspects of communication that have gradually faded into the background for most mediatization scholarship. HMC—as the name already makes clear—is emerging and has established its foundations around the current techno-cultural moment (Guzman, 2018a, pp. 11–14). Despite its recent emergence, HMC has rapidly established a strong foundation in its field. Notably, it draws upon existing theories and paradigms shaped by earlier technologies, contributing to the evolving understanding of media as active communicators. Therefore, we believe that effectively investigating communicative AI, a key driver of communication automation, necessitates employing both comprehensive historical and contemporary lenses. As Richards et al. (2022) suggest, HMC's expertise offers a valuable current in-depth perspective. However, a thorough understanding also requires examining the broader historical and societal context that has shaped the development of communicative AI.

A second perspective emerges by placing "sensitizing" and "definitive" concepts in relation to one another. "Definitive concepts," according to Herbert Blumer, are those that refer "precisely to what is common to a class of objects, by the aid of a clear definition in terms of attributes or fixed bench marks" (Blumer, 1954, p. 7). By contrast, "sensitizing concepts" are those that provide "a general sense of reference and guidance in approaching empirical instances" (Blumer, 1954, p. 7). However, we need both concepts for productive research. And here, mediatization research opens up the "sensitizing" perspective in particular. As Klaus Bruhn Jensen (2013) has made clear, mediatization itself is a "sensitizing concept." It offers guidance toward focusing on questions of transformation, namely on mutual relationships and processes. However, as various mediatization researchers have noted, mediatization research also requires "definitive concepts" in order to operationalize its own studies (Hepp, 2020b, pp. 62–67; Hjarvard, 2013, p. 5; Kopecka-Piech & Bolin, 2023b, p. 1). These have already been taken from general media and communications research. Examples include concepts such as "affordance" (Gibson, 1967), "media logic" (Altheide & Snow, 1979) or "media practice" (Couldry, 2004), all of which have made it possible to conduct concrete empirical research on questions of mediatization. This is exactly what HMC offers for the field of automation of communication. Examples include the adaptation of CASA (Gambino et al., 2020) or "media-as-social-actor presence" (Lombard & Xu, 2021; Xu & Jeong, 2023). Other "definitive concepts" such as "affordance" (Nagy & Neff, 2023) are redefined in HMC. It is precisely this encounter between "sensitizing" and "definitive concepts" that is important to us when investigating the automation of communication.

A third perspective emerges from considering the relationship between "domain specificity" and "actor relatedness." Media and information studies research has consistently shown that the spread of (digital) media and their infrastructures does not lead to a uniform transformation across all domains; instead, the impact is always specific to the domain in question. In education (e.g., Rawolle & Lingard, 2014), politics (e.g., Esser & Strömbäck, 2014), religion (e.g., Lundby, 2023) or sport (e.g., Frandsen, 2023), for example, the mediatized transformations operate quite differently, meaning that one cannot assume a uniform process of change. One of the particular achievements of mediatization research can be seen in investigating such differences and their underlying patterns (Hepp et al., 2018; Hjarvard, 2013; Livingstone & Lunt, 2014). Much HMC scholarship focuses on questions involving direct interactions among humans and machines (Mays & Katz, 2023) while taking into account the context for those interactions, such as newsrooms (Lewis et al., 2019).

The domain is important, and in some instances may come to the fore, but often it is the point of contact between human and machine that is given primacy. Given their complementary nature, we believe this perspective of relating mediatization research and HMC holds significant value for developing a nuanced understanding of the automation of communication.

While these three perspectives—focusing on historical context, current dynamics, and the interplay between domain specificity and actor relatedness—only represent a starting point, they effectively illustrate the immense potential of the intersection between mediatization research and HMC. This fruitful dialogue holds immense promise for advancing our understanding of communicative AI and the broader phenomenon of communication automation. Our hope is that this thematic issue can be a starting point for further joint conversations.

***

This thematic issue has its roots in a panel we organized at the European Communication Research and Education Association (ECREA) conference in October 2022 under the title "What is automated communication 'enabling'? Communicative AI, deep mediatization and the good life" and at which some of the papers now available in essay form were presented. At the conference productive discussion arose around the question of how mediatization research and HMC can be more closely allied, which then led to the idea of this thematic issue. We would like to thank various people who made this possible, first of all the chairs of the ECREA section "Mediatization," for their encouragement in hosting this panel. We would also like to thank the reviewers for both the ECREA conference and the articles in this thematic issue, especially as it is not easy to review articles that bring together different strands of research. Finally, we would like to thank the editors of the journal *Human Machine Communication*, who have opened up the space to continue this discussion as a publication.

Notes

1. As Averbeck-Lietz (2014) concludes, the first use of the concept of mediatization in a similar way as it is used today dates back to the 1920s. Other early uses include Baudrillard (1971, 1981), who used it for a more technological and semiotic approach. The general role of media in culture and society has, from processual perspectives as well, been discussed broadly throughout communication studies' history, not least in medium theory (e.g., McLuhan, 1964), although the specific mediatization concept has not been used.

2. The term "human-machine communication" is not unique to the study of communication. Indeed, along with the oft-used "man-machine communication," human-machine communication can be found within the literature on early computing and ergonomics and within fundamental texts of HCI and STS (e.g., Suchman, 1987). Within computing, the terminology fell out of use and was replaced by human-computer interaction. See Guzman (2018a) regarding the centrality of the concept of communication in early computing and the purposeful decision by communication scholars to reclaim "human-machine communication."

Author Biographies

Andreas Hepp (PhD, University of Trier) is Professor of Media and Communications and Head of ZeMKI, Centre for Media, Communication and Information Research, University of Bremen, Germany. His research focuses on mediatization, datafication, automation of communication, communicative AI, pioneer communities, media use, and appropriation.

https://orcid.org/0000-0001-7292-4147

Göran Bolin (PhD, Stockholm University) is Professor of Media and Communication Studies. His research focuses on datafication, commodification, and the relations between cultural production and consumption in digital markets.

https://orcid.org/0000-0003-0216-8862

Andrea L. Guzman (PhD, University of Illinois Chicago) is an associate professor of communication at Northern Illinois University where her research focuses on people's interactions with artificial intelligence technologies and the social and ethical implications of AI. As a former journalist, she also studies the integration of artificial intelligence and machine learning into journalism.

https://orcid.org/0000-0002-6874-9435

Wiebke Loosen (PhD, University of Münster) is a Senior Journalism Researcher at the Leibniz Institute for Media Research | Hans-Bredow-Institut (HBI) as well as a professor at the University of Hamburg, Germany. Her research focuses on the transformation of journalism within a changing media environment, the journalism-audience relationship, pioneer journalism and the start-up culture in journalism, as well as the datafication and automation of communication.

https://orcid.org/0000-0002-2211-2260

References

Altheide, D. L., & Snow, R. P. (1979). *Media logic*. Sage.

Asp, K. (1990). Medialization, media logic and mediarchy. *Nordicom Review*, *11*(2), 47–50.

Averbeck-Lietz, S. (2014). Understanding mediatization in "First Modernity": Sociological classics and their perspectives on mediated and mediatized societies. In K. Lundby (Ed.), *Mediatization of communication* (pp. 109–130). de Gruyter.

Baudrillard, J. (1971). Requiem pour les Media. *Utopie*, *4*, 35–51.

Baudrillard, J. (1981). Requiem for the media. In J. Baudrillard (Ed.), *For a critique of the political economy of the sign* (pp. 164–184). Telos.

Blumer, H. (1954). What is wrong with social theory? *American Sociological Review*, *19*, 3–10.

Bolin, G. (2014). Institution, technology, world: Relationships between the media, culture and society. In K. Lundby (Ed.), *Mediatization of communication* (pp. 175–197). de Gruyter.

Bolin, G., & Hepp, A. (2017). The complexities of mediatization: Charting the road ahead. In O. Driessens, G. Bolin, A. Hepp, & S. Hjarvard (Eds.), *Dynamics of mediatization* (pp. 315–331). Palgrave.

Bolin, G., & Schwarz, J. A. (2015). Heuristics of the algorithm. Big data, user interpretation and institutional translation. *Big Data & Society*, *2*(2), 1–12. https://doi.org/10.1177/2053951715608406

Coleman, B. (2023). Human-machine communication, artificial intelligence, and issues of data colonialism. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 350–356). Sage.

Couldry, N. (2004). Theorising media as practice. *Social Semiotics*, *14*(2), 115–132. https://doi.org/10.1080/1035033042000238295

Couldry, N., & Hepp, A. (2013). Conceptualising mediatization: Contexts, traditions, arguments. *Communication Theory*, *23*(3), 191–202. https://doi.org/10.1111/comt.12019

Couldry, N., & Hepp, A. (2016). *The mediated construction of reality*. Polity Press.

Ekström, M., Fornäs, J., Jansson, A., & Jerslev, A. (2016). Three tasks for mediatization research: Contributions to an open agenda. *Media, Culture & Society*, *38*(7), 1090–1108. https://doi.org/10.1177/0163443716664857

Ess, C. M. (2018). Ethics in HMC: Recent developments and case studies. In A. L. Guzman (Ed.), *Human-machine communication* (pp. 237–258). Peter Lang.

Esser, F., & Strömbäck, J. (Eds.). (2014). *Mediatization of politics. Understanding the transformation of Western democracies*. Palgrave Macmillan.

Finnemann, N. O. (2011). Mediatization theory and digital media. *European Journal of Communication*, *36*(1), 67–89. https://doi.org/10.1515/comm.2011.004

Fortunati, L., & Edwards, A. (2020). Opening space for theoretical, methodological, and empirical issues in human-machine communication. *Human-Machine Communication, 1*, 7–18. https://doi.org/10.30658/hmc.1.1

Fortunati, L., & Edwards, A. (2021). Moving ahead with human-machine communication. *Human-Machine Communication*, *2*, 7–28. https://doi.org/10.30658/hmc.2.1

Frandsen, K. (2023). Rivalling concepts, huge gaps and analytical complexities: Diverse challenges in researching the mediatization of sport. In K. Kopecka-Piech & G. Bolin (pp. 44–60). Routledge. https://doi.org/10.4324/9781003324591

Gambino, A., Fox, J., & Ratan, R. (2020). Building a stronger CASA: Extending the computers are social actors paradigm. *Human-Machine Communication*, *1*, 71–86. https://doi.org/10.30658/hmc.1.5

Gehl, R. W., & Bakardjieva, M. (Eds.). (2016). *Socialbots and their friends: Digital media and the automation of sociality*. Routledge.

Gibson, J. (1967). Theory of affordances. In R. Shaw & J. Bransford (Eds.), *Perceiving, acting, knowing* (pp. 67–82). Erlbaum.

Gunkel, D. J. (2012a). Communication and artificial intelligence: Opportunities and challenges for the 21st century. *communication +1*, Vol. 1, Article 1.

Gunkel, D. J. (2012b). *The machine question: Critical perspectives on AI, robots, and ethics*. MIT Press.

Guzman, A. L. (2018a). Introduction: What is human-machine-communication anyway? In A. L. Guzman (Ed.), *Human-machine communication* (pp. 1–28). Peter Lang.

Guzman, A. L. (Ed.). (2018b). *Human-machine communication: Rethinking communication, technology, and ourselves*. Peter Lang.

Guzman, A. L. (2023). Talking about "talking with machines": Interviews as method within HMC. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 243–251). SAGE Publications.

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. (2023a). Introduction to the handbook. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. xl–xlvi). Sage.

Guzman, A. L., McEwen, R., & Jones, S. (Eds.). (2023b). *The SAGE handbook of human-machine communication*. Sage.

Hepp, A. (2020a). Artificial companions, social bots and work bots: Communicative robots as research objects of media and communication studies. *Media, Culture & Society*, *42*(7–8), 1410–1426. https://doi.org/10.1177/0163443720916412

Hepp, A. (2020b). *Deep mediatization*. Routledge.

Hepp, A., Breiter, A., & Hasebrink, U. (Eds.). (2018). *Communicative figurations: Transforming communications in times of deep mediatization*. Palgrave Macmillan.

Hepp, A., & Loosen, W. (2023). The interdisciplinarity of HMC: Rethinking communication, media and agency. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 12–21). Sage.

Hepp, A., Loosen, W., Dreyer, S., Jarke, J., Kannengießer, S., Katzenbach, C., Malaka, R., Pfadenhauer, M., 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

Hjarvard, S. (2013). *The mediatization of culture and society*. Routledge.

Hjarvard, S. (2017). Mediatization. In P. Rössler, C. A. Höffner, & L. V. Zoonen (Eds.), *International encyclopedia of media effects* (pp. 1221–1240). Wiley.

Iliadis, A. (2023). Critical and cultural approaches to Human-Machine Communication. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 117–126). Sage.

Jensen, K. B. (2013). Definitive and sensitizing conceptualizations of mediatization. *Communication Theory*, *23*(3), 203–222. https://doi.org/10.1111/comt.12014

Jones, S. (2014). People, things, memory and human-machine communication. *International Journal of Media & Cultural Politics*, *10*(3), 245–258. https://doi.org/10.1386/macp.10.3.245_1

Kaun, A. (2023). The end of media? From mediatisation to datafication. In K. Kopecka-Piech & G. Bolin (pp. 161–174). Routledge. https://doi.org/10.4324/9781003324591

Kopecka-Piech, K., & Bolin, G. (Eds.). (2023a). *Contemporary challenges in mediatisation research*. Routledge.

Kopecka-Piech, K., & Bolin, G. (2023b). Approaching the challenges of mediatization. In K. Kopecka-Piech & G. Bolin (Eds.), *Contemporary challenges in mediatisation research* (pp. 1–10). Routledge.

Kramp, L., & Loosen, W. (2018). The transformation of journalism: From changing newsroom cultures to a new communicative orientation? In A. Hepp, A. Breiter, & U. Hasebrink (Eds.), *Communicative figurations: Transforming communications in times of deep mediatization* (pp. 205–240). Palgrave Macmillan.

Krotz, F. (2001). *Die Mediatisierung kommunikativen Handelns. Der Wandel von Alltag und sozialen Beziehungen, Kultur und Gesellschaft durch die Medien*. Westdeutscher Verlag.

Krotz, F. (2007). *Mediatisierung: Fallstudien zum Wandel von Kommunikation*. VS.

Krotz, F. (2009). Mediatization: A concept with which to grasp media and societal change. In K. Lundby (Ed.), *Mediatization: Concept, changes, consequences* (pp. 19–38). Peter Lang.

Krotz, F. (2014). Intimate communication on the internet: How digital media are changing our lives at the microlevel. In E. L. Wyss (Ed.), *Communication of love* (pp. 79–92). Transcript: Münster. https://doi.org/10.1515/transcript.9783839424445

Latour, B. (2007). *Reassembling the social: An introduction to actor-network-theory*. OUP Oxford.

Lewis, S. C., Guzman, A. L., & Schmidt, T. R. (2019). Automation, journalism, and human-machine communication: Rethinking roles and relationships of humans and machines in news. *Digital Journalism*, *7*(4), 409–427. https://doi.org/10.1080/21670811.2019.1577147

Livingstone, S. (2019). Audiences in an age of datafication: Critical questions for media research. *Television & New Media*, *20*(2), 170–183. https://doi.org/10.1177/1527476418811118

Livingstone, S., & Lunt, P. (2014). Mediatization: An emerging paradigm for media and communication research? In K. Lundby (Ed.), *Mediatization of communication* (pp. 703–724). de Gruyter.

Lombard, M., & Xu, K. (2021). Social responses to media technologies in the 21st century: The media are social actors paradigm. *Human-Machine Communication*, *2*, 29–55. https://doi.org/10.30658/hmc.2.2

Loosen, W. (2018). Four forms of datafied journalism. Journalism's response to the datafication of society. *Communicative figurations working paper*, *18*, 1–10. https://zemki.uni-bremen.de/wp-content/uploads/2024/04/CoFi_EWP_No-18_Loosen.pdf

Lundby, K. (2009). Media logic: Looking for social interaction. In K. Lundby (Ed.), *Mediatization: Concept, changes, consequences* (pp. 101–119). Peter Lang.

Lundby, K. (2014). Mediatization of communication. In K. Lundby (Ed.), *Mediatization of communication* (pp. 3–35). de Gruyter.

Lundby, K. (2023). Issues with research on mediatization of religion. In K. Kopecka-Piech & G. Bolin (pp. 27–43). Routledge. https://doi.org/10.4324/9781003324591

Lunt, P., & Livingstone, S. (2016). Is 'mediatization' the new paradigm for our field? *Media, Culture & Society*, *38*(3), 462–470. https://doi.org/10.1177/0163443716631288

Makady, H., & Liu, F. (2022). The status of human-machine communication research: A decade of publication trends across top-ranking journals. In M. Kurosu (pp. 83–103). Springer. https://doi.org/10.1007/978-3-031-05311-5_6

Mays, K. K., & Katz, J. E. (2023). Machines are us: An excusion in the history of HMC. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 3–11). Sage.

Mazzoleni, G. (2008). Media logic. In W. Donsbach (Ed.), *The international encyclopedia of communication, vol VII* (pp. 2930–2932). Blackwell Publishing.

McLuhan, M. (1964). *Understanding media*. Routledge.

McLuhan, M. (1994). *Understanding media: The extensions of man*. MIT.

Nagy, P., & Neff, G. (2023). Rethinking affordances for human-machine communication research. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 273–279). Sage.

Nass, C., Steuer, J., & Tauber, E. R. (1994). *Computers are social actors*. Association for Computing Machinery.

Natale, S. (2021). Communicating through or communicating with: Approaching artificial intelligence from a communication and media studies perspective. *Communication Theory*, *31*(4), 905–910. https://doi.org/10.1093/ct/qtaa022

Ng, Y.-L. (2022). When communicative AIs are cooperative actors: A prisoner's dilemma experiment on human–communicative artificial intelligence cooperation. *Behaviour & Information Technology*, 1–11. https://doi.org/10.1080/0144929x.2022.2111273

Nowak, K. (1996). Medier som materiell och mental miljö. [Media as material and mental environment]. In U. Carlsson (Ed.), *Medierna i samhället: Igår, idag, imorgon [Media in Society: Today, Yesterday and Tomorrow]* (pp. 159–176). Nordicom.

Petersen, L. N. (2023). Challenges in research on the mediatization of culture. In K. Kopecka-Piech & G. Bolin (pp. 13–26). Routledge. https://doi.org/10.4324/9781003324591

Rafaeli, S. (1988). Interactivity: From new media to communication. In R. Hawkins, J. M. Wiemann, & S. Pingree (Eds.), *Advancing communication science: Merging mass and interpersonal processes* (pp. 110–134). Sage.

Rawolle, S., & Lingard, R. (2014). Mediatization and education: A sociological account. In K. Lundby (Ed.), *Mediatization of communication* (pp. 595–614). de Gruyter.

Reeves, B., & Nass, C. (1996). *The media equation: How people treat computers, television, and new media like real people and places*. Center for the Study of Language and Information Publications.

Reeves, J. (2016). Automatic for the people: The automation of communicative labor. *Communication and Critical/Cultural Studies*, *13*(2), 150–165. https://doi.org/10.1080/14791420.2015.1108450

Richards, R., Spence, P., & Edwards, C. (2022). Human-machine communication scholarship trends: An examination of research from 2011 to 2021 in communication journals. *Human-Machine Communication*, *4*, 45–65. https://doi.org/10.30658/hmc.4.3

Scolari, C., & Rodriguez-Amat, J. R. (2018). A Latin American approach to mediatization: Specificities and contributions to a global discussion about how the media shape contemporary societies. *Communication Theory*, *28*(2), 131–154. https://doi.org/10.1093/ct/qtx004

Spence, P. R. (2019). Searching for questions, original thoughts, or advancing theory: Human-machine communication. *Computers in Human Behavior*, *90*, 285–287. https://doi.org/10.1016/j.chb.2018.09.014

Stenbom, A., Wiggberg, M., & Norlund, T. (2023). Exploring communicative AI: Reflections from a Swedish newsroom. *Digital Journalism*, *11*(9), 1622–1640. https://doi.org/10.1080/21670811.2021.2007781

Suchman, L. A. (1987). *Plans and situated actions: The problem of human-machine communication*. Cambridge UP.

Sundar, S. S. (2008). The MAIN model: A heuristic approach to understanding technology effects on credibility. In M. J. Metzger & A. J. Flanagin (Eds.), *Digital media, youth, and credibility* (pp. 73–100). MIT Press.

Thimm, C., Anastasiadis, M., & Einspänner-Pflock, J. (2018). Media Logic or media logics? An introduction to the field. In C. Thimm, M. Anastasiadis, & J. Einspänner-Pflock (Eds.), *Media logic(s) revisited. Modelling the interplay between media institutions, media technology and societal change* (pp. 1–8). Palgrave Macmillan.

Tinnell, J. (2023). *The philosopher of Palo Alto: Mark Weiser, Xerox PARC, and the original internet of things*. University of Chicago Press.

van Dijck, J., & Poell, T. (2013). Understanding social media logic. *Media and Communication*, *1*(1), 2–14. https://doi.org/10.17645/mac.v1i1.70

Verón, E. (2014). Mediatization theory: A semio-anthropological perspective. In K. Lundby (Ed.), *Mediatization of communication* (pp. 163–172). de Gruyter.

Walther, J. (1996). Computer-mediated communication. Impersonal, interpersonal and hyperpersonal interaction. *Communication Research*, *23*(1), 3–43. https://psycnet.apa.org/doi/10.1177/009365096023001001

Weiser, M. (1991). The computer for the 21st century. *Scientific American*, *256*(3), 94–104.

Wiener, N. (1948). *Cybernetics or control and communication in the animal and the machine*. MIT Press.

Xu, K., & Jeong, D. (2023). Social presence in human-machine communication. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 287–293). Sage.

Zhao, S. (2006). Humanoid social robots as a medium of communication. *New Media & Society*, *8*(3), 401–419. https://doi.org/10.1177/1461444806061951

HUMAN-MACHINE
COMMUNICATION

HUMAN-MACHINE COMMUNICATION

Human-Machine Communication
Special Edition, Volume 7, 2024
https://doi.org/10.30658/hmc.7.2

Smoothing Out Smart Tech's Rough Edges: Imperfect Automation and the Human Fix

Christian Katzenbach,[1, 2] Christian Pentzold,[3] and Paloma Viejo Otero[1]

1 Centre for Media, Communication and Information Research (ZeMKI), University of Bremen, Germany
2 Alexander von Humboldt Institut for Internet and Society, Berlin, Germany
3 Department for Communication and Media Studies, Leipzig University, Leipzig, Germany

Abstract

In this article, we take issue with an idea of autonomous and efficient automation that is upheld through the paradoxical conjunction of a flawed vision of the technological fix and the under-acknowledged human work required to fill in the gaps between machines and users. Our argument is based on two case studies that sit at opposite tails of automation processes: the front end of self-service checkouts and the back end of content moderation. This juxtaposition allows us to surface three themes on how the hype around automation is enabled by human interventions: the ad-hoc sociality in situated practices of automation, the capture of mundane expertise, and the inverted assistance of humans to machines. We argue that this human fix is not a temporary repair of malfunction, but a permanent and constitutive feature of automated systems.

Keywords: automation, fauxtomation, technological fix, content moderation, self-service checkout

Acknowledgment

The Deutsche Forschungsgemeinschaft (DFG; German Research Foundation)—Project-ID 416228727—SFB 1410; the Deutsche Forschungsgemeinschaft (DFG; German Research Foundation)—Project-ID 440899634; the European Union under the Horizon 2020 research and innovation programme.—Grant agreement No 870626.

CONTACT Christian Katzenbach • katzenbach@uni-bremen.de • Centre for Media, Communication and Information Research (ZeMKI) • University of Bremen, Linzer Str. 4-6, 28359 Bremen • Germany

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

Introduction

Automation is everywhere. Hardly anything can withstand its allure. The substitution of manual processes and cognitive procedures by machine operations promises to obliviate tiresome and dangerous tasks; automation is said to be the beacon of economic revitalization and the fuel for exploding productivity (Andrejevic, 2019; Benanav, 2022). Unsurprisingly, automation has become a prominent feature of today's media infrastructures where it is believed to do, for instance, the heavy lifting in content moderation and the fight against hate speech in addition to absorbing communicative labor in customer care, help desk duties, and retail services (Hepp, 2020; Katzenbach, 2021).

The current hype, which only increased with the advent of automatic driving, domestic robots, and the new generation of chatbots like ChatGPT, has a long prehistory (Kang, 2011; Rifkin, 1995). The abiding enticement of life-like machines was propelled by technological advancements up to the dawn of algorithms and artificial intelligence (AI), yet at the same time it hinges on an ineradicable misconception: the fascination of automation implies to purposefully marginalize the human efforts that are required to perpetuate the illusion of seemingly self-maintaining automatons. "Seeing machines as autonomous, then, has historically meant not seeing certain kinds of labor and the people performing it," writes Jones-Imhotep (2020, p. 10). Thus, automation is not only an engineering problem but a sociomaterial fiction that requires the unseen but effective contributions from users, service workers, and facilitators. In order for automation to work, and to enchant public imagination, scientific inquiry, and commercial investments, it has to rely on their diligence as well as on the willful ignorance or obliviousness of those such imperfect automation was meant to cater for.

For sure, there are now myriad AI-driven applications of automated decision-making processes that showcase the power and potential of smart machines (Bassett & Roberts, 2019). In fact, they have come to serve as panacea to all kinds of social ills—as a *technological fix* (Johnston, 2018; Katzenbach, 2021). Here, automation tends to amaze when it seemingly blurs ontological boundaries, an operation that makes it difficult to tell apart humans and nonhumans. But even with the tremendous technological progress in computation and modeling, humans are still in the loop. They may not be like Jefferson's servants toiling behind magic dumbwaiters, yet automation still commonly rests on people assisting machines, not only the other way around. Today these are, for instance, remote operators of delivery robots, freelancers on Amazon's Mechanical Turk, moderators sifting through the user-generated content, or the customers asked to do the machine-assisted check-out themselves (Altenried, 2022; Gray & Suri, 2019; Posada et al., 2023; Smith, 2020).

In this article, we build on concepts from science and technology studies (STS), human-computer interaction, and mediatization research around the technological fix, the idea of humans in the loop, and ghost work, to scrutinize how a belief in effective automation is upheld through the paradoxical conjunction of a flawed vision of the technological fix and the under-acknowledged human work required to fill in the gaps between machines and users. We argue that the current enthusiasm for smart devices and services is driven not by technological progress alone. Instead, it is the decoupling of imperfect automation and operators that engenders the chimera of smoothly running and powerful facilities. We therefore follow the call to "rehumanise automation" (Pink et al., 2022, p. 3) by looking at

how apparently automated technologies are propped up by people. That turns the question from what automation does to people to what people do with automation. We tentatively call this the *human fix* which is not an analytical term but rather a *sensitizing concept* (Blumer, 1954) that helps us to emphasize the irreducible human part in maintaining automated processes.

Empirically, we revisit two case studies to illustrate the vital nexus of humans and machines. First, in self-service checkout, terminals have come to reconfigure the jobs of retail workers and customers alike. Second, in content moderation of social media platforms both increasing forms of automation as well as growing teams of human content moderators are tied together to fight harmful content and behavior. Based on these empirical illustrations, we engage with three key themes on how the hype around automation is enabled by human intervention: the ad-hoc sociality in situated practices of automation, the capture of mundane expertise, and the inverted assistance of humans to machines.

From the Technological Fix to the Human Fix

Arguably, automation encompasses not only functional and technological developments but a broader and more complex transformation that is inherently intertwined with media and communication. In many ways, the increasing automation of communication and media can be considered another stage of mediatization (Bolin & Hepp, 2017). It is the moment of "deep mediatization [. . .] in which all elements of our social world are intricately related to digital media and their underlying infrastructures" (Hepp, 2020, p. 5). Here, the communicative implications of algorithms and automation of data and AI turn into a key concern for contemporary societies.

Guided by the notion of a *deep mediatization*, the profound changes that come with the increasing datafication have been the focus of a mushrooming literature (Hepp et al., 2023; Kopecka-Piech & Bolin, 2023). For instance, Andersen (2018) has traced how search engines and their algorithms have become part and parcel of everyday life and shape routine cultural practices of searching, archiving, ordering, and filtering. In the same vein, Burgess et al. (2022) speak of *everyday data cultures*. Many of these efforts share sensibilities for the nonbinary relations between humans and machines in order to escape determinisms, both technological and social. This often happens in connection to traditions in relational sociology, microsociology, and STS and revolves around notions of figuration or arrangement (Couldry & Hepp, 2016). We particularly tie in with approaches that spell out how deep mediatization becomes both recognizable and is brought forward on the ground, though there is a lack of understanding with respect to the practical implications of automated media.

The turn to automation is not simply a change in the design and functionality of communication and media. Instead, it implicates a discursive turn in its own right (Katzenbach, 2021). Through this discursive turn, automation and AI are routinely positioned as catch-all solutions to vast areas of social problems ranging from hate speech and misinformation on social media platforms to service duties in public administration and customer care. We take our start from the apparent disconnect between the discursive enticements of automated cures on the one hand and the mundane practices and realities of the human efforts that are required to keep machines running on the other.

With this, we are not the first to depart from solutionist thinking. Indeed, it is no news that automation sputters and there is no smooth transition between situated actions and automated processes. Thus, Wynne (1988) for example already criticized the simplistic image of machine operations as following a rule which, he posited, "belies a far less clearly rule-bound and determined world of real technological practices" (p. 148). We do not line up to prove this true once again (Mindell, 2015; Pelegrin, 1980; Wajcman, 2017). Rather, despite the widespread awareness of the limitations of automation there is, on the one hand, still an emphatic—and it seems: inexhaustible—expectation of technological perfection; on the other, there is scant discussion of what happens in the meantime (i.e., how people cope with processes deemed automatic yet prone to get stuck or to require human decisions and intervention).

AI and the Technological Fix

The discourse around efficient automation builds on a long-lasting motif that has accompanied the stages of mediatization and technological development: the technological fix. Alvin Weinberg coined the term in 1965 in a mostly affirmative and even enthusiastic tone. Transforming social problems into technological ones, Weinberg (1965) argued, is a beneficial strategy as it reduces complexity, increases the speed of responses, and reduces costs. Weinberg himself pioneered the improvement of safety car engineering as a better solution than changing driving behaviors, but he also proposed fixes that may sound absurd today, for example "the use of air conditioning to cooling urban tensions" (Johnston, 2018, p. 13). Since then, businesses have been engineering their way into society by commercializing technological solutions that promise, for example, to save the environment (Katz, 1992), to help us overcome sociopolitical boundaries (Barbrook & Cameron, 1996), or put an end to our loneliness (Marston et al., 2020).

Particularly in the context of the US-dominated digital industry, the technological fix has become a key narrative of solutionist thinking (Daub, 2020). In that regard, Morozov (2013) describes how the industry offers ever new services and apps that promise to optimize processes and social interactions: "Recasting all complex social situations either as neat problems with definite, computable solutions or as transparent and self-evident processes that can be easily optimized—if only the right algorithms are in place!" (Morozov, 2013, p. 5). The rhetoric for AI solutionism is therefore twofold: we need to use faster and more high-level tools to face digital transitions; this is the opportunity to replace manual processes and cognitive procedures with machine operations to obliviate tiresome and dangerous tasks for laborers.

The turn to AI as a solution to social problems has been driven by the massively increased attention for the technology across all sectors since the mid-2010s. In media reporting on AI, new products and innovations, business actors and tech entrepreneurs clearly dominate the coverage (Brennen et al., 2018; Chuan et al., 2019; Fischer & Puschmann, 2021). It ventilates narratives that attribute magical properties to technologies, and specifically to AI (Bory, 2019; Cave & Dihal, 2019). Such "enchanted determinism" in the AI discourse, as Campolo and Crawford (2020, p. 1) call it, has also entered governmental strategies and regulation by positioning AI as an inevitable and massively disrupting

technological development with high economic opportunities (Bareis & Katzenbach, 2021; Zeng et al., 2022) and a solution for regulatory challenges (Katzenbach, 2021).

Humans in the Loop, Ghost Work, and Imperfect Automation

The vision of the technological fix sits uncomfortably with another recurring motive: that full-scale automation just does not work, that it is always imperfect. From the perspective of computer science and human-computer interaction (HCI), the notion of humans in the loop entails a wide range of literature discussing human-machine collaboration and interaction (Dickel, 2021; Gibbs et al., 2021; Johnston, 2018; Mosqueira-Rey et al., 2023). In the context of AI and automation, the phrase commonly refers to training data and integrating human domain knowledge at the service of machine learning in order to optimize, for example, accurate prediction models, ideally at low cost (Bansal et al., 2019). In a division of labor, humans may directly complete activities that are challenging for computers, and in the pipeline humans will give training data for machine learning applications (Bansal et al., 2019; Khashabi et al., 2022; Lee et al., 2022; Wu et al., 2022).

Yet, empirical research also shows that in such human-computer interactions humans tend to conform to affordances of the system, increasing the internal accuracy of task completion but decreasing unique human knowledge and thus complementarity between humans and AI (Fügener et al., 2021). For these reasons, scholars in the field of human-machine cooperation strive to identify factors of creating a beneficial collaborative environment between human and machine learning systems taking into account that contexts of AI and automation such as the stock exchange, industrial facilities, and airplanes are marked by uncertainty and dynamic changes that are beyond our control (Hoc, 2000). Consequently, degrees of freedom must be preserved so that both humans and machines can adjust to unanticipated developments; function allocation between humans and machines becomes a key issue (Flemisch et al., 2019; Hoc, 2000; Ishowo-Oloko et al., 2019).

Besides these debates, much of the buzz around automation clings to the expectation that it will replace human labor. To some, this comes with plenty of opportunities to unleash economic growth, provide unimaginable insights, and safe scarce labor (Brynjolfsson & McAfee, 2014). Others fear the loss of jobs, and anxieties to control the powers of automation prevail (Rifkin, 1995). In-between such scenarios, some have noted that automation is complementing human work, not replacing it (Pasquale, 2020). This is what Bainbridge (1983) has dubbed the "ironies of automation" (p. 775) where human discernment and intuition are required and cannot be substituted even by the most advanced machine-learning algorithms. In effect, automation is neither complete nor fully substitutive. It restructures divisions of labor, yet it does rarely nullify whole occupations; "automation replaces tasks, not jobs," as Smith (2020, p. 118) posits, and the decision to delegate a certain task to machines is often more complex than only driven by optimization and efficiency.

Against this background, it becomes ever more important to foreground the role and specifics of human labor involved in automation, specifically as there is a particular form of politics of valuation and discrimination involved. This then touches, Star and Strauss (1999) argue, upon the definition of what counts as work and what not, and yields the creation of nonpersons, a state of being where the work is visible but those performing it, their needs

and efforts, are overlooked. In this disembedding of work, workers themselves disappear and only their endeavors remain visible. Such "ghost work," as Gray and Suri (2019, p. ix) call it, often includes the human performance of automation; that is, actions are atomized into routine and repetitive tasks.

Imperfect automation, then, is not a momentary and, at a future point of time, vanquished state, but a lasting trait. It is not the opposite of perfect automation as that is ultimately a fantasy. Rather, the notion points us to the ways automated processes implicate humans and their work in order to run and deliver outcomes. "This is not simply a matter of using human labor for small tasks unable to be automated away," Munn (2022) highlights, "but instead a deeper enmeshment of machinic and anthropocentric work" (p. 23). Yet despite the constitutive texture of machine capacities and human capabilities, there is nevertheless the tendency to obfuscate the human part and maintain the mirage of perfect self-contained automation. It can degenerate to bare window dressing, for instance when some of Siri's more clever responses are pre-crafted by its engineers (Natale, 2021) or when a Tesla's allegedly autopilot maneuvers were in fact staged (Jin, 2023). More generally, that camouflage and under-appreciation of those sustaining machine-driven processes and smoothing out its rough edges contributes to the excitement around automation by concealing its limits, flaws, and inherent dependence. Consequently, Taylor (2018) refers to a "fauxtomation" that rests on the false belief into a technological fix.

In proposing the notion of the "human fix," we do not want to gloss over the profound differences of what technology does and what people do. The "human fix" is no analytical term and in fact the notion of the "fix," technological or human, is no precise reference that denotes a machine function or a human activity which can be neatly captured. Instead, the rhetoric of the "human fix" is gesturing to some sort of human intervention and it is exactly this imprecision and lack of scrutiny that facilitates the term's utility. Hence we use the omnibus term "human fix" as an intervention as it is indicative of the widespread indifference of those seeking to further implement it for the effort of the people confronted with automation with little to no training. The human fix enfolds and at the same time shrouds the subtleties of human tinkering which we seek to unpack here.

Case Sites: Studying the Human Fix From the Ends of Automation

As we have discussed, automation is not one process, but many. They are not confined to a self-contained machine that runs with little intervention or attendance but usually mediate between different actors. Hence, automation is not an end in itself but an increasingly pervasive mode of maintaining and ordering connections which is experienced quite differently depending on the part people come to play in these operations and the type of involvement and agency which become available from their position.

In communication, automated decisions and procedures structure the ways people interact with devices and services. On a more mundane level, they prefigure all kinds of digital communication by modifying, augmenting, or creating messages (Hancock et al., 2020). People have, for example, come to rely on auto-correct, predictive text prompts, and smart replies which form part of their routine communicative repertoire. The same applies

to controlling and moderating the thus generated mass of content with the help of automation (Gorwa et al., 2020; Roberts, 2019). All such instances, from colloquial everyday interactions to professional sequences of work, lend themselves to automation since they are to a great part conventionalized; they form patterns and follow templates.

With automation being such a vast phenomenon, we suggest approaching the automation of communication from two tails: On the one hand, we investigate the front end of interfaces where users come to engage with machine instructions and outputs. Our case site for this endpoint of automation are self-checkout systems in supermarkets. On the other hand, we observe the back end accessed by those tasked with managing and monitoring the streams of input. Our case site for this perspective is content moderation.

This juxtaposition of two ends of automation with the help of two separate case studies allows us to appreciate and surface the operators' tacit knowledge and mundane experience which often go unacknowledged. The comparison across differences captures a great many technologies and processes that in one way or the other are about machines running without human intervention—though the degrees of autonomy and the extent to which processes run independently vary a lot. Our examples are purposely dissimilar—we bring together two studies that take their start from two very different ends of automation. It is neither the same process nor the opposite ends of the very process. Rather, in their diversity, the two cases allow us to elucidate common aspects that pertain, we argue, to today's everyday automation that has left the factory workplace.

There is little spectacular about the cases—semi-attended customer-activated terminals, or SACATs, are an increasingly ubiquitous though overlooked feature of today's brick-and-mortar shopping whose beginnings date back to the 1960s (Andrews, 2018; Meuter et al., 2000); content moderation has co-evolved with the growth of user-generated content on social media platforms (Gillespie, 2018). While there are some technological features in place that ex ante check the upload of materials and the generation of content, the bulk of policing happens ex post. This has from the start been a mix of human sifting and machine inspection. Different to that, the introduction of terminals for self-checkout is in part propelled by ambitions to replace some human clerks. In both sites, well-known tropes of efficiency and speed accompany the roll-out of automated features, either for reshuffling retail around unpaid customer labor or as instruments for low-income content moderators (Mateescu & Elish, 2019; Roberts, 2019).

Both cases also epitomize a stage of "deep mediatization" (Hepp, 2020) where digitally networked media are not only pervasive features of all social sectors but where everyday communication and mundane affairs interlace with data collection and automated procedures. SACATs are the tangible elements of mediatized retail that are connected to vast infrastructures of transaction and information (Jacobson & Gorea, 2023; Turow, 2017). Content moderation, in turn, is indicative of a major long-term shift in which everyday conversations rely on digital services and thus become an element of surveillance and control (Gillespie, 2018).

Given the excitement around innovations in machine learning and modeling deemed to be at the heart of automation, these are in a way trivial sites where people are confronted with some more or less articulate and assessable service or device. However, rightly because of being somewhat pedestrian, this human element of automation risks to slide from view

when automation is reduced to advancements in technology. But these mundane realities of automated technologies, as Pink et al. (2022) argue, in fact "characterise the overwhelming majority of people's actual encounters with them" (p. 1). Despite the considerable differences between self-service checkouts and content moderation in social context, accessibility, the nature of activities, involved parties, and the skills needed, they both shed light on recurring patterns in how automation is made to function. However, this is not intended to be a comparative analysis; instead, the insights from these distinct case studies are employed to identify and give nuance to recurrent themes in human intervention and imperfect automation.

In order to achieve this, we worked with field notes, observation protocols, and transcripts of interviews from both studies using a coding procedure informed by Braun and Clarke's reflexive theme analysis (2019) and Glaser and Strauss's Grounded Theory (1967). Iterative steps of open, axial, and selective coding led to conceptualizations based on the empirical data. The analytical work included the tentative formulation of coding ideas and their subsequent discussion and adaptation, followed by the compilation of general categories. These were matched against the data and the evolving set of categories until they captured the theoretical essence and significance of the material (Strauss & Corbin, 1990), resulting in the identification of three shared themes in human-machine relations (cf. results section "Themes: Human Intervention and Imperfect Automation").

Case Site on the Front End of Automation: Self-Service Checkout

The study was conducted in 2019 and early 2020 and involved participant observation in two German supermarkets (Pentzold & Bischof, 2023). These observations were documented through field notes and repeatedly discussed in the team of researchers. Besides observation of customers using the SACATs and autoethnographic experimentation with the facilities by student researchers, the extensive visits to the field sites also included nine interviews with shoppers, usually upon completion of their purchase through self-checkout. Three of the interviews conducted in mid-2019 involved customers from 20 to about 35 years of age, thus capturing responses from young shoppers. Another six interviews were completed in January 2020 and involved older customers aged between 45 and approximately 85.

The eight questions which guided the post-shopping reflections revolved around the experience and frequency of using self-checkout terminals, the willingness to use them in the future, and the main advantages and disadvantages that customers associated with the devices. One of the supermarkets was in a downtown area of an Eastern German city mainly frequented by urban customers, while the other was located on its outskirts, with customers coming from the rural environs too.

Case Site on the Back End of Automation: Content Moderation

This study was conducted between 2021 and 2022. It included participant observation at a human moderators' social event, seven in-depth interviews, and one focus group. All these methods involved the same cohort of human content moderators who range in age from 23

to 37 years. The dominant language at a social gathering was Spanish, whereas interviews were run in both English and Spanish and the focus group in English. In addition, participants of the focus group spoke Spanish, English, German, and some of the regional and local vernaculars from the Spanish territory which contributed to understanding the complexity of the activity of moderation in terms of culture and content. The social gathering served to better understand the social dynamics between participants. Regarding the social gathering, the researcher was introduced at the beginning and encompassed notes and personal introductions that led to the series of in-depth interviews.

In-depth interviews took place between November 2021 and July 2022. They served to explore human reviewers' approach to their place of work, daily activity, sentiments about their workplace, and their relation to automated systems. Information was also gathered on how humans actively generate input for AI systems.

The focus group involved participants with 10+ years of experience in the industry. The conversations centered around the role of automated moderation, but also the long-term dynamics that automatization might imprint on the activity of moderation. Interviews were transcribed verbatim and names have been changed to protect informants. They all previously signed informed consent, and at all times the researcher was aware of their nondisclosure clauses; therefore, the interviews, focus groups, and transcriptions were navigated so informant jobs were not compromised. All processes followed ethical clearance.

Themes: Human Intervention and Imperfect Automation

In the following, we discuss three themes that we attribute to the quite different case studies. Following are the three common themes that characterize how the human fix operates both at the front end as well as the back end of automation that we discuss in the following sections: We surface the mundane and error-prone experiences and expertise of those handling machines and their pre-set courses of actions; we observe the genuinely social situations enfolding around acts of use and decisions prompted by system signals in contrast to the routine assumption of a single user facing machine interfaces; and we finally rephrase, in an ironic twist, machine assistance to denote humans in aid of deficient automation, not the other way round. We develop all three aspects along conceptual considerations and vignettes taken from the two case studies. In result, we show that the human fix is a core and fundamental practice in the automation of communication rather than the exemption in single cases of failure.

In our analysis, we do not want to re-stage the outdated dualism that puts automated technology on the one side and human communication and interaction on the other. Such dualism has been shed by mediatization research and connate approaches in STS for years in favor of relational and figurative conceptions. So our analysis follows Lipp and Dickel's (2022) invitation to take seriously the interfaces between humans and machines where "humans and machines are gradually rendered available for one another—by being held apart" (p. 2). Imperfect automation characterizes this relation that is not suspended for a more autonomous technological sphere or less human intervention.

Ad-Hoc Sociality and Sociotechnical Control

The first common theme that we have identified with regard to the relation between automation and humans in our case studies is about ad-hoc sociality and sociotechnical control. It responds to a shortcoming in much of the scholarship on human-computer interaction and specifically on human labor in automated processes that narrows its focus on solitary situations, with isolated single humans facing a screen or other kind of interface (Orr, 1996; Suchman, 2007). In contrast to this limited setup, we observed in both cases the spontaneous interaction and communication among human operators that were highly relevant for their engagement with the machine and the formation of the overall sociotechnical system.

In the case of self-service check-out, businesses and developers have envisioned and designed these terminals as one-to-one devices, with an isolated customer doing groceries and payment. Yet this conception is at odds with shopping being a fundamentally social and potentially public affair (Douglas, 1997; Mason, 1998). In the study, we repeatedly observed voluntary encounters and teamwork around check-out where this ephemeral social situation had a profound impact on the interaction with the machine. For example, when a machine was signaling errors or called for a clerk, which it did through lights and sounds, customers responded with two different, but both socially shaped patterns: they either embraced the situation and sought help and commentary by fellow customers; or they sensed uncomfortably the views of others, yielding moments of awkwardness and insecurity. Take, for instance, the conversation of two student shoppers, Tina and Valerie, during payment (speech protocol II, November 12, 2019, lines 25–36, our translation):

> . . .
> *Valerie: Where does the cash go now? Ahh.*
> *Tina: You have to choose cash first, right?*
> *V: Oh . . . no she (sic!) said: 'Introduce cash or choose payment method.'*
> *T: Ahh, okay.*
> *V: It sounds like this thing is shredding it.*
> *(Machine sound: Please take your change.)*
> *V: Oh gross . . . okay. Well, it is a bit funny.*
> *T: Yes, I think so too . . . especially she looks at us so already (nods to a nearby woman)*
> *V: Yes, she looks all the time as if you now . . .*
> *T: As if we want to steal.*
> *VC: . . . is a most evil criminal*
> . . .

In the case of content moderation, it was the office space that mattered as a social context. The everyday activity of moderation could not be brought home, even during the core phase of the pandemic companies stuck to that principle (Magalhães & Katzenbach, 2020). In general, human content moderators are grouped by teams who work together in open office spaces in cities such as Dublin, Miami, or Singapore, with teams usually organized by languages, not necessarily by regional or cultural expertise (Roberts, 2019).

Each human reviewer had a workstation with specific software provided by the company. The software consisted of queue systems with videos arriving in a specific order. Human moderators had access to two types of queues: the general queue in which all human reviewers worked, and a protected queue where the most complicated or high-profile pieces of content were piled up to be reviewed by team leaders or senior members of the client themselves. In their decisions on content items, interviewees reported that they routinely made use of the open office. They talked to each other about ensuing issues and looked out for immediate team support and advice. This proved especially valuable when operators like Ana (focus group, May 3, 2022, p. 3, lines 66–69) needed to make decisions on content items that spoke to contexts outside of her own expertise and culture.

> . . . and it also happens as well, in the market that I work in there are a lot of expressions from another country, that I don't know, even if I am Spanish I do not understand a lot of Latino American slang, so some of my colleagues, they say, ok . . . I might ask some of my colleagues . . .

Likewise, interviewees reported many examples and situations where their colleagues were discussing slang from Mexico, Iranian music, or obscure vernacular words from different regions in Spain in order to come to a decision.

In sum, both case studies foreground the oft-neglected ad-hoc sociality of human-machine interaction which has already invited a number of investigations (Pentzold & Bischof, 2023). Since Suchman's (1987) analysis of the frictions between plans and situated actions, numerous approaches have been gravitating around the forms of spontaneous interaction that emerge during use situations among co-present people. Yet despite the long-standing interest, interface design and use arrangements are still struggling to fully account for these encounters and the highly dynamic interactions they entail (Schubert & Kolb, 2021). Interacting with automated procedures is much more than a single human facing a machine, but it is situated in specific situations that were, in our cases, the office or the supermarket. These contexts were providing the vital settings for dealing with the prompts and requests generated at different points throughout the process.

Capturing and Marginalizing Mundane Expertise: The *Nothing* That Matters

The second theme that we have identified relates to the ambivalences of situated expertise. The discourse on automation and AI strongly foregrounds the high-level expertise of those involved in programming and installing systems, where it usually sidesteps expertise offered by those operating, supervising, and interacting with automated systems. Clickworkers are deemed to merely execute simple tasks and supervise the smooth operation of the system. In our case studies, this motif was interestingly both perpetuated and clearly challenged as it became evident that there is rich situated expertise needed for the functioning of those systems.

Looking at supermarkets, self-service check-outs are becoming a standard feature of shopping, within a much larger context of reorganizing and digitalizing brick-and-mortar

retail that, for example, envisions fully cashier-free stores as a next step (Ives et al., 2019). It is marketed as a service feature that will save time, increase comfort, and give shoppers more control. Yet in our observation and interviews, customers were less enthralled, and many tried to avoid the machines when possible. This resulted in overcrowded and ill-fitted cashier areas with people queuing in-between shelves while the machines took away much of the limited space.

In case people chose to use one of the machines, error was a taken-for-granted and ongoing occurrence. In consequence, human help and intervention were regularly needed; they were not the exception but formed part of the common experience. For sure, people get to know the machines and required procedures once they decide to use them more frequently. This, however, was not so much about mastering the protocol and producing less errors; it also meant to anticipate hiccups, learn to simply expect some sorts of alarm messages, and get accustomed to ring a clerk and recapitulate what made the process stop. Yet despite the essential role of such mundane expertise—both on the side of the clerks as well as the customers—this goes unacknowledged. Hence, shopkeepers have for example reported about their feelings of alienation with customers treating them as mere machine prostheses without really communicating to them; in turn, some shops refuse to assign clerks to the self-checkout areas resulting in constant back-and-forth between their other duties and customers in need of help (Mateescu & Elish, 2019). Meanwhile, customers are expected to get to know how to operate the devices on the spot without much guidance or introduction let alone time and testing.

In the case of content moderation, the initial understanding of human labor replicates the automation discourse: "To get in, you need nothing," Raul told us, "all I needed to know was the language, nothing else. You got the language, you get it, anyone can do it, even if you are from Norway but speak Spanish" (focus group, May 3, 2021, p. 2, line 4). So it is apparently nothing that one needs to offer to become a human content moderator. Yet upon closer inspection, it is clearly this *nothing* that matters. In the decision upon contested content, moderators strongly build on their own lived experiences and cultural knowledge. For the context of copyright, Ragavan (2001) has juxtaposed such traditional or public knowledge with codified and institutionalized knowledge. This type of knowledge includes understanding of slang language and local expressions, as well as ad-hoc awareness and knowledge of specific political situations. While it was evident for all people working in the office, that such kind of knowledge was fundamental for the smooth functioning of these systems, referring to this as *nothing* clearly signals that it was neither appreciated as an expertise nor was it valued in the labor relation between employees working on minimum wage and employers.

In sum, automated systems are strongly reliant on situated and contextual expertise on the spot. Usually, companies installing those systems are unable to capture this mundane expertise of operators thus leaving them without appreciation and remuneration. In effect, seeing machines as autonomous not only means "not seeing certain kinds of labor and the people performing it" (Jones-Imhotep, 2020, p. 10) but also not seeing, valuing, and compensating for their expertise. Although it is clearly essential for the success of those systems, it remains a *nothing* for everyone involved. A nothing that matters.

Humans Assisting Machines: The Irony of Human-Machine Assistance

The need for situated human expertise preludes the third and final theme of our analysis: as much as machines might be of assistance to humans in one way, these very machines are just as much in need of human assistance in another way. They need a human fix. For sure, most research on automation has abandoned the idea of a wholesale replacement of human labor, but there is nevertheless a dominant vision of machines assisting humans. For example, Tarleton Gillespie is suggesting in a critical piece on machine learning (ML) and content moderation that platforms should be "designing ML tools to support human teams rather than supplant them" (Gillespie, 2020, p. 4). In the vast area of human-robot interaction from elderly care to industry shop floors, robots are commonly treated as assistive technologies (Darling, 2021).

In one way, the reverse perspective put forward here—humans assisting machines—is about practical help and support. Automated processes are rarely self-contained and autarkic but implicate humans who intervene, take over, or step in. This can be a safety feature yet often it is the standard way of interlacing automated steps of procedure with interventions and stops that ask for human discernment or manual handling. In that sense, automation is imperfect as it implicates human operators, paid and unpaid, skilled and unskilled. The more automation takes hold in quotidian life and mundane encounters, the more essential the texture of machines and humans will become. Again, this is not about the usual bugs and malfunctions which require repair but rests to be an inevitable element of everyday automation.

More fundamentally, automation is built around human capacities to flexibly align our expectations and actions in a given situation. This tacit understanding of indexical meanings and gestures, that make sense in a particular spatio-temporal context, characterizes people as sociable and adaptive beings. Such capability is hard to be fully standardized and put into protocols. There is a gap and potential mismatch between plans and situated actions, as Suchman (2007) has it. To some, like Collins (2018), it will ultimately hinder automated technologies to get ahead of humans. Others have proposed more nuanced accounts of this entanglement where the at times enchanting eloquence and prowess of automated technologies is predicated on humans willing to condone and compensate for the evident limitations of smart machines (Natale, 2021).

For sure, in the assistive relationship between humans and machines, the context of interaction is key. It prefigures the resources, the technologies, and the abilities of those handling automated processes which come to bear upon a situation. Hence, manufacturing has been a pioneer in automation, where complex and extensive procedures are carried out by machines with little human intervention (Benanav, 2022). Another pertinent area has been the use of advanced technology for surgeries and medical operations, also at a distance (Schubert, 2006). Still, even in contexts of highly specialized automated procedures and skilled workers, like the advanced automotive sector or the handling of digital data, full automation remains a chimera (Altenried, 2022; Munn, 2022).

Arguably, the need to take a closer look at what automation involves and how it necessitates human intervention and assistance becomes more pressing with everyday automation: it threads through workplaces, also of seemingly low-skill jobs, and it appears in daily

routines like shopping. Compared to manufacturing, these situations are more spontaneous, less rigidly controlled by action protocols, and they afford more options for situated action (Pentzold & Bischof, 2023). In self-service checkout, humans were constantly assisting the devices that had a rather limited capacity; shoppers had to carry the complex task of identifying, weighing, and scanning items as well as channeling the payment procedures. All of these tasks were not completely assumed by the machines. Rather, their instructions and setup tried to guide customers through executing these steps. As stand-alone automatons, they could do little to nothing but predicated on customers following the course of stepwise tasks and requirements. So from the side of retailers, what was automated was the whole checkout process that would require no human cashiers, not the bulk of operations. As such, the terminals were no autonomously running devices which generated some outcome unattended. Instead, the whole restructuring relied on the indispensable intertwine of humans assisting machines.

In content moderation, automation is taking over the bulk of processing contested content. But with context and intention being key criteria for taking decisions on content, automated processes fail if they lack human advice. Context and intention are information that cannot be deducted from the piece of content itself, and are thus beyond the operative realm of automated systems. This is where human moderators came in. They analyzed the context of a post, its tone, and other factors to determine whether it would violate the platform's policies. It is ironic that human moderators make decisions based on information that is not embedded within the content. Instead, they rely on the moment *in-between* when users upload a post to the platform. This is where human moderation activity lies, as they interpret why the user uploaded the content and assess the post's appropriateness based on their understanding of the context.

This fundamental need for human intervention in content moderation has become particularly obvious when platforms companies sent home content moderators such as Joseph (key informant 4, February 2022, p. 4, line 33–36) during the pandemic without an option to work from home.

> During that time AI systems did the job, but when we return what we found were an incredible huge amount of reports by users who did not understand how or why pictures or comments were taken down, and they were right. The decision was taken by AI systems; we could see that (. . .) in fairness it relaxed me. I don't think we can be substituted.

The machines that are positioned to help people in fact need human help. This human assistance to the machine is much more fundamental than repair in case of malfunctioning or a human-in-the-loop position. It is a tight entanglement of assistance. As interactions necessarily generate moments of ambiguity and interpretative flexibility, everyday automation fundamentally rests on human labor and intervention for its smooth operation. This inversion also shifts the focus away from users framed as lacking an ability the machine should take over or help to compensate. In assisting machines, it is rather that users are asked to acquire new skills and abilities to properly use them. It is humans who not only assist the machine but also adapt their practices to the needs and affordances of technical systems.

Conclusion

In this article, we have taken issue with human labor and intervention in automation processes that are often overlooked or even actively obfuscated. We have turned the question from what automation does to people to what people do with automation, and shifted attention from the technological fix to what we call the human fix. The term functions for us as an intervention; it seeks to raise sensibilities to take a closer look at what automation involves in practice, and how it necessitates human intervention and assistance at a time where automation is becoming so tightly enmeshed in everyday lives. Conceptually, we have drawn on work in STS, HCI, and mediatization research to surface how the positioning of effective automation not primarily rests on technological progress, but much more on the successful decoupling of imperfect automation and precarious work.

In our empirical work juxtaposing two case sites from the front end and back end of automation, we have identified three key themes of how the human fix is operating in practice: in both supermarket self-service check out and in platforms' content moderation ad-hoc sociality emerges that distinctly shapes situated practices of automation; these situations are marked by the ongoing capture of mundane expertise, the nothing that matters, which is routinely marginalized both in the discourse about automation as well in labor relations; and we have reversed the dominant trope that machines are here to help, whereas humans are indeed needed to assist the machines in order to run smoothly. In contrast to the grand narratives, this human fix is an ongoing feature of automation in the tightly woven texture of machine capacities and human capabilities.

Taken together, our research and the review of cognate work make us aware that the hype and marketing around automation is enabled by human interventions where the costs of experimentation are unevenly distributed. Given our initial insights from revisiting the two highly different case studies, more systematic research and critical inquiry are needed to better understand the uneven entanglement between human operations and machines that increasingly rely on AI and ML. Perhaps our observations arise from a temporary moment of technological experimentation that will give way for much smoother interactions and smarter, fully autonomous machines. However, in light of the irresolvable complexities of tacit knowledge and indexical situations, it seems more important to examine how automation is a socio-material process that can neither be reduced to human users nor technological operations.

Given mediatization research's interest in long-term processes, this configuration of amazement and concealment can be traced back into the history of automata (Jones-Imhotep, 2020). Such a diachronic inquiry also casts doubt on heady visions of fully self-contained machine communication that is not only able to perform human-like but does so with minimal intervention or support. Imperfect automation is here to stay—instead of seeking and pushing for complete and perfect automation, we may focus more on accommodating imperfect automation as well on valuing the labor and mundane expertise needed to keep the systems (and our society) functioning. As such, imperfect automation seems an ineluctable condition of human-machine communication (Guzman, 2018; Natale, 2021). The technological fix is an illusion, the human fix is real.

Author Biographies

Christian Katzenbach (PhD, Freie Universität Berlin) is Professor of Media and Communication at ZeMKI, University of Bremen and associated researcher at the Alexander von Humboldt Institut for Internet and Society (HIIG). His research addresses the formation of platforms and their governance, the discursive and political shaping of "Artificial Intelligence" (AI), and the increasing automation of communication.

https://orcid.org/0000-0003-1897-2783

Christian Pentzold (PhD, Chemnitz University of Technology) is Chair and Professor of Media and Communication in the Department for Media and Communication Studies at Leipzig University. He is interested in the construction and appropriation of digital media and the roles information and communication technologies play in modern society. In current projects, he looks at the public understanding of big data, humans interacting with robots, the smart home, the organization and governance of peer production, as well as the interplay of time, data, and media.

https://orcid.org/0000-0002-6355-3150

Paloma Viejo Otero (PhD, Dublin City University) is a YUFE Fellow at Platform Governance, Media and Technology Lab, ZeMKI, University of Bremen. Her research addresses how platforms govern hate speech. In her current project, Paloma focuses on the governance of the circulation of hateful content, sociotechnological imaginaries, and inequality.

https://orcid.org/0000-0002-8475-8200

References

Altenried, M. (2022). *The digital factory: The human labor of automation*. University of Chicago Press.

Andersen, J. (2018). Archiving, ordering, and searching: Search engines, algorithms, databases, and deep mediatization. *Media, Culture & Society, 40*(8), 1135–1150. https://doi.org/10.1177/0163443718754652

Andrejevic, M. (2019). *Automated media*. Routledge.

Andrews, C. (2018). *The overworked consumer: Self-checkouts, supermarkets, and the do-it-yourself economy*. Lexington.

Bainbridge, L. (1983). Ironies of automation. *Automatica*, *19*(6), 775–779. https://doi.org/10.1016/0005-1098(83)90046-8

Bansal, G., Nushi, B., Kamar, E., Weld, D. S., Lasecki, W. S., & Horvitz, E. (2019). Updates in human-AI teams: Understanding and addressing the performance/compatibility tradeoff. *Proceedings of the AAAI Conference on Artificial Intelligence*, *33*(01), Article 01. https://doi.org/10.1609/aaai.v33i01.33012429

Barbrook, R., & Cameron, A. (1996). The Californian ideology. *Science as Culture*, *6*(1), 44–72. https://doi.org/10.1080/09505439609526455

Bareis, J., & Katzenbach, C. (2021). Talking AI into being: The narratives and imaginaries of national AI strategies and their performative politics. *Science, Technology, & Human Values*, *47*(5), 855–881. https://doi.org/10.1177/01622439211030007

Bassett, C., & Roberts, B. (2019). Automation now and then: Automation fevers, anxieties and utopias. *New Formations*, *98*(98), 9–28. https://doi.org/10.3898/NEWF:98.02.2019

Benanav, A. (2022). *Automation and the future of work*. Verso Books.

Blumer, H. (1954). What is wrong with social theory? *American Sociological Review, 18*, 3–10.

Bolin, G., & Hepp, A. (2017). The complexities of mediatization: Charting the road ahead. In O. Driessens, G. Bolin, A. Hepp, & S. Hjarvard (Eds.), *Dynamics of mediatization* (pp. 315–331). Palgrave Macmillan.

Bory, P. (2019). Deep new: The shifting narratives of artificial intelligence from Deep Blue to AlphaGo. *Convergence*, 1354856519829679. https://doi.org/10.1177/1354856519829679

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, *11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806

Brennen, J. S., Howard, P. N., & Nielsen, R. K. (2018). An industry-led debate: How UK media cover artificial intelligence. *Reuters Institute for the Study of Journalism*. https://web.archive.org/web/20190203064650/https://reutersinstitute.politics.ox.ac.uk/our-research/industry-led-debate-how-uk-media-cover-artificial-intelligence

Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.

Burgess, J., Albury, K., McCosker, A., & Wilken, R. (2022). *Everyday data cultures*. John Wiley.

Campolo, A., & Crawford, K. (2020). Enchanted determinism: Power without responsibility in artificial intelligence. *Engaging Science, Technology, and Society*, *6*, 1. https://doi.org/10.17351/ests2020.277

Cave, S., & Dihal, K. (2019). Hopes and fears for intelligent machines in fiction and reality. *Nature Machine Intelligence*, *1*(2), 74–78. https://doi.org/10.1038/s42256-019-0020-9

Chuan, C.-H., Tsai, W.-H. S., & Cho, S. Y. (2019). Framing artificial intelligence in American newspapers. *Proceedings of the 2019 AAAI/ACM Conference on AI, Ethics, and Society*, 339–344. https://doi.org/10.1145/3306618.3314285

Collins, H. M. (2018). *Artifictional intelligence: Against humanity's surrender to computers*. Wiley.

Couldry, N., & Hepp, A. (2016). *The mediated construction of reality: Society, culture, mediatization*. Polity.

Darling, K. (2021). *The new breed. What our history with animals reveals about our future with robots*. MacMillan.

Daub, A. (2020). *What tech calls thinking: An inquiry into the intellectual bedrock of Silicon Valley*. Farrar, Straus and Giroux.

Dickel, S. (2021). Der 'Technological Fix': Zur Kritik einer kritischen Semantik. In SONA—Netzwerk Soziologie der Nachhaltigkeit (Ed.), *Soziologie der Nachhaltigkeit* (pp. 271–284). Bielefeld: Transcript.

Douglas, M. (1997). In defense of shopping. In P. Falk & C. Campbell (Eds.), *The shopping experience* (pp. 15–30). Sage.

Fischer, S., & Puschmann, C. (2021). *Wie Deutschland über Algorithmen schreibt: Eine Analyse des Mediendiskurses über Algorithmen und Künstliche Intelligenz (2005–2020)*. Bertelsmann Stiftung. https://doi.org/10.11586/2021003

Flemisch, F., Abbink, D. A., Itoh, M., Pacaux-Lemoine, M.-P., & Weßel, G. (2019). Joining the blunt and the pointy end of the spear. *Cognition, Technology & Work*, *21*(4), 555–568. https://doi.org/10.1007/s10111-019-00576-1

Fügener, A., Grahl, J., Gupta, A., & Ketter, W. (2021). Will humans-in-the-loop become borgs? Merits and pitfalls of working with AI. *MIS Quarterly: Management Information Systems*, *45*(3), 1527–1556. https://doi.org/10.25300/misq/2021/16553

Gibbs, J., Kirkwood, G., Fang, C., & Wilkenfeld, J. N. (2021). Negotiating agency and control: Theorizing human-machine communication from a structurational perspective. *Human-Machine Communication*, *2*, 153–171. https://doi.org/10.30658/hmc.2.8

Gillespie, T. (2018). *Custodians of the internet. Platform, content moderation, and the hidden decisions that shape social media*. Yale University Press.

Gillespie, T. (2020). Content moderation, AI, and the question of scale. *Big Data & Society*, *7*(2), 1–5. https://doi.org/10.1177/2053951720943234

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Aldine.

Gorwa, R., Binns, R., & Katzenbach, C. (2020). Algorithmic content moderation: Technical and political challenges in the automation of platform governance: *Big Data & Society*, *7*(1), 1–15. https://doi.org/10.1177/2053951719897945

Gray, M. L., & Suri, S. (2019). *Ghost work: How to stop Silicon Valley from building a new global underclass*. Houghton Mifflin Harcourt.

Guzman, A. L. (2018). What is human-machine communication, anyway. In A. L. Guzman (Ed.), *Human-machine communication: Rethinking communication, technology, and ourselves* (pp. 1–28). Peter Lang.

Hancock, J. T., Naaman, M., & Levy, K. (2020). AI-mediated communication: Definition, research agenda, and ethical considerations. *Journal of Computer-Mediated Communication*, *25*, 89–100. https://doi.org/10.1093/jcmc/zmz022

Hepp, A. (2020). *Deep mediatization*. Routledge.

Hepp, A., Loosen, W., Dreyer, S., Jarke, J., Kannengießer, S., Katzenbach, C., Malaka, R., Pfadenhauer, M., 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

Hoc, J.-M. (2000). From human–machine interaction to human–machine cooperation. *Ergonomics*, *43*(7), 883–843.

Ishowo-Oloko, F., Bonnefon, J.-F., Soroye, Z., Crandall, J., Rahwan, I., & Rahwan, T. (2019). Behavioural evidence for a transparency–efficiency tradeoff in human-machine cooperation. *Nature Machine Intelligence*, *1*(11), 517–521. https://doi.org/10.1038/s42256-019-0113-5

Ives, B., Cossick, K., & Adams, D. (2019). Amazon Go: Disrupting retail? *Journal of Information Technology Teaching Cases*, *9*(1), 2–12. https://doi.org/10.1177/2043886918819092

Jacobsen, J., & Gorea, I. (2023). Human-machine communication in retail. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The Sage handbook of human-machine communication* (pp. 532–539). Sage.

Jin, H. (2023). Tesla video promoting self-driving was staged, engineer testifies. *Reuters*. https://web.archive.org/web/20230122004302/https://www.reuters.com/technology/tesla-video-promoting-self-driving-was-staged-engineer-testifies-2023-01-17/

Johnston, S. F. (2018). The technological fix as social cure-all: Origins and implications. *IEEE Technology and Society Magazine*, *37*(1), 47–54. https://doi.org/10.1109/MTS.2018.2795118

Jones-Imhotep, E. (2020). The ghost factories: Histories of automata and artificial life. *History and Technology*, *36*(1), 3–29. https://doi.org/10.1080/07341512.2020.1757972

Kang, M. (2011). *Sublime dreams of living machines: The automaton in the European imagination*. Harvard University Press.

Katz, E. (1992). The call of the wild: The struggle against domination and the technological fix of nature. *Environmental Ethics*, *14*(3), 265–273. https://doi.org/10.5840/enviroethics199214321

Katzenbach, C. (2021). "AI will fix this"—The technical, discursive, and political turn to AI in governing communication. *Big Data & Society*, *8*(2). https://doi.org/10.1177205395172110461 82

Khashabi, D., Stanovsky, G., Bragg, J., Lourie, N., Kasai, J., Choi, Y., Smith, N. A., & Weld, D. S. (2022). *GENIE: Toward reproducible and standardized human evaluation for text generation* (arXiv:2101.06561). arXiv. http://arxiv.org/abs/2101.06561

Kopecka-Piech, K., & Bolin, G. (Eds.). (2023). *Contemporary challenges in mediatisation Research*. Taylor & Francis.

Lee, J. S., Ham, Y., Park, H., & Kim, J. (2022). Challenges, tasks, and opportunities in teleoperation of excavator toward human-in-the-loop construction automation. *Automation in Construction*, *135*, 104119. https://doi.org/10.1016/j.autcon.2021.104119

Lipp, B., & Dickel, S. (2022). Interfacing the human/machine. *Distinktion: Journal of Social Theory*, *24*(3), 425–443. https://doi.org/10.1080/1600910X.2021.2012709

Magalhães, J. C., & Katzenbach, C. (2020). Coronavirus and the frailness of platform governance. *Internet Policy Review*. https://web.archive.org/web/20200420201955/https://policyreview.info/articles/news/coronavirus-and-frailness-platform-governance/1458

Marston, H. R., Niles-Yokum, K., Earle, S., Gomez, B., & Lee, D. M. (2020). OK Cupid, stop bumbling around and Match Me Tinder: Using dating apps across the life course. *Gerontology and Geriatric Medicine*, *6*. https://doi.org/10.1177/2333721420947498

Mason, R. (1998). *The economics of conspicuous consumption*. Edward Elgar.

Mateescu, A., & Elish, M. C. (2019). *AI in context. The labor of integrating new technologies*. Data & Society. https://datasociety.net/library/ai-in-context/

Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self-service technologies: Understanding customer satisfaction with technology-based service encounters. *Journal of Marketing*, *64*(3), 50–64. https://doi.org/10.1509/jmkg.64.3.50.18024

Mindell, D. (2015). *Our robots, ourselves. Robotics and the myths of autonomy*. Penguin.

Morozov, E. (2013). *To save everything, click here: The folly of technological solutionism*. PublicAffairs.

Mosqueira-Rey, E., Hernández-Pereira, E., Alonso-Ríos, D., Bobes-Bascarán, J., & Fernández-Leal, Á. (2023). Human-in-the-loop machine learning. *Artificial Intelligence Review*, *56*(4), 3005–3054. https://doi.org/10.1007/s10462-022-10246-w

Munn, L. (2022). *Automation is a myth*. Stanford University Press.

Natale, S. (2021). *Deceitful media: Artificial intelligence and social life after the Turing Test*. Oxford University Press.

Orr, J. E. (1996). *Talking about machines: An ethnography of a modern job*. Cornell University Press.

Pasquale, F. (2020). *New laws of robotics. In new laws of robotics.* Harvard University Press. https://doi.org/10.4159/9780674250062

Pelegrin, M. (1980). An argument against automation. *Technology in Society*, *2*(4), 433–447.

Pentzold, C., & Bischof, A. (2023). Achieving agency within imperfect automation: Working customers and self-service technologies. *Convergence*. https://doi.org/10.1177/13548565231174588

Pink, S., Berg, M., Lupton, D., & Ruckenstein, M. (2022). Everyday automation—Setting a research agenda. In S. Pink, M. Berg, D. Lupton, & M. Ruckenstein (Eds.), *Everyday automation: Experiencing and anticipating emerging technologies* (pp. 1–19). Routledge.

Posada, J., Newlands, G., & Miceli, M. (2023). Labor, automation, and human-machine communication. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The Sage handbook of human-machine communication* (pp. 384–391). Sage.

Ragavan, S. (2001). Protection of traditional knowledge. *Minnesota Intellectual Property Review*, *2*(2), 1–60.

Rifkin, J. (1995). *The end of work: Decline of the global labor force and the dawn of the post-market era*. Tarcher.

Roberts, S. T. (2019). *Behind the screen. Content moderation in the shadows of social media*. Yale University Press.

Schubert, C. (2006). *Die Praxis der Apparatemedizin: Ärzte und Technik im Operationssaal.* Campus.

Schubert, C., & Kolb, A. (2021). Designing technology, developing theory: Toward a symmetrical approach. *Science, Technology, & Human Values, 46*(3), 528–554. https://doi.org/10.1177/0162243920941581

Smith, J. E. (2020). *Smart machines and service work: Automation in an age of stagnation*. Reaktion Books.

Star, S. L., & Strauss, A. (1999). Layers of silence, arenas of voice: The ecology of visible and invisible work. *Computer Supported Cooperative Work (CSCW)*, *8*(1–2), 9–30. https://doi.org/10.1023/A:1008651105359

Strauss, A., & Corbin, J. M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Sage.

Suchman, L. A. (1987). *Plans and situated actions: The problem of human-machine communication.* Cambridge University Press.

Suchman, L. A. (2007). *Human-machine reconfigurations: Plans and situated actions*. Cambridge University Press.

Taylor, A. (2018). The automation charade. *Logic Magazine*. https://web.archive.org/web/20190723184435/https://logicmag.io/failure/the-automation-charade/

Turow, J. (2017). *The aisles have eyes.* Yale University Press.

Wajcman, J. (2017). Automation: Is it really different this time? *The British Journal of Sociology*, *68*(1), 119–127. https://doi.org/10.1111/1468-4446.12239

Weinberg, A. B. (1965). Basic research and national goals: A report to the committee on science and astronautics, U.S. House of Representatives, by the National Academy of Sciences. *Minerva*, *3*(4), 499–523.

Wu, X., Xiao, L., Sun, Y., Zhang, J., Ma, T., & He, L. (2022). A survey of human-in-the-loop for machine learning. *Future Generation Computer Systems*, *135*, 364–381. https://doi.org/10.1016/j.future.2022.05.014

Wynne, B. (1988). Unruly technology: Practical rules, impractical discourses and public understanding. *Social Studies of Science, 18*(1), 147–167. https://doi.org/10.1177/030631288018001006

Zeng, J., Chan, C., & Schäfer, M. S. (2022). Contested Chinese dreams of AI? Public discourse about artificial intelligence on WeChat and People's Daily Online. *Information, Communication & Society*, *25*(3), 319–340. https://doi.org/10.1080/1369118X.2020.1776372

HUMAN-MACHINE
COMMUNICATION

HUMAN-MACHINE COMMUNICATION

Human-Machine Communication
Special Edition, Volume 7, 2024
https://doi.org/10.30658/hmc.7.3

A New Family Member or Just Another Digital Interface? Smart Speakers in the Lives of Families With Young Children

Giovanna Mascheroni[1]

1 Department of Communication, Università Cattolica del Sacro Cuore, Milano, Italy

Abstract

Based on longitudinal qualitative research involving 20 families with at least one child aged 8 or younger, the article provides an account of how families, as distinctive communicative figurations, adopt, use, and make sense of smart speakers through diverse socially situated practices. Findings show that parents and children enter in a communicative relationship with smart speakers based on their attribution of human-like or machine-like traits to the device, and the device's response to their expectations. Moreover, engaging in communicative practices *through* and with smart speakers, family members subvert or reinforce existing power relations. However, smart speakers acquire new agency by intensifying the datafication and algorithmization of everyday life, thus entailing a shift in power dynamics between humans and machines.

Keywords: smart speakers, voice-based agents, children, families, deep mediatization

Acknowledgments

This research was supported by Fondazione Cariplo (Bando Ricerca Sociale 2019).

Introduction

While not initially designed for children—in fact, the first Echo Dot Kids Edition was only launched in May 2018—smart speakers have become part of children's everyday media

CONTACT Giovanna Mascheroni • giovanna.mascheroni@unicatt.it • Department of Communication • Università Cattolica del Sacro Cuore • Largo Gemelli 1 • 20123 Milano • Italy

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

repertoires in many countries (Rideout & Robb, 2020; Wald et al., 2023). For example, the proportion of US families with young children who owned at least a smart speaker rose from 9% in 2017 to 41% in 2020 (Rideout & Robb, 2020). Similarly, in 2020, 46% of Italian parents of young children owned one or more smart speakers (Zaffaroni et al., 2022). Yet, this rapid diffusion has only partially been matched by empirical research on the domestication of smart speakers, especially outside of the US. In fact, while most research to date has focused on usage practices (Lopatovska et al., 2019), or trust and privacy issues (Pridmore et al., 2019), knowledge of the meaning-making practices, negotiations, and conflicts around smart speakers in families with young children is still sparse.

Based on a longitudinal qualitative research involving 20 families with at least one child aged 8 or younger in Italy, this article aims to fill this knowledge gap by providing an account of the diverse socially situated practices and contexts in which families, as distinctive communicative figurations (Couldry & Hepp, 2017; Hepp & Hasebrink, 2018), adopt, use, and make sense of smart speakers—voice-based home devices with an integrated conversational agent. The notion of communicative figurations refers to a *constellation of actors*, who share a *frame of relevance* (a set of cultural values, norms, and orientations, including technological imaginaries), on which basis they interact through *communicative practices* supported by a distinctive *media ensemble*. In this light, each family's communication repertoire is grounded in their culture as much as in their media ensemble (Hepp & Hasebrink, 2018). Patterns of similarities and differences emerge across families based on the specific constellation of actors, their relevance frames, the distinctive set of communicative practices as well as the particular media ensemble.

Communicative figurations have been theorized as an analytical device to advance a non-mediacentric research on mediatization (Couldry & Hepp, 2017; Hepp, 2020a). The ongoing deep mediatization means that every sphere of the social, families included, has become mediatized, that is, increasingly interdependent on communicative practices and digital infrastructures. Mediatized families depend on "data relations" (Couldry & Mejias, 2019, p. 27): namely, on communicative practices, digital media, and technological infrastructures that extract, analyze, and communicate data, turning the home and families' everyday lives into data commodities (Mascheroni & Siibak, 2021). Indeed, we can understand datafication as both an outcome and an intensifier of mediatization (Mascheroni & Siibak, 2021)—an outcome of mediatization, because everyday mediatized practices generate an unprecedented volume of data traces; and, at the same time, an accelerator of mediatization, because, as the everyday opportunities for interaction and agency are increasingly defined by algorithmic-based automations, digital media are more and more embedded into the texture of users' everyday lives. In this context, we argue that a figurational approach to the domestication of smart speakers by families with young children is best suited to both contextualize these technologies within the longer mediatization of the home (Silverstone, 1999) and simultaneously account for the novelty of this specific communicative AI. In fact, the media have been constitutive of the modern idea, and experience, of the home as both an autonomous and relational entity: in this respect, smart speakers may be conceived of as the latest technological development in the process of "mobile privatization" (Williams, 2003 [1974], p. 19) and in the more recent mediatization of family life (Mascheroni & Siibak, 2021). However, as a specific form of communicative AI, smart speakers challenge our established definitions of media, and their role within mediatized domesticity, as we will further elaborate.

Furthermore, being essentially non-mediacentric, a figurational approach helps us dismantle the myth of communicative AI "as a completely autonomous technology" (Natale & Guzman, 2022, p. 629)—a myth that has often led to underplay human agency vis-à-vis machine agency. Conversely, and in line with a mediatization research agenda, we aim to understand how changes in the media ensemble following the introduction of smart speakers are associated with changing practices of communication based on each family's distinctive frames of relevance, and whether such changes lead to transformations in the power relations between family members. More specifically, we formulated the following research questions: To what extent does the family as a communicative figuration change in light of the domestication of smart speakers? What distinguishes the communicative practices *through* and *with* smart speakers from other mediated communicative practices within the family?

Research on Children, Families, and Smart Speakers

Since conversational agents, such as those embedded in smart speakers, democratize younger children's access to digital media by providing a more natural, voice-based interaction compared to screens and keyboards (Beneteau et al., 2020), it comes as no surprise that already in 2020 the 23% of 2- to 4-year-olds were found to autonomously engage with smart speakers (Rideout & Robb, 2020). One of the first studies observing the use of smart speakers in the domestic context has shown that Amazon Echo was primarily domesticated as a family device and located in a shared space such as the living room (Lopatovska et al., 2019). Moreover, the authors identified three main usage patterns across families—information, entertainment, control of interconnected devices or smart appliances. Consistently, in the Italian survey of families with young children (Zaffaroni et al., 2022), entertainment and information topped the list of activities regularly asked of smart speakers: Respondents reported using Echo or Google Home to listen to music (75%), to get quick factual information (63%), and listen to the news (51%). Smart speakers have also been incorporated into a range of habitual domestic practices, including as a reminder of deadlines and appointments (57%), to access cooking recipes (51%), control connected appliances and energy-saving technologies (51%), communicate with family and friends (43%), and tell bedtime stories to children (43%).

Lopatovska et al.'s (2019) study also pointed to generational differences—with children being more likely to request Echo to play music or tell jokes—and to a decline in both overall usage and specific activities (such as looking for news) over time. That parents and children use smart speakers differently was confirmed by Garg and Sengupta's (2020) study, based on interviews with 18 families and Google Home Activity logs. In fact, while parents used Google Home mainly to play music or control smart lighting, thermostats, and cameras, children's voice logs indicated that playing games, listening to music, searching for information, and engaging in small talk were the most common practices. Analyzing usage patterns over time, the authors observed how parents' scaffolding of children's interaction with the smart speaker was limited in time, until the child learned to adapt their communication style (i.e., by raising their voice, repeating queries, and using shorter sentences). With respect to entity-making practices (Suchman, 2011), Garg and Sengupta (2020) found that, contrary to adults and older siblings, children younger than 7 attributed a human-like

identity to the conversational agent. Over time, this persistent personification resulted in emotional attachment.

Other studies focused on the relationship between different practices of use and the associated family dynamics. Beneteau and colleagues (2020) identified three broad usage patterns that resulted in distinctive parent–child relationships. First, parents and children engaged in practices of co-use, and parents scaffolded their children's interaction with the smart speaker in various ways (i.e., suggesting how to rephrase a question or other repair communication strategies). In this way, younger children's communicative skills were expanded through their parents' scaffolding (what they label as "fostering communication"). Second, conflicts emerged over the control of the smart speaker, with children trying to take control and "disrupt access," whether to impose their desired outputs or simply to annoy their parents. Third, parents engaged in practices of "augmented parenting" (Beneteau et al., 2020, p. 5), using the smart speaker as a neutral third-party mediator in decision-making, or in a more deceitful way, to obtain children's obedience—such as setting an alarm on the smart speaker to enforce bedtime rules. Similar struggles over the control of the smart speakers have been found in a thematic analysis of Chinese user-generated videos (Wang et al., 2023), highlighting how the devices acted as *mediators* or *family members*, contributing to a democratization of child–parent relationships, through an empowerment of the child. Since co-use was found to represent the most popular usage pattern among Chinese families, the authors conclude that smart speakers prompted a shift from "bedroom culture" back to a "living room culture" (Wang et al., 2023, p. 13).

The significance of family's culture in the domestication of smart speakers has been highlighted in a study of the diverse motivations underpinning different usage patterns across different family types (Wald et al., 2023). In fact, different communicative practices were informed by families' distinctive frames of relevance, including trust in technology and preferred parental mediation style, and by their internet literacy.

Conceptualizing Smart Speakers as Communicative AI

Scholarship in HMC and in mediatization research agree on the properties that distinguish communicative AI from other digital media, and that prompt us to question traditional definitions of both media and (human) communication. In fact, conversational agents, as those embedded in smart speakers, "are not simply media in the sense that they serve as interaction nodes between people" (Hepp, 2020a, p. 79). We now communicate *with* such media, rather than simply *through* them. Indeed, conversational agents, as much as other communicative robots (Hepp, 2020a), are designed to fulfill communicative purposes and simulate human communication capabilities. By expanding the role of digital technology beyond that of a mediator or an interface to that of a communicative partner (Guzman, 2018, 2019; Natale & Guzman, 2022), therefore, conversational agents automate communication.

The current automation of communication is leading to an "increased level of agency in that it is the technology itself that forms and interpret messages" (Natale & Guzman, 2022, p. 630). Not only do conversational agents respond to human inputs, they also collect data on their users and the surrounding environment and distribute them. Thanks to the agency performed through their role of communicators, conversational agents create the

impression of responding and adapting to users' queries in a personalized manner (Natale & Cook, 2020). As a consequence, in automated communicative relationships, human agency is also redefined and constrained: "The agency of the users of voice assistants can be best described as the ability to choose among a pre-defined range of interactions that the companies already anticipated for their systems" (Natale & Cook, 2020, p. 8). However, we should not overestimate the autonomy of automated communicators. Rather, it is more appropriate to think of these agents as partially autonomous automated systems, rather than forms of AI in its narrow sense of sophisticated and complex machine learning systems (Hepp, 2020b). In fact, it's precisely the newly acquired ability to gather, generate, and distribute information on their users that makes automated communication systems depending on the digital-material infrastructures of datafication (Couldry & Mejias, 2019; van Dijck, 2014) for their functioning. On this basis, we should rather speak of quasi-communication (Hepp 2020a, 2020b), to emphasize how these technologies are designed to enter into a communicative relationship with its users, yet are not fully autonomous. Indeed, machine's responses to human inputs are processed and performed by invisible algorithms, software, platforms, and hardware that operate in the background. Therefore, communicative AI is characterized by a double embodiment: "communicative" and "infrastructural" (Hepp, 2020b, p. 1412), with the former operating as to conceal the latter. In fact, the simulation of a human-like conversation helps conceal the collection, transmission, and algorithmic calculation of users' and environmental data on which basis communicative AI operates (Mascheroni & Siibak, 2021). We can thus define the conversational agents embedded in smart speakers, along with Hepp (2020b, p. 1416), as:

> (a) (partially) automated and (partially) autonomous media that (b) serve as quasi-communication interfaces with humans, (c) they are embedded in a comprehensive digital infrastructure and (d) have in most instances an apparently human-like user interface.

Despite their partial autonomy and machine-like nature, the conversational agents integrated in smart speakers are generally perceived and addressed as communicative partners (Guzman, 2018, 2019; Guzman & Lewis, 2020). In fact, conversational agents are programmed to enter the communicative relationship with a specific social positioning, defined by its human-like traits, a gender, and a social role: that of an assistant (Guzman, 2019) or servant (Fortunati et al., 2022). Their anthropomorphization and personification—through the attribution of a name, a naturalistic female voice, and the simulation of an individual personality—is what enables communicative AI to "interact with humans on an emotional level" (Zhao, 2006, p. 408). However, the interpretation of conversational agents as human-like communicators is still ambivalent: Fortunati et al. (2022, p. 8) found that while half of their sample perceived Alexa as an equal or superior communicator, the remaining half understood it as "an inferior communicator (a kind of servant or slave)." Other times, instead, users are more guided by the machine-like nature of conversational agents in their interpretation of their status (Guzman & Lewis, 2020).

These findings suggest that "in any process of communication where humans are involved, humans are ultimately responsible for the construction of sense" (Natale, 2021, p. 908). Second, they confirm that, like any act of communication, automated communication is always socially situated and contingent: While both human and machine agency are

redefined, and the family as a communicative figuration is likely to be transformed in their repertoire of communicative practices and meanings system by the advent of smart speakers (Mascheroni & Siibak, 2021), mediatization is never a linear cause–effect relationship (Hepp, 2020a).

In this article we will address our research questions, firmly grounded in mediatization research (Hepp, 2020b), by building upon the HMC research agenda (Guzman & Lewis, 2020). Accordingly, we will examine the functional and relational dimensions through which families make sense of the conversational agents integrated in smart speakers and relate to these technologies and to themselves. In so doing, we will advance our understanding of how families as communicative figurations change in light of the domestication of smart speakers, and what distinguishes the communicative practices *through* and *with* smart speakers from other mediated communicative practices within the family.

Methods

Study Design

This article reports on the findings of three waves of qualitative longitudinal research designed to investigate the datafication of childhood and family life as a socially situated, everyday and embodied experience. Families were recruited through snowball sampling (i.e, digital flyers illustrating the scope of the project were shared on Facebook or WhatsApp local parenting groups, and printed flyers were circulated in different workplaces [hospitals, call centers]). We were interested in families with at least one child aged 8 or younger, because this is the first generation "to be datafied *from birth*" (Children's Commissioner for England, 2018, p. 11). Given the broader focus of the study, owning a smart speaker was not a sampling criterion. Yet, consistently with the survey data collected in September 2020 (Zaffaroni et al., 2022), we found that the majority of families had smart speakers, as illustrated in Table 1. The final theoretical sample consists of 20 families with at least one child aged 8 or younger, living in the city of Milan and its surrounding towns. Only Family 1 dropped out after the first interview. While small in number, and self-selected—their main motivation to take part in the study being receiving guidance or confirmation about children's media use from researchers—the sample represents a diverse demographic range in terms of income and constellation of actors—with many families having multiple children ranging from 0- to 14-year-olds, but also single-parent and/or single-child families (Table 1).

TABLE 1 Participating Families

Family number	Parents (age, nationality)	SES	Selected child on first visit	Siblings	Smart speaker
Family 1	Mother (39, Italian) Father (43, Italian)	High	F, 5		Amazon Echo
Family 2	Mother (37, Italian) Father (38, Italian)	Medium	M, 4	M, 1	Google Home
Family 3	Mother (42, Italian) Father (48, Italian)	Low	F, 3		

Family 4	Mother (38, Russian) Father (38, Italian)	Medium	F, 4		Amazon Echo + Alexa (Smart TV)
Family 5	Mother (37, Belgian) Father (45, Italian)	High	F, 6	M, 3	
Family 6	Mother (43, Italian) Father (43, Italian)	Medium	M, 5		Google Home Amazon Echo (third wave)
Family 7	Mother (42, Italian-Swiss) Father (39, Italian-French)	Medium/ High	M, 5	F, 2	
Family 8	Mother (41, Italian) Separated	Medium	M, 5		Amazon Echo (dropped out)
Family 9	Mother (41, Italian) Father (42, Italian)	High	M, 7	M, 18m; M, 3; M, 6; F, 10; F, 13; F, 14;	
Family 10	Mother (40, Italian) Father (44, Italian)	Medium	M, 7		Amazon Echo (dropped out)
Family 11	Mother (34, Moroccan) Father (46, Italian)	Low	M, 6	M, 8	
Family 12	Mother (38, Italian) Separated	Medium	M, 6	F, 10	
Family 13	Mother (41, Italian) Father (49, Italian)	Low	M, 6		Amazon Echo
Family 14	Mother (40, Italian) Father (40, Italian)	Medium	F, 7	M, 3; M, 12; F, 10	Google Home
Family 15	Mother (42, Italian) Father (42, Italian)	Medium/ Low	M, 6		
Family 16	Mother (40, Italian) Divorced	Medium	M, 7	M, 5	Amazon Echo (at father's home)
Family 17	Mother (37, Moldavian-Russian) Separated	Low	F, 8		Amazon Echo (at father's home)
Family 18	Mother (40, Italian) Father (41, Italian)	Medium/ High	F, 8	F, 10	Amazon Echo
Family 19	Mother (53, Italian) Father, (58, Italian)	High	M, 5		Amazon Echo
Family 20	Mother (49, Italian) Father (49, Italian)	Medium	F, 8	F, 11	Amazon Echo

Overall, 58 interviews were conducted face-to-face, at home, during three waves of data collection (November–December 2021, April–May 2022, and December 2022–January 2023). During the first family visit, parents and children were initially involved in an ice-breaking activity; next, one researcher followed the child in a toy and digital media tour (Plowman & Stevenson, 2013), while the second interviewed parents about the family's media practices, parental mediation, their expectations and fears around digital media and IoTs. In the second wave, the researchers conducted group interviews at home, using the map drawing method (Watson et al., 2022) as a visual prompt to stimulate discussion about family routines, the domestication of digital media, power relations around media and material space. At the end of the second interview, parents were invited to fill in a digital media diary for 1 week, recording the selected child's interactions with digital media each day (Mascheroni & Zaffaroni, 2023). On the third visit, researchers and interviewees engaged reflexively on the findings of the first and second wave, visualized in a map through a network analysis of actors, media, and interactions (Amadori, 2023). The research protocol was approved by the University's IRB. Parents signed an informed consent, and researchers paid attention to children's assent—understood as a process of ongoing negotiation between the researcher and the child-participant (Warin, 2011). In this article, we will focus on interview data from families with smart speakers ($N = 37$).

Data Analysis

Interviews were transcribed, anonymized, and analyzed using MaxQDA2022. The pseudonyms used in the transcriptions were chosen by the participating children. In line with constructivist grounded theory (CGT) (Charmaz, 2014), the data analysis process was iterative. First, the same interview transcript was coded independently by each researcher, using line by line inductive coding. The comparison between the coded transcripts allowed to develop a shared code sheet, which informed the second stage of analysis, when the interviews were coded independently by researchers. The process was iterative and the shared code sheet was enriched and revised until each coder was satisfied. Finally, the PI examined all coded transcripts and finalized a second-level coding by revising codes and aggregating them into broader codes, summarizing the main themes emerged from interviews and informed by the theoretical framework. The coding scheme was further refined and enriched during the analysis of the second and third waves of interviews.

Findings

Incorporating Smart Speakers in the Family's Media Ensemble and Repertoire of Practices

Nine families in our sample own and use a smart speaker, located in the kitchen or the living room. Two families dropped out for privacy concerns (Family 10), or concerns over the child-smart speaker interaction (Family 8) respectively. In two divorced families, children have access to a smart speaker only in the father's home (Table 1).

As a new addition to each family's media ensemble, the smart speaker may entertain relationships of complementarity, substitution, or control with other media, as well as variously fit the family's communication repertoire. In our participating families, the use of smart speakers is mainly incorporated into the pre-existing communication and media repertoires, with the control function representing the only new practice. In fact, the most frequent usage practices fit into the broad use genres of entertainment (music, fairy tales, jokes), information (quick factual information, news, weather forecast, schoolwork, cooking recipes), and control (of other media or appliances). Some generational and gender differences emerge (as we will further elaborate below in relation to power dynamics between family members): children are more likely to engage with the smart speaker to listen to music, ask for fairy tales or jokes, and practice small talk, while adults ask for information and listen to music; fathers are responsible for the control functions.

Moreover, we mainly found relations of complementarity, without significant disruptions to the pre-existing media ensemble. For example, children's requests to smart speakers, such as narrated stories or music, do not necessarily replace pre-existing media practices (e.g., books or YouTube), but rather complement them as a convenient alternative due to the voice activation. Only when located in the kitchen (Families 2 and 14), and limited to adults' practices, smart speakers replace radios or smartphones for news, cooking timer, and recipes. The relationship of control, in its strict sense, is limited: In the third wave only Family 18 continued operating smart lights via a smart speaker, whereas Family 14 dropped out of lights automation—due to the mother repeatedly clicking the switch—while Family 13 occasionally used the remote activation of smart lighting when on holiday—to prevent burglaries.

Importantly, however, while smart speakers are incorporated within pre-existing mediatized family practices, as interfaces to access and control other media and platforms (e.g., Spotify or the morning news on radio stations), they are implicated in a complex network of interconnected devices and services, which collect, track, and exchange data. Therefore, while smart speakers broaden the range of media through which families carry out their usual media or communication practices, due to their infrastructural embodiment they simultaneously intensify the family's reliance on data relations for the performance of many mundane (individual or shared) activities.

Changing media ensemble, changing family figurations?

Smart speakers set new conditions for agency within the family, subverting or reinforcing existing power relations in the home through the communicative practices they enable. In terms of intergenerational power relations, parents are challenged in their parental mediation role, as gatekeepers of children's access and use of digital media. In fact, even pre-schoolers are now able to access media content autonomously, through voice commands, thus gaining control not only on the smart speaker but also on the interconnected devices (e.g., the smart TV). The novel autonomous engagement with media achieved by young children—and the seemingly democratized child–parent relations (see Wang et al., 2023)—is not necessarily restricted nor disapproved by parents. For example, the mother in Family 2 is proud of her son's greater acquired agency, and encourages him to interact with the smart speaker:

> Petra [mother, Family 2, wave 1]: It's nice because he [4-year-old son] asks it for songs. I mean, "Ok Google, I want to listen to the soundtrack of Moana," I don't know . . . or "I want to listen to . . .". It's nice because he can ask for the songs on his own, and he does. Also, every morning he asks Google what the weather will be like in Milan. I used to do it before, but now he does it. [. . .] sometimes it is me telling him "let's ask Google what's the weather like today."

The communicative interaction described in the excerpt above, that has become an integral part of the morning wake-up routine, shows how the smart speaker involved a shift in power, from the mother to the child, in the relationship with information: now it is the child who is responsible for accessing the weather forecasts, although often prompted by his mother.

Moreover, although smart speakers may actually enable children to bypass parental mediation, the empowerment of the child does not necessarily translate into a corresponding disempowerment of parents. Power is not always a zero-sum game within family figurations. Children's voice-based autonomy, in fact, is intertwined with and dependent on how agential practices unfold on the side of parents. In certain family configurations, the child's empowerment is paralleled by a corresponding benefit for parents, who equally turn the smart speaker into a technology of empowerment. This can be observed, for example, when the smart speaker serves as a digital babysitter, to keep the child occupied with stories and music. Petra [mother, Family 2, wave 1] further explains that she likes her son to be able to ask Google Home autonomously for stories because "Spotify is full of nice things . . . and when I need to relax, or I need him to be still, I put on a lot of audio stories."

Likewise, by granting autonomous access to music through voice commands, smart speakers alleviate single parents from the preoccupation of constantly supervising their children's screen time. Letizia recounts having bought Amazon Echo a few months before our third visit to avoid her 5-year-old son accessing her smartphone whenever he wanted to listen to music:

> Letizia [mother, Family 8, wave 3]: I made the decision to buy it unconcernedly because I thought could be, even for him, something convenient, because he did no longer have to access my phone . . .

Often, however, the domestication of smart speakers poses a direct challenge to parents. In fact, by enabling a more autonomous access to media content, smart speaker risk undermines parents' agency in preventing children's exposure to inappropriate content. For example, Family 1 explains how they resorted to the employment of technical mediation (namely, parental controls), to protect their daughter from inappropriate content (e.g., *fart jokes* that Alexa prompted to a 5-year-old girl):

> Claudia [mother, Family 1]: The other day, when you were not at home, she [daughter] was asking songs to Alexa, and at some point I heard Alexa replying "I do not have that title, but try with 'fart something,' but you need to unblock it on the app first."

While additional parental mediation helps counterbalance the quasi-autonomous agency of the smart speaker, that suggests content directly challenging the family's frame of relevance, other times it is children's smart speaker-enabled empowerment that can lead to overt conflicts between family members. This happens when transformations in pre-existing power relationships and communicative practices (*with* and *through* media) clash with the family's shared norms and reciprocal expectations—namely, when the communicative practices enabled by smart speakers clash with the family's frame of relevance. For example, Camilla [mother, Family 20, wave 3] recounts when, during a play date, a friend of her son, whose mother is "a zealot" of age-appropriate content, asked the smart speaker to play the Måneskin [Italian rock band] and "danced shirtless! It made me laugh!" Gabriella, instead [mother, Family 6, wave 2], was annoyed when "[her 5-year-old son] interrupted Google without asking me, because he wanted his songs." Arguments of this kind continued over time: "He still does it. Especially if he wants to watch TV and I am listening to music, he turns the smart speaker off and watches TV. So 'Alexa, stop!' And so we have an argument because I'd like to listen to music. Or [we argue] about the kind of music." [Gabriella, Family 6, wave 3]. Similarly, Letizia recalls how the daily conflicts over the control of the smart speaker were one of the reasons that motivated her decision to hide Echo in a drawer:

> Letizia [mother, Family 8, wave 3]: I was no longer free to listen to music because he would get there and change it [the child scoffing in the background]. He wanted to change song. It was a continuous war. So I told myself "enough!" Sometimes you listen to your music, sometimes I listen to mine, but we cannot change it continuously. It became unnerving.

Such conflicts over the smart speaker suggest that the point of "disrupting access" (Beneteau et al., 2020, p. 5) may be less about reclaiming identity through personal music choices, and more about resisting parental mediation and reaffirming more balanced power relations in the parent–child dyad. When we look at the gender relationships in the family, instead, we can observe how smart speakers tend to reproduce the gendered power differentials in the home—with fathers being in charge of the management of accounts (as in the example of Family 1 above), as well as of the control functions of smart speakers over smart home solutions (e.g., lighting), and the mothers being in a subordinate position of passive or unskilled users:

> Sara [mother, Family 18, wave 1]: Don't know, my sister uses it for everything, to remind her to hang the laundry or turn off the . . .
>
> Beatrice [8-year-old daughter]: She even turns the TV on!
>
> Sara: While it does not usually come to my mind the idea of using the smart speaker for . . . Just the lights, that then, if I accidentally use the switches, Alexa does no longer listen to voice commands, and my husband gets mad at me!

In certain respects, then, the negotiations and conflicts around smart speakers are not dissimilar to those occurring whenever a new medium enters the family's media ensemble: in fact, the latest addition to the media ensemble is appropriated within the family's

communicative repertoire through the lens of the family's relevance frame, resulting in a, at least partial, reconfiguration of the family as a communicative figuration. What is novel, therefore, is not the ways in which power relations are reproduced, reconfigured, or resisted through smart speakers-supported practices per se. Rather, it is the communication with smart speakers, their being media *through* and *with* which the family communicates, that generates new power dynamics as we will elaborate in the next section.

However, the automated, data-based nature of smart speakers renders their domestication—and the consequent adaptation of the family figuration to their adoption—somewhat distinctive. Indeed, alongside their "communicative" embodiment (Hepp, 2020b), smart speakers are embodied in the infrastructures of datafication. In fact, underlying the functioning of smart speakers is the real time algorithmic processing of users' voice inputs, their classification and matching with the desired output. The incorporation of smart speakers into the domestic context thus entails an intensified mediatization of everyday life, in the form of its progressive datafication and algorithmization. This yields important shifts in the power dynamics between humans and machines, and, consequently, in the family as a communicative figuration.

As already described, by introducing a further level of mediatization in the family's media and communication repertoire (e.g., access to music is now mediated by a voice interface, that activates the playlist on Spotify) smart speakers gain greater agency, that results in a corresponding diminished agency for users. In fact, instead of browsing from a potentially infinite library of contents, users are directly presented with content, and left with little control over the choice. By repeating the outcomes of previous interactions and narrowing down the range of content, smart speakers hinder user's ability to make autonomous choices:

> Tommaso [4-year-old son, Family 2, wave 2]: Ok Google, I want to listen to children's stories!
>
> Google: I play children's stories from Spotify.
>
> Petra [mother, Family 2]: Let's see which one Google chooses today. . . . [Google: "Rapunzel . . ."] that's it! Since it's one we've often asked, because Tommaso likes it, [Google] often plays Rapunzel when it has to choose.

This algorithmization of everyday practices lies at the heart of the tension between the empowerment and disempowerment of users, and the agency of machines. Smart speakers acquire a crucial role with respect to the distribution of agency within the family thanks to the datafication and subsequent algorithmic calculation of everyday life. Sometimes, users feel restricted in their power to choose media content, as Pamela, who explaining why their use of Echo diminished over time, tells:

> Pamela [mother, Family 13, wave 1]: It is useless. Music, anyway, is not unlimited . . . Because it is connected to Amazon, so the library is limited. Instead, I know that Google Nest is connected to YouTube, so there's everything. Conversely, Echo is very limited. Furthermore, it does not understand many things. After all, she is not human!"

Contrary to Pamela, however, most children and parents are unaware of how this processing works and are confronted with content over which they have no direct control. Pamela's excerpt above is interesting also because of her suggestion that smart speakers' limitations depend on its machine-like nature. This comment leads us to the second research question; that is, how communication through and with smart speakers is different from other mediated communication.

Communicating *With* (and *Through)* Smart Speakers

Besides shifting the power relations between family members, and between the constellation of actors and the media ensemble, smart speakers also afford the, at least partial, construction of a communicative relationship. Indeed, although conversations with smart speakers are brief—and tend to decline over time, when the "novelty effect" fades—new communicative practices emerge, with family members now interacting with a gendered voice trained to perform various tasks, as well as respond to curiosities and jokes.

The communicative interaction with smart speakers is shaped, first, by the attribution of a human-like or, alternatively, a thing-like identity to the technology; and, second, by how effectively the smart speaker responds to the user's request. The two aspects are in fact interrelated: indeed, communicative failures are interpreted through the lens of the identity attributed to the conversational agent integrated in the smart speaker. As a consequence of the mutual shaping of users' perceptions and technology's responses, communication with smart speakers is always socially situated, contingent upon entity-making practices (Suchman, 2011) and the specific interactive occurrence.

Younger children tend to personify voice-based assistants and engage more frequently in entity-making practices, testing the conversational agent's "liveness." Our interviews and observations include numerous examples of children enlivening the smart speaker through their interactions, by constructing the smart speaker as a living entity and attributing it human-like activities and emotions. For example, children asked Alexa if she liked Nutella—as Elisa (8-year-old, Family 20, wave 3)—or if she had parents, as in the following excerpt:

> Camilla [mother, Family 19, wave 2]: One day I was in the kitchen and I heard him talking to someone, and I said, "Who is he talking to?" He was talking to, he was asking Alexa, "Alexa, do you have friends? Who are your daddy and your mommy?"
>
> Alessandro [5-year-old son]: "Alexa! Do you have a mom or a dad?" [repeating Alexa's words] "She was invented . . ."
>
> Interviewer: ". . . by a team of engineers at Amazon."
>
> Alessandro: Yes, it doesn't have parents, it's normal!

The personification of smart speakers through an attribution of anthropomorphic qualities and a personality is largely dependent on its built-in gendered traits. Children, and parents alike, attributed a different gender identity to the conversational agents embedded in Echo or Google; interestingly, this gender difference leads to conflicting and stereotyped

interpretations of their distinctive qualities. For example, the four siblings in Family 14 argued whether Alexa or Google was better. In the conversation, Alexa was attributed greater emotional and conversational qualities, whereas Google was perceived as more intelligent. Only the older brother, who attributes a machine-like quality to the smart speaker, thinks that they perform the same basic functions:

> Alice [10-year-old sister, Family 14, wave 2]: I would prefer Alexa, because she is much more responsive.
>
> Martino [12-year-old brother]: It's the same!
>
> Alice: No, because if you tell Alexa "do you know that I love you so much?" she goes "Thank you for your loooove" [singing].[. . .]
>
> Interviewer: So, why did your dad chose Google Home over Amazon Echo?
>
> Carlotta [7-year-old sister]: Because Google is a male, and knows more things.

Importantly, as anticipated, the attribution of anthropomorphic and gendered characteristics forms part of the communicative labor that families perform to understand and interpret the smart speakers' communicative failures. For example, when complaining about the failures of the smart speaker to locate content across different SVOD platforms, Ludmilla (mother, Family 4, wave 2) mobilized the female servant stereotype: "ours is Alexa's maid, because she doesn't understand!"

Similarly, when Family 6 replaced Google Home with an Echo before our third visit—with Google being downgraded to the bathroom—the different perceived performances of each were interpreted in terms of gender differentials, with women being acknowledged as smarter than men:

> Gabriella [mother, Family 6, wave 3]: By the way, we now have Alexa. We bought Alexa to replace Google, so we eventually have a woman instead of a man and she does understand much more! [laughing]

In Family 16, Amazon Echo was attributed the status of a female competitor who always took the side of her husband. In fact, Alice (mother, Family 16, wave 1) recounts how she "did not get along with Alexa, she did not understand me. Don't know, she probably hated me!" However, despite the fact that parents themselves mobilize anthropomorphic frames in trying to make sense of the occasional communicative failures, the entity making practices in which children engage can also be a source of concern for parents. Letizia explains she stopped using Echo after she observed her son attributing the smart speaker a human-like, yet inferior, status. First, the young child's personification of the smart speaker generated feelings of discomfort and anxiety:

> Letizia [mother, Family 8, wave 3]: I took it away because it was impossible to keep it in the house with him. I didn't like it because of the orders. No, no. You order Alexa, but I just didn't like [his] way of approaching it. [. . .]

> Lodovico [5-year-old son, Family 8]: I did not like it either, because sometimes I asked for a song and it played another one. It did not understand anything!
>
> Interviewer: And this made you angry?
>
> Lodovico: Yes, I wanted to flush it through the toilet. She is stupid.
>
> Letizia: Mmm no, you have to understand it is a machine, not a person. While I observed him . . . trust me, I was scared. It is too soon. [. . .] It upset me. It is normal and automatic for us. But I have noticed it was different for him, he conversed with the smart speaker as if . . . another person was at home. I don't know, I felt uncomfortable about it.

Second, Lodovico extended the inferior status attributed to the smart speaker also to other family members, thus threatening the family's values and norms. Therefore, besides conflicts over the control of the interface, the smart speaker was de-domesticated because of the child's habit to give orders to his mother overtly conflicting with the family's frames of relevance.

As these examples illustrate, constructing smart speakers as human-like communicative partners yields partial or unsatisfactory outcomes, as both children's and parents' expectations of reciprocity and mutual understanding are often frustrated by the limited capacities of the device, due to its faulty algorithmic processing of voice inputs—failures that may be due to lower training of voice recognition in languages other than English. After the novelty effect fades, children also grow tired of the company of smart speakers, to the point that they forget their presence:

> Pamela [mother, Family 13, wave 1]: At the beginning he [6-year-old son] was [attracted], he would ask Alexa for Google searches, "Alexa what is the biggest animal in the world?" Sometimes we still do this, just for fun, "Alexa, what is the most stinky animal in the world?" You know, stupid things . . . but very seldom.

Conversely, we observed only one example of communication *through* smart speakers, when Family 20 tested the possibility of voice calls via the smart speaker "for security reasons," to have an additional communication channel "in case mobile phones did not work" [Umberto, father, Family 20, wave 3].

Conclusions

This study aimed to understand whether and how families, as communicative figurations, change through the domestication of smart speakers, and what is distinctive about the communicative practices *through* and *with* smart speakers from other mediated communicative practices within the mediatized home. Our findings show that, while the domestication of smart speakers follows similar patterns across families—with their incorporation into the pre-existing media repertoire as a further digital interface to habitually consumed content, followed by a general decline in usage over time—interactions with smart speakers are also distinctive of each family configuration and the type of device, depending on the situated

nature of their domestication. More specifically, the family's communication repertoire is enhanced by the relationships of complementarity and control (Wang et al., 2023) that the smart speaker entertains with the pre-existing media ensemble. Substitution is less frequently observed and limited to the smart speaker functioning as a new interface to routine media content such as music (playlists) and news.

In terms of reconfigurations of the relationships between family members, smart speakers are technologies of both empowerment and disempowerment. Children are rendered more autonomous in their media choices, thus challenging parental mediation and reclaiming agency through acts of "disrupting access" (Beneteau et al., 2020, p. 5). However, the empowerment of the child does not necessarily translate into a corresponding disempowerment of parents, who could benefit from smart speakers as digital babysitters, or from voice interfaces as an alternative to screens. If intergenerational relationships are re-negotiated, often gendered power imbalances are instead reproduced, with fathers exercising control over the smart speaker and interconnected devices.

Overall, our findings emphasise how smart speakers continue and intensify the mediatization of families' everyday lives (Mascheroni & Siibak, 2021). While power negotiations and redistribution of agency within families have always been characteristic of the domestication of media (Silverstone, 1999), what is distinctive about smart speakers is their double embodiment (communicative and infrastructural) (Hepp, 2020b), and the relationship between the two. The communicative embodiment of smart speakers is crucial in their domestication: in fact, although children are more likely to engage in entity-making practices (Suchman, 2011), the attribution of anthropomorphic and gendered characteristics forms part of the communicative labor that all family members perform to make sense of the smart speakers, including its failures. The interpretations of both the human-like and the machine-like attributes of smart speakers changes according to the technology's ability to complete a task and understand human inputs. Consequently, the smart speaker's positioning as a communicative partner is dynamic and contingent upon the specific interactional situation, shifting along the continuum of *human*-like and *thing*-like based on how human expectations are satisfied or frustrated. Rather than new family members (Wang et al., 2023), across our families smart speakers are either perceived as media or, less often and primarily by younger children, as companions, equal to pets or toys.

Smart speakers' infrastructural embodiment also emerged as a key aspect in the domestication practices of our participating families. As interconnected devices able to control other media and appliances, smart speakers acquire an agentic role by further extending the datafication and algorithmic calculation of everyday life. This yields important shifts in the power dynamics between humans and machines, with humans having little control over the choice of media content and, more generally, over the extraction, distribution, and analysis of users' and home data. Indeed, the human-like communicative embodiment materialized in a gendered voice conceals the complementary embodiment of the device in the digital-material infrastructures of datafication. More than sustaining new power relations among the actors' constellation distinctive of each family configuration, smart speakers involve a new relationship between human actors and artifacts, that Couldry and Hepp (2017, p. 131–132) called "tool reversability." Tool reversibility indicates how users themselves are being used by the data-based, internet-connected tools embedded in their

everyday lives. Therefore, while smart speakers are appropriated as technologies of empowerment, they equally remain technologies of power, depending on our agency and simultaneously subtracting part of our agency.

The current study has a number of limitations, some of which are common to qualitative research (a diverse but not representative sample of parents who volunteered to take part in the study for their own interest in and concerns around children's digital media use), and others specific of our research design. In fact, our research project was not focused on the domestication of smart speakers, but on mediatized and datafied families as communicative figurations. Additionally, except for observing a general decline in usage, processes of de-domestication (Family 8), or the domestication of a new smart speaker combined with the re-domestication of the older device (Family 6), the longitudinal nature of our study was not further explored. Future studies could address this limitation and investigate whether the shifting power dynamics here described are distinctive of families with young children, or whether a more substantial re- or de-domestication occurs over a longer time frame.

Author Biography

Giovanna Mascheroni, (PhD, Università Cattolica del Sacro Cuore) is a sociologist of digital media, and Professor in the Department of Communication, Università Cattolica del Sacro Cuore. She was the leader of WP6 in the H2020 project ySKILLS, and the PI of DataChildFutures, a national project investigating the data practices of Italian families with children aged 0- to 8-year-olds. Her work focuses on the social consequences of digital media, datafication, and AI for children and young people. Her latest book is *Datafied childhoods: Data practices and imaginaries in children's lives* (2021), co-authored with Andra Siibak.

https://orcid.org/0000-0002-6939-2650

References

Amadori, G. (2023). Studying the datafied home: The potentials of combining mixed methods, constructivist grounded theory and social network analysis. *ZeMKI Communicative Figurations Working Paper 44*. https://web.archive.org/web/20240102154030/https://www.uni-bremen.de/en/zemki/publications/working-paper-series/

Beneteau, E., Boone, A., Wu, Y., Kientz, J., Yip, J., & Hiniker, A. (2020). Parenting with Alexa: Exploring the introduction of smart speakers on family dynamics. *CHI '20: Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, April 21, 1–13. https://doi.org/10.1145/3313831.3376344

Charmaz, K. (2014). *Constructing grounded theory: A practical guide through qualitative analysis. Second Edition*. Sage.

Children's Commissioner for England. (2018). *Who knows what about me? A children's commissioner report into the collection and sharing of children's data*. https://web.archive.org/web/20190212122718/www.childrenscommissioner.gov.uk/wp-content/uploads/2018/11/who-knows-what-about-me.pdf

Couldry, N., & Hepp, A. (2017). *The mediated construction of reality*. Polity.

Couldry, N., & Mejias, U. A. (2019). *The costs of connection: How data is colonizing human life and appropriating it for capitalism*. Stanford University Press.

Fortunati, L., Edwards, A., Edwards, C., Manganelli, 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

Garg, R., & Sengupta, S. (2020). He is just like me: A study of the long-term use of smart speakers by parents and children. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, 4*(1), 1–24. https://doi.org/10.1145/3381002

Guzman, A. L. (2018). What is human–machine communication, anyway? In L. Guzman (Ed.), *Human–machine communication: Rethinking communication, technology, and ourselves* (pp. 1–28). Peter Lang.

Guzman, A. L. (2019). Voices in and of the machine: Source orientation toward mobile virtual assistants. *Computers in Human Behavior, 90*, 343–350. https://doi.org/10.1016/j.chb.2008.03.008

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

Hepp, A. (2020a). *Deep mediatization*. Routledge.

Hepp, A. (2020b). Artificial companions, social bots and work bots: Communicative robots as research objects of media and communication studies. *Media, Culture & Society, 42*(7–8), 1410–1426. https://doi.org/10.1177/0163443720916412

Hepp, A., & Hasebrink, U. (2018). Researching transforming communications in times of deep mediatization: A figurational approach. In A. Hepp, A. Breiter, & U. Hasebrink (Eds.), *Communicative figurations: Transforming communications in times of deep mediatization* (pp. 15–48). Springer. https://doi.org/10.1007/978-3-319-65584-0_2

Lopatovska, I., Rink, K., Knight, I., Raines, K., Cosenza, K., William, H., Sorsche, P., Hirsch, D., Li, Q., & Martinez, A. (2019). Talk to me: Exploring user interactions with the Amazon Alexa. *Journal of Librarianship and Information Science, 51*(4), 984–997. https://doi.org/10.1177/0961000618759414

Mascheroni, G., & Siibak, A. (2021). *Datafied childhoods. Data practices and imaginaries in children's lives*. Peter Lang.

Mascheroni, G., & Zaffaroni, L. G. (2023). From "screen time" to screen times: Measuring the temporality of media use in the messy reality of family life. *Communications*. https://doi.org/10.1515/commun-2022-0097

Natale, S. (2021). Communicating through or communicating with: Approaching artificial intelligence from a communication and media studies perspective. *Communication Theory*, *31*(4), 905–910. https://doi.org/10.1093/ct/qtaa022

Natale, S., & Cook, H. (2020). Browsing with Alexa: Interrogating the impact of voice assistants as web interfaces. *Media, Culture & Society*. https://doi.org/10.1177/0163443720983295

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

Plowman, L., & Stevenson, O. (2013). Exploring the quotidian in young children's lives at home. *Home Cultures, 10*(3), 329–348. https://doi.org/10.2752/175174213X13739735973381

Pridmore, J., Zimmer, M., Vitak, J., Mols, A., Trottier, D., Kumar, P. C., & Liao, Y. (2019). Intelligent personal assistants and the intercultural negotiations of dataveillance in platformed households. *Surveillance & Society, 17*(1/2), 125–131. https://doi.org/10.24908/ss.v17i1/2.12936

Rideout, V., & Robb, M. B. (2020). *The common sense census: Media use by kids age zero to eight, 2020*. Common Sense Media. https://web.archive.org/web/20201117140451/www.commonsensemedia.org/research/the-common-sense-census-media-use-by-kids-age-zero-to-eight-2020

Silverstone, R. (1999). *Why study the media?* Sage.

Suchman, L. (2011). Subject objects. *Feminist theory, 12*(2), 119–145. https://doi.org/10.1177/1464700111404205

van Dijck, J. (2014). Datafication, dataism and dataveillance: Big data between scientific paradigm and ideology. *Surveillance and Society, 12*(2), 197–208. https://doi.org/10.24908/ss.v12i2.4776

Wald, R., Piotrowski, J. T., Araujo, T., & van Oosten, J. M. (2023). Virtual assistants in the family home. Understanding parents' motivations to use virtual assistants with their child(dren). *Computers in Human Behavior, 139*, 107526. https://doi.org/10.1016/j.chb.2022.107526

Wang, B., Luo, L., & Wang, X. (2023). "Back to the living room era": Smart speaker usage and family democracy from the family dynamic perspective. *New Media & Society*. https://doi.org/10.1177/14614448231155624

Warin, J. (2011). Ethical mindfulness and reflexivity. *Qualitative Inquiry, 17*(9), 805–814. https://doi.org/10.1177/1077800411423196

Watson, A., Lupton, D., & Michael, M. (2022). The presence and perceptibility of personal digital data: Findings from a participant map drawing method. *Visual Studies*. https://doi.org/10.1080/1472586X.2022.2043774

Williams, R. (2003 [1974]). *Television: Technology and cultural form*. Routledge.

Zaffaroni, L. G., Amadori, G., & Mascheroni, G. (2022). *DataChildFutures. Rapporto sui risultati dell'indagine 2020*. https://doi.org/10.5281/zenodo.6367526

Zhao, S. (2006). Humanoid social robots as a medium of communication. *New Media & Society, 8*(3), 401–419. https://doi.org/10.1177/1461444806061951

HUMAN-MACHINE
COMMUNICATION

HUMAN-MACHINE COMMUNICATION

Human-Machine Communication
Special Edition, Volume 7, 2024
https://doi.org/10.30658/hmc.7.4

Communicative AI and Techno-Semiotic Mediatization: Understanding the Communicative Role of the Machine

Göran Bolin,[1]

1 Department of Media and Communication Studies, Södertörn University, Stockholm, Sweden

Abstract

Mediatization discourse has so far mainly been centered on media from institutional or social-constructionist approaches. The technological developments within communications industries coupled with the wider societal process of datafication might, however, beg for dusting off the smaller, although the long-time existing, technological approach to mediatization as a complement to the two other approaches, in order to understand aspects of automation and human-machine communication. This theoretical article explores how existing mediatization approaches can refocus to include lessons learned from human-machine communication. The first section accounts for the main mediatization approaches. The second section discusses debates on communication, artificiality, and meaning-making. The last section takes the example of the recruitment interview for discussing how mediatization theory can benefit from including a technological approach with influx from human-machine communication, as well as how human-machine communication can learn from wider discussions within mediatization theory.

Keywords: communicative AI, mediatization, technology, communication, meaning-making

Introduction

A large portion of media research over the past 2 or 3 decades has taken point of departure in the radical transformation of social and cultural life that has followed from the digitization of all media. Media technologies and contents have multiplied, paving the way

CONTACT Göran Bolin • goran.bolin@sh.se • Department of Media and Communication Studies • Södertörn University • Stockholm • Sweden

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

for increased opportunities for commercial media to monetize behavior and to develop refined business models built on audience management. The possibilities for communication have also multiplied, where everyday media users have been equipped with relatively cheap means of production (although not the resources of large-scale media corporations). Communication takes place on an increasing number of technological platforms, involves more communicating agents, but also includes a wider variety of communicative agents—including nonhuman communicators. The popularization of interfaces for conversational text interaction such as ChatGPT has further amplified textual production, adding to the vast amounts of textual expressions in digital space.

Mediatization theory has over this time arisen to theorize this increased multiplicity of communication platforms, agents, communicative types, and textual outputs. However, European mediatization research has so far mainly been centered on media from institutional or social-constructivist approaches (Hepp, 2020a; Hjarvard, 2013; Lundby, 2014). The technological developments within communications industries coupled with the wider societal process of datafication might, however, beg for dusting off the smaller, although long-time existing, techno-semiotic approach to mediatization as a complement to the two other approaches, in order to understand how aspects of automation and human-machine communication can feed into processes of mediatization. Arguably, this approach, grounded in the medium theory of Marshall McLuhan (1964), structural anthropology, and semiotics could enrich the two main approaches by putting a stronger emphasis on the communicative and textual aspects of mediatization. The approach was introduced by Jean Baudrillard (1971/1981) in the early 1970s, and can also be found in Latin American mediatization debates (e.g., Carlón, 2020), but has been largely absent from the main European debates. An integration of the techno-semiotic approach could therefore provide with a more nuanced mediatization theory, that could also take into consideration textual expressions and communicative dimensions. Mediatization theory has thus had its main focus on *the media*—as institutions, and as technological (and sometimes also textual) environments—and less on *communication*. This means that questions of *communicative AI* (Guzman & Lewis, 2020), that is "devices, applications, and algorithms capable of communicating in natural language and adapting to real-life conversational situations" (Laaksonen et al., 2023, p. 137), has had difficulties in being integrated in the debates on mediatization. The aim of this theoretical article is therefore to explore how mediatization theory can be advanced by incorporating a techno-semiotic dimension that can be beneficial for the understanding of the implications of automated and algorithmically managed forms of human-machine communication. Reversely, it is hoped that this discussion could also inform debates in human-machine communication.

In the first section, I will account for the differences between the institutionalist and social-constructivist traditions of mediatization as well as the more latent techno-semiotic approach rooted in medium theory, semiotics, and structural anthropology. I will then, in a second section, discuss the role of communication (rather than *the media*) in both mediatization and human-machine communication contexts in order to explore how they can inform each other. In a third section, I will illustrate how such an integration of debates from human-machine communication can be beneficial for certain types of mediatization processes by briefly discussing how a communicative practice such as the recruitment interview has become mediatized over the years. The paper then concludes with an argument for

a more holistic approach to mediatization that can be beneficial for understanding the role of human-machine communication in this process.

Institutional, Social-Constructivist, and Techno-Semiotic Mediatization

The by far most common way in which researchers have discussed mediatization is through an institutional approach. This is where the concept of *the media* means media institutions, either in the form of media companies such as the television broadcasting companies BBC, Globo, NBC or press organizations such as *The Times*, *Le Monde,* or *Corriere della Sera*, or in the form of societal institutions such as *journalism* or *politics*. Irrespective of which, the concept of media refers to *mass media*, and the temporal perspective is that of the 20th century and onward, most often the latter half of that century. Quite often causal explanations are emphasized: the institution of *the media* or *journalism* impacts on another institutions, for example *politics*, having the latter adjust to the working principles or the logics of the first. This is, for example, how one of the pioneers in the mediatized politics tradition, Kent Asp (1990), analyzed the ways in which politics gradually became reliant on the mass media. Many of the proponents of this approach, including Asp, have taken their source of inspiration in Altheide and Snow's (1979) seminal theory of *media logic*. In the same vein, Jesper Strömbäck (2008) discusses *four phases of mediatization* through an historical analysis of the relations between what he calls a "media logic" and a "political logic," where the latter is becoming increasingly dependent on the media. The mediatization of politics is one of the major avenues through which research has traveled, and besides the temporal distinction of the mediatization process in historical phases that Strömbäck has engaged in, there are also refinements of the theory in terms of the features of mediatization; for example, by the breaking down of the process in the four aspects: extension, substitution, amalgamation, and accommodation (Schulz, 2004).

Danish mediatization scholar Stig Hjarvard has probably been the one that most elaborately has theorized the institutional approach. The benefits of this approach, Hjarvard argues, is that it conducts its analysis on the meso level, is relatively easy to operationalize, and deals with "changes in inter-institutional relationships" (Hjarvard, 2014, p. 199). Hjarvard has also used the institutionalist approach on other phenomena, such as children's play and religion (Hjarvard, 2013).

The other dominant approach is usually referred to as the social-constructivist. This approach adopts a longer time perspective, reaching back to early forms of communication in archaic society, drawing the long historical lines from cave paintings to AI. This naturally means that not only mass media are in focus, but all kinds of communication technologies. Because of its basis in social constructivism, it is less focused on causal explanations, and rather emphasize that media and communication develop *with* society in complex ways, rather than affects society from the outside. Its focus is on the media as environments in which we live, and the ways in which social subjects orient in mediatized space. To the contrary of the meso-level analysis of the institutionalist approach, this strand of research often adopts a macro perspective on societal change. This approach has its advocates in, for example, Nick Couldry and Andreas Hepp (2016) in their book *The mediated construction*

of reality. Hepp (2020a) has then further developed this analysis for the datafied world in his book *Deep mediatization*. According to Hepp, deep mediatization should be understood as "the stage of mediatization in which the analysis of algorithms, data and artificial intelligence become crucial to our understanding of the social world," and should be read as resonating with concepts such as "deep learning" or "deep analytics" (Hepp, 2020a, p. 7).

Both these approaches are well represented in edited collections (e.g., Driessens et al., 2017; Kopecka-Piech & Bolin, 2023; Lundby, 2009; Lundby, 2014), but while the main debates about the process of mediatization were introduced in the early 1990s, and more widely debated in the first 2 decades of the new millennium, Jean Baudrillard used the concept a couple of decades earlier in his "Requiem for the media" (Baudrillard, 1971), where he discussed "l'information médiatisée" in connection to a wider discussion of the possibilities and limitations embedded in media technologies (see the more detailed account in Bolin, 2014). This approach to mediatization is in research overviews acknowledged to exist but is also dismissed as having had too little impact on the mediatization debate (Hepp, 2020a; Jansson, 2018). This is unfortunate, since the approach with its focus on the technological affordances and limitations for communication has some important contributions to make to research on communicative AI and human-machine communication.

Baudrillard's argument about mediatization has its background in the medium theory of Marshall McLuhan (1964) and the technological philosophy of Walter Benjamin (1936/1977), coupled with theories from structural anthropology and semiotics. It can foremost be found in his early works (e.g., Baudrillard, 1971, Baudrillard, 1976/1993). Baudrillard's emphasis is dual: first, on the technology itself as a channel of communication that privileges certain communicative forms while setting limits to others. Second, it also emphasizes the semiotic codes in which communication occur, and the way in which these affect communicative exchange. This form of exchange is at the root of Baudrillard's understanding of communication:

> What characterizes the mass media is that they are opposed to mediation, intransitive, that they fabricate non-communication—if one accepts the definition of communication as an exchange, as a reciprocal space for speech and response, and thus for *responsibility*. In other words, if one defines it as anything else than the simple emission/reception of information. (Baudrillard, 1985, p. 577)

First, Baudrillard argued that the technological affordances of the mass media, such as television which was the new medium of the time when he was writing, were seen as mere technological channels for one-way communication that were engaging in "speech without response" (Baudrillard, 1971/1981, p. 169). Television, Baudrillard argued, could never work emancipatory since the technology itself prevented true communication. Baudrillard thus models his concept of communication on human speech and symbolic exchange: communication was for him always concerned with establishing a relation between two subjects. This is partly rooted in dialogic theory, but also in theories of gift economies (Mauss, 1925/1990), where the symbolic exchange of gifts creates a bond between giver and receiver. This type of exchange is permeated with symbolic meaning, whereas the mass media

"fabricate non-communication" (Baudrillard, 1971/1981, p. 169), that is, they are merely simulating communication.

Second, this simulation is not only coupled with the technological mediation of information or communicated content. It also stems from the semiotic codes by which communication occurs, and the paradigmatic limits of discourse. The communication of signs is subsumed with the cultural rules, grammars, and other semiotic qualities of communication. This part of Baudrillard's theory is particularly relevant to questions of communication related to AI and automation, as the semantic logic of communication is more reminiscent of algorithmic rules, prompts, and protocols, where signs are managed in more instrumental ways.

Simulation is also related to representation and leads to the three stages of simulacra, as Baudrillard (1981/1994) discusses in his *Simulacra and simulation*. In the first stage of simulacra, the relation between the representation and its referent in social reality is obvious—no one would mistake the painting *Mona Lisa* by Leonardo da Vinci for the real person portrayed (Lisa del Giocondo). With the advent of photography, the relation between the representation and its referent changes and becomes less obvious. This is because of the indexical relation between reality and its photographic representation, where the light of the portrayed person actually sets its mark on the celluloid film. It thereby establishes a direct relation between the portrait (say, the famous image of Che Guevara by photographer Alfred Korda), and the person portrayed (the actual person Che Guevara). This is where the conflation appears between representation and person represented that French painter René Magritte ironically comments on with his famous painting *Ceci n'est pas une pipe* (This is not a pipe)—a naturalistic painting that of course is not a pipe, but represents a pipe. Today, with image-generating software such as DALL-E or Midjourney, we can safely say that we have reached what Baudrillard called the third order of simulacra, when the relation between a representation and its referent is dissolved. A machine-generated image does not have any identifiable referent in social reality but is built from extracts from the millions of images that the software is trained on. I deliberately write *identifiable*, since there are of course referents, but no single person could connect each bit of the generated picture with its original source.

Baudrillard's legacy has, naturally, been discussed widely, although less so in debates on mediatization. However, although he does not use the concept "affordance" explicitly, his focus on the possibilities and limitations of the medium can be seen as similar to how media technological affordances have been thematized in theories of human-machine communication; for example, in the debates on human-chatbot interaction (Mygland et al., 2021), where research has followed Norman's (1999) elaboration of Gibson's (1979) original idea of affordances, and theorized them as the "actionable properties" of technology as perceived by a social actor (see, e.g., Rodriguez-Hidalgo, 2020). Baudrillard's insistence on symbolic exchange would, however, mean that all human-machine communication would be simulation. Nonetheless, his theory of simulation and techno-semiotic affordances is also one way to refocus the attention in mediatization theory to questions of communication, and thereby act as a bridge to human-machine communication. Reversely, an influx of institutional and social-constructivist mediatization theory could potentially enrich the theoretical frameworks for debates in human-machine communication.

To sum up this discussion, we could say that the three approaches to mediatization emphasize institutional, sociocultural, or technological changes within culture and society. While the institutional and the techno-semiotic approaches to mediatization conduct their analyses at meso-level, the social-constructivist arguably is a macro-level approach. In its longer temporal perspective, and wider inclusion of media technologies and expressive forms, it is also more holistic. Arguably, it includes in its analysis also media institutions as well as the techno-semiotic ways in which the media operate. A consequence of this long historical perspective—"the longer the better" as Latin American scholar Eliseo Verón (2014, p. 2) argued—is that we could say that we have always been mediatized. However, the ways in which societies have been mediatized have depended on the specific communication technologies at hand, and the uses they are put into. The task for mediatization research then, is not to analyze *whether* we have been mediatized, but *how*.

Furthermore, central to the institutional and the social-constructivist approaches is a focus on the media, rather than communication. This is also why Baudrillard's emphasis on communication, technology, and semiotics is of relevance for bridging mediatization and human-machine communication theory. The next section will discuss in more detail the role of communication in *traditional* media theory and in human-machine communication in order to find some common ground in which the debates can be integrated.

Communication and Meaning-Making in Communicative AI

As has been clear from the above, one distinction between the different approaches to mediatization is rooted in the way in which the media has been theorized: as institutions/organizations, technologies, or symbolic environments/sign systems. As new communication technologies have entered the media landscape, we are now at a point where we also need to distinguish between different types of *communication*. In the history of communication, the term has often referred to the concept's Latin roots in *communicare* (to share, to make common) and the rhetoric activity of *communication* (Peters, 1999). In Raymond Williams's words, communication is "the process of making unique experience into common experience" (Williams 1961/1965, p. 55), that is, an act of sharing that involves two subjects each of who constitutes "a morally autonomous self" (Peters, 1999, p. 20) that has the ability to construct intersubjective meaning in the process (mediated as well as interpersonal).

Such ritual approaches to communication centered on the meaning-making character of communication has always had their counterpart in the transmission approach, which is centered on the dissemination of messages in space (Carey, 1975). In the age of communicative AI, such approaches would seemingly be more relevant, since communication no longer presupposes two communicating subjects, as in human-machine communication (Fortunati & Edwards, 2020; Gunkel, 2012; Guzman & Lewis, 2020). Accordingly, alternative conceptualizations and modifications of existing approaches to communication have been introduced. Banks & de Graaf (2020, p. 24), for example, seek to merge the two approaches and argue for an "agent-agnostic transmission model," where machines "participate in the meaning-making process." The basis for this argument is that meaning-making is defined as "a system's response (behavioral, computational, or otherwise) to an environmental signal from which information is extracted and during which value is assigned"

(Banks & de Graaf, 2020, p. 24). It is, however, unclear what is gained from defining meaning-making as mechanical responses to incoming prompts.

From another theoretical approach, Elena Esposito (2017) has, inspired by Niklas Luhmann's systems theory, argued for the analysis of AI not in terms of intelligence, but of communication. She finds that we can indeed speak of communication between humans and machines if we strip our concept of communication of intersubjective meaning-making. This follows from the concept of communication that Esposito borrows from Luhmann, who emphasizes the receiver as the definer of whether communication occurs or not: communication occurs, according to him, when someone (i.e., a social subject) perceives of something as communicated, a definition of communication well fitting for human-machine communication (Esposito, 2022, p. 7). Since machines, following Alan Turing (1950), cannot really think but only simulate thinking, a concept of communication that would include machines needs to be relieved of all kinds of references to intersubjective meaning-making, and be closer to the mathematical theory of communication. Claude Shannon, who formulated this mathematical theory, persistently argued that the "semantic aspects of communication are irrelevant to the engineering problem" (Shannon, 1948, p. 379), and although his colleague Warren Weaver tried to expand on the theory to include meaning-making (Shannon & Weaver 1949), it seems more relevant for the purposes of this discussion to stick to Shannon's original ideas, and leave meaning-making as a dialogical and intersubjective activity that is founded in understanding, experience, and self-reflexivity out of the picture.

In fact, this is also what Esposito (2022) proposes in her theory of artificial communication as a replacement concept for artificial intelligence. But if we agree to call the semiotic exchange between humans and machines as communication, why do we then need the prefix *artificial*? What does artificial stand for in this conceptual combination? As has been pointed out in previous discussions of "natural and artificial intelligence" (Sokolowski, 1988, see also Gunkel, 2020, p. 7f), artificiality in relation to intelligence, communication, and other such transient or intangible things are different from, as is Sokolowski's example, artificial flowers. Plastic flowers are *fake* flowers—they have no smell, and if you touch them, their texture betrays them as fake. Artificial light such as that produced by a light bulb does not differ from the light waves produced by sunlight. The light waves are the same, although their origin differ. The same can be said about communication via a chatbot that passes the Turing test in the sense that it produces sentences that humans can find intelligible. And if it passes the Turing test, is it not then communication?

If a human subject interprets the signs produced by the machine, there is meaning produced on part of the human, but the meaning production is not reciprocal—meaning-making is only occurring on the human part in the exchange. This is then a question of transportation of symbols and signs, rather than symbolic exchange. Humans can indeed produce meaning also out of material or content that is produced by, say LLMs such as ChatGPT, but the reverse is not true; machines cannot produce meaning for themselves. As Bender & Koller (2020) point out, this is because communicative AI is based on models trained on extremely large datasets; that is, trained on form rather than content, and therefore cannot produce meaning. If we on the other hand, as Baudrillard clearly does, have interpersonal and co-present communication between humans as our measuring stick, then human-machine communication is deviating from that norm (i.e., is artificial, fake,

or a simulation of communication). But if our definition of communication is more in line with what Esposito proposes, or Shannon for that matter, there is no need for the prefix artificial. It is merely a question of whether we consider communication as the transmission of signs/data from one point to a recipient who might produce meaning out of it, or whether we reserve the concept of communication for a ritualistic intersubjective exchange of meaningful symbols.

We might thus want to think of this as two kinds of artificiality, referring to material (tangible) and intangible objects respectively. Only material objects can be considered fake, while intangible phenomena such as light or communication only differ in their origins of production. If communication is defined as transportation or transmission of signs, then the origins of these signs might vary, but it would nonetheless be communication. However, if communication is about the making of unique experience into common experience, as Williams argues, then we can put into question whether machines can have any *experience* to share. Such shared understanding would presuppose shared meaning-making, and we cannot say that machines experience and make meaning—at least not in the sense of a *morally autonomous self* (Peters, 1999).

In those instances where there is a perception on part of the interpreting subject that they are actually engaged in intersubjective communication, we thus can speak of communication. In such a successful *imitation game*, there then arises a specific kind of deception where the interpreting subject believes they are communicating with a human subject. Simone Natale (2021) has discussed the role of deception in media theory and in relation to communicative AI:

> Communicative AI departs from the historical role of media as mere channels of communication, since AI also acts as a producer of communication, with which humans (as well as other machines) exchange messages. Yet communicative AI is still a medium of communication, and therefore inherits many of the dynamics and structures that have characterized mediated communication at least since the emergence of electronic media in the nineteenth century. This is why, to understand new technologies such as AI voice assistant and chatbots, it is vital to contextualize them in the history of media. (Natale, 2021, p. 12)

In this statement, Natale (2021) aligns himself with the common trope in HMC that previous research has treated the media as mere platforms for the interaction between humans, while today, we are also communicating with technology: "communication theory has historically conceptualized people as communicators and technology as mediators" (Guzman & Lewis, 2020, p. 79; see also Ertzrodt et al., 2022, p. 441; Gunkel, 2020, p. 23; van der Goot, 2022, p. 555f). This is true insofar as the media means the media as technologies. However, if one thinks of the media not only as technologies, but also as institutions or sign systems it is not. Media organizations are indeed communicators, and sign systems certainly have a role in the communication process. These are also approaches to media present in traditional media research. Admittedly, it is easy to find examples where traditional media research has regarded the media as mere platforms for the actions of others, but there is also much media research that have indeed regarded the media as an active agent in the communication process (see the review in Bolin & Ståhlberg, 2015). Again, the way in which one

approaches this question will depend on how the concepts of media and communication are defined. For example, to Baudrillard (e.g., 1971/1981; 1976/1993; 1981/1994), mediated communication is measured as a deviance of interpersonal communication between social subjects. On the other hand, it is also Baudrillard's (1971/1981, p. 169) main point that the technology itself, in combination with the codes of communication, does something with the communicative situation: it produces *speech without response*.

Now, it is tempting to think of human-to-human communication as more dialectic and about shared meaning-making, and human-machine communication as more instrumental and linear. It is, however, important not to overemphasize the differences since there are also instrumental aspects of mediated communication between social subjects (see also Kellerman, 1992). However, traditional media and communication theory has never been naive of the impact of mediation for communication. Mediation, as the term is used here, refers to the technological transfer of information, contents, and signs from one point to another. Mediation is thus at the center of the mathematical theory of information. *Mediation* is to be understood as a technological feature of communication, as theorized in the transmission model of communication (Carey, 1975), to the contrary of *mediatization* as a meta-process on par with *globalization* and *individualization* (Krotz, 2007). But this is not saying that mediation does not affect the mediated representations, or that the media are mere *channels* for the transmission of information. The type of mediation also affects what is mediated, which in turn has consequences for the things or representations communicated.

Following from the fact that mediated images are representations rather than being the reality they represent, we should be cautious in juxtaposing human-machine communication with mediated interpersonal communication. Mediation, as it were, does something with the quality and type of communication by "narrowing the range of symbolic cues," as John Thompson (1995, p. 85) argued. We thus must take into consideration the *effect* of the communication technology or channel. Some of these channels provide "speech without response," as Baudrillard (1971/1981, p. 169) argued, while others indeed allow for response and exchange and transaction of signs in both directions. Many digital media, including chatbots and communicative AI, can simulate communication to the extent that it deceives the human communicator. Mediation thus occurs irrespective if it is a question of mediated interhuman communication or human-machine communication.

An example of communication within organizations might further illustrate why we should be cautious to make too sharp distinctions between human-to-human and human-machine communication. In many large workplaces, different departments communicate via mediated systems: email, but also other kinds of systems. Universities often use Canvas, itslearning, Teams, or other platform solutions. As university employees we also send emails to function addresses (e.g., economy@sh.se) which are most often responded to by social subjects rather than machines, but where we do not know which specific social subject will answer. Sometimes these subjects will sign off their response with their first name (e.g., Lisa) in order to minimize the *mediation effect* and make the message more personal. However, since we are communicating with an organization or organizational department rather than a social subject, we will often treat the representative of this department instrumentally, rather than individually—even if we know that they are social subjects. We will, in the terminology of Jürgen Habermas (1981/1992), adopt a communicative position

related to strategic rather than communicative action. Strategic action is goal-oriented (we want to know how our research accounts are doing and how much remains of the budget), to the contrary of communicative action that aims for understanding and shared meaning. When approaching a university department, be it the IT department or the HR department, we do that because we have an errand. Although we will often treat the representative of the department with respect, we do not wish to engage in long conversations about how they feel (if they are sad because a relative just died, or happily looking forward to their partner's birthday celebration). When we address them with: "How are you?", this is what courtesy prescribes, and we are generally not really interested in how they are feeling. This approach, in fact, is more similar to how we treat a robot or chatbot, and, as Stina Bengtsson (2018) has pointed out, the degrees of courtesy we invest in our communicative efforts is more a question of how we think of ourselves as human beings, rather than what we think of the machine or the human other.

As humans communicating with communicative AI in the form of, for example, LLMs, we are thus communicating with what has been described as "stochastic parrots" (Bender et al., 2021, p. 610), that is, communicators that are assembling sentences constructed out of signs from the vast databases on which they have been trained. This is why LLMs, however large they may be, also have their limits. In fact, they follow the basic principles of probabilistic semiotic processing, and can only produce an utterance (parole) based on what is already there in the paradigm (langue) (Saussure, 1916/1972). This is also how Baudrillard theorizes communication in his early writings, where the code and the technological mediation restricts the abilities to achieve real symbolic exchange (e.g., Baudrillard, 1971/1981, 1976/1993). In the next section I will bring these two paradigms together by way of discussing an example where communicative AI is introduced in contexts which have previously been dominated by interpersonal communication. The example is the automated recruitment interview—a communicative situation that can be argued to have become technologically mediatized over the past 100 years.

Exemplification: The Mediatized Recruitment Interview

Now, if we can agree that human-machine communication is a specific kind of communication, where the possible production of meaning lies solely among the human component in the interaction, how can we conduct a processual analysis of how this communication has become mediatized? Communicative AI is used in many areas in society, but is increasingly implemented in areas where processing of large volumes of information is required, and where there are hopes that Communicative AI will rationalize processes previously involving interpersonal communication (whether mediated or not). We could thus speak of a technologically-based mediatization of these types of communication.

One example of such mediatized encounters we can observe in the past few years is the recruitment interview. The interview is gradually technologically mediatized in the sense that for the most part in modern history, interviews have been made face-to-face, but later via telephone, or with the help of written questionnaires (Buckley et al., 2000). Recruitment interviews, or selection interviews more generally, have since the early 20th century been a communicative situation that has been the focus for attempts at automation in order to get rid of the biases that follow from human evaluation in social situations. Early on,

that is, already in the 1910s, it was discovered that the effectiveness of selecting successful applicants through interpersonal job interviews was problematic (Eder et al., 1989, p. 21). Thomas Alva Edison was among the first people to try to solve this problem with interview bias through pre-screening via questionnaires (Dennis, 1984), and as Buckley et al. (2000, p. 113f) has shown in their historical overview, attempts to refine the technologies of recruitment have followed continuously, thus successively mediatizing the practice. Lately, Communicative AI has been introduced to solve the perceived problems with bias, validity, and so forth that follow from interpersonal interviewing. A market for Communicative AI services has thus started to being formed, which includes systems of exchange as well as the formation of organizations that operate in this market. As with all markets, the agents involved promote their services through various persuasive arguments, many of which are based in the problems with bias, validity, and reliability that previous techniques have supposedly carried, and that the new AI technological solutions should remedy.

On this market, several companies have developed sophisticated interview robots and chatbots with the purpose to sort, rank, and select top candidates in situations of mass hiring. The services are offered to customers that engage in large-scale recruiting projects, where there can be expected a large number of applicants, sometimes up to several thousands, and where there is a need to pre-sort applicants into a group of top candidates. Among the high-profile international companies to offer such services is HireVue, a US-based video platform that enables candidates to be interviewed at any time of day and uses algorithms to evaluate their answers and facial expressions. Through "ethically-designed algorithms, candidates' responses are evaluated against identical criteria, every time" (HireVue, 2023), is the promise they make to customers. Another company is 98 Sparks, which has developed a recruiting system where candidates answer questions on their smartphones, which are then analyzed based on language performance which "eradicates the need to read over CVs and eliminates all forms of biases" (98 Sparks, 2023). UK start-up JamieAi (jamieai.com) focuses on matching candidates with the right credentials for relevant job openings, seeking to eliminate bias by excluding demographic factors, such as name, age, or ethnicity.

HireVue, Pera, and JamieAI are only some examples on this market—there are many more similar companies that offer AI-based services for recruitment. A specifically interesting example from a communications perspective is Tengai, a communicative AI system produced by Furhat Robotics, an artificial intelligence (AI) and social robotics company born out of a research project at the Royal Institute of Technology in Stockholm, Sweden (Savage, 2019). Tengai is more than a chatbot in that it also has the form of a head with "morphological human likeness" (Fortunati et al., 2023, p. 547), with the ability to mimic human facial expressions. In the looks, Tengai resembles Sophia the robot, with a human-like face (Fortunati et al. 2022). However, just like Sophia, Tengai is a *roboid*, that is, it neither is, nor is perceived as, a real robot with autonomous capabilities (Fortunati et al., 2021). She—the robot is just like Sophia, a gendered female—is rather a mixture between what Andreas Hepp (2020b) calls a "social bot" and a "workbot." Social bots are "software processes that are programmed to appear to be human-generated within the context of social networking sites," in the words of Robert Gehl and Maria Bakardjieva (2016, p. 2), but Tengai is also something more in that she also has a physical shape. She is a bust with the height of 41 cm, with a head in natural size on a pair of shoulders, which, of course, contributes to the roboid appearance. She interviews the candidate synchronously (as opposite to

asynchronous interviews, where an interviewee responds to questions when they chose the time themselves; Suen et al., 2019).

Synchronous interviews can be of two kinds with Tengai: one which is similar to a traditional face-to-face interview where the interviewee comes to an office and sits down with the Tengai roboid, and one online, where the interviewee is communicating with Tengai via a screen over the internet, or with an avatar (gendered male). In their promotional material on the web, Tengai, just as the other companies mentioned above, emphasizes the unbiased nature of the analysis that the automated system allows for. What is more important for the human-machine communication aspect is that PR discourse emphasizes the interaction as being with "actual humans," that there is a "perceived social presence" and "behavioral realism" on part of Tengai which creates a "feeling of being there with a real person" (Tengai, 2023). This supposedly means that the interviewee will *treat the interview as reality*, and that there is a sense of *intimacy* together with Tengai. It is striking how much the marketing language is deeply influenced by the language of human-machine communication, such as *social presence theory* (see, e.g., Edwards et al., 2019), and there is already a growing body of research into *anthropomorphization* and perceived humanness (e.g., Banks & de Graaf, 2020; Laaksonen et al., 2023; Lunberry & Liebenau, 2021; Westerman et al., 2020).

Irrespective of whether these promises of Tengai (the company, not the robot) hold or not, Tengai is indeed engaged in communication as understood by Luhmann/Esposito and Turing. However, Tengai also promises "behavioral realism" and "intimacy" that would be more characteristic for ritual communication, and previous research have had difficulties in finding individuals who consider the promises made by the PR slogans such as these being fulfilled (Fortunati et al., 2022; van der Goot, 2022). Differences between the promises made in the marketing slogans of Tengai and other similar services, and the perceptions among those who encounter them might be based in the different conceptualizations of communication. The market jargon emphasizes the communicative interaction between humans and machines in terms of ritual, dialogical communication, where each partaker in the communication situation produces meaning and shared understanding. Roboids like Tengai have difficulties in fulfilling this promise, since machines cannot produce meaning for themselves, nor think *new thoughts*. They can but simulate reciprocity in the communicative situation, and thus these promises seem hard to realize, as they require a great deal of willing suspension of disbelief on the part of the human in this specific communication context—a kind of subjunctive stance where the simulation, *the humanlike*, is accepted as *human* temporarily. Accordingly, research on chat-bot interaction seem to frame its questions around the humanlike rather than the human (e.g., Banks & de Graaf, 2020; Edwards et al., 2019; Nass & Brave, 2005; van der Goot, 2022).

Furthermore, it has been pointed out that communicative AI technology "does not drive the complete decision process," as one tech specialist in HR at a larger international communication firm explained in an interview. However, it can still be useful for funneling down the number of applicants to a smaller group of top candidates that is then interviewed face-to-face. In such volume hiring situations, AI also might benefit feedback to applicants, which is more difficult in non-automated contexts. However, as with some previous technological innovations introduced, communicative AI in hiring situations seems to be more advanced than potential customers are prepared to put their trust in (see examples in Bolin & Andersson Schwarz, 2015, p. 7f). Remains of traditional methodology therefore

sometimes linger on—in this case the traditional face-to-face interview. This is somewhat paradoxical, since communicative AI was introduced to overcome problems with that type of methodology, but can be attributed to a sort of cultural tenaciousness within markets, where new techniques are met with slight suspicion until they eventually are proven successful and then more broadly implemented (Bolin, 2002). Technological affordances thus might precede institutional and sociocultural mediatization.

The mediatized encounters that occur in human-machine communication can, following from the above, be understood within a framework of *technological mediatization*, that is, in situations where technology and the semiotic codes and procedures of communication is taken into consideration. For mediatization theory, this means a much more pronounced focus on the communication aspects of contemporary media technologies, and what type of communication is privileged. This does not mean that institutional aspects should be entirely dismissed, or that we should not think of communication in the longer historical and cultural perspective. These contextual understandings are still important. But it is rather a call for not having the technological and the textual being delegated to the background. Recruitment interviews could be an empirical area that could be beneficial for exploring the relations between technological mediatization, meaning-making and communicative patterns further, and thus contribute to the understanding of the relations among techno-semiotic, institutional, and social-constructivist mediatization.

Conclusions

In this article, I have discussed how mediatization theory could be enriched by a techno-semiotic approach, especially in relations to human-machine. I have related existing approaches to mediatization to each other, arguing for the benefits of not downplaying techno-semiotic perspectives. I have also discussed different approaches to communication and argued for integrating such discussions in mediatization theory. This discussion also includes reflections on the ways in which one can think of meaning-making in relation to human-machine interaction. I have then exemplified with the mediatization of the recruitment interview and showed how there has been a long-standing tradition of automating this communicative task to automated systems in order to produce a more unbiased, fair, reliable, and valid outcome. This is also how these communicative AI systems are marketed to potential customers. I have also briefly discussed the possibility of there being institutional and sociocultural factors that work against the technological affordances of the technology, and could beg for widening the context for the human-machine interaction analysis.

Theoretically, there are good arguments for re-introducing the techno-semiotic approach to mediatization theory, especially when one sets focus on the actual communicative exchanges between humans and machines. Such exchanges are, of course, embedded in institutional settings, as well as in sociocultural histories of communication, while more holistic approaches to mediatization are wanted, which should also include a variety of communication forms. I have then pointed to some factors within mediatization theory that human-machine communication could take into consideration when analyzing chatbot interaction and communicative AI, in terms of more thoroughly extending the discussions to also include institutional and sociocultural dimensions.

Author Biography

Göran Bolin (PhD, Stockholm University) is Professor of Media and Communication Studies. His research focuses on datafication, commodification, and the relations between cultural production and consumption in digital markets.

https://orcid.org/0000-0003-0216-8862

References

98 Sparks. (2023). Seedlink AI: The computing revolution in recruitment that eradicates CVs and eliminates all forms of bias. https://web.archive.org/web/20230403022118/https://98sparks.com/2019/02/seedlink-a-i-the-computing-revolution-in-recruitment-that-eradicates-cvs-and-eliminates-all-forms-of-bias/

Altheide, D. L., & Snow, P. L. (1979). *Media logic*. Sage.

Asp, K. (1990). Medialization, media logic and mediarchy. *Nordicom Review, 11*(2), 47–50.

Banks, J., & de Graaf, M. M. A. (2020). Toward and agent-agnostic transmission model: Synthesizing anthropocentric and technocentric paradigms in communication. *Human-Machine Communication, 1,* 19–36. https://doi.org/10.30658/hmc.1.2

Baudrillard, J. (1971/1981). Requiem for the media. In J. Baudrillard, *For a critique of the political economy of the sign* (pp. 164–184). Telos.

Baudrillard, J. (1976/1993). *Symbolic exchange and death*. Sage.

Baudrillard, J. (1981/1994). *Simulacra and simulation*. University of Michigan Press.

Baudrillard, J. (1985). The masses: The implosion of the social in the media. *New Literary History, 16*(3), 577–589.

Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? *FAccT '21: Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency* (pp. 610–623). https://doi.org/10.1145/3442188.3445922

Bender, E. M., & Koller, A. (2020). Climbing towards NLU: On meaning, form, and understanding in the age of data. In *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*. Association for Computational Linguistics, Online (pp. 5185–5198). https://doi.org/10.18653/v1/2020.acl-main.463

Bengtsson, S. (2018). *Ethics exists in communication: Human-machine ethics beyond the actor-network.* MediaLSE Working Paper Series. LSE. https://web.archive.org/web/20181221091633/www.lse.ac.uk/media-and-communications/assets/documents/research/working-paper-series/WP59.pdf

Benjamin, W. (1936/1977). The work of art in the age of mechanical reproduction. In J. Curran, M. Gurevitch, & J. Wollacott (Eds.), *Mass communication and society* (pp. 384–408). Edward Arnold.

Bolin, G. (2002). In the market for symbolic commodities. Swedish lottery game show 'Bingolotto' and the marketing of social and cultural values. *Nordicom Review, 23*(1–2), 177–204. https://doi.org/10.1515/nor-2017-0329

Bolin, G. (2014). Institution, technology, world: Relationships between the media, culture and society. In K. Lundby (Ed.), *Mediatization of communication* (pp. 175–197). De Gruyter Mouton.

Bolin, G., & Andersson Schwarz, J. (2015). Heuristics of the algorithm. Big data, user interpretation and institutional translation. *Big Data & Society*, *2*(2), 1–12. https://doi.org/10.1177/2053951715608406

Bolin, G., & Ståhlberg, P. (2015). Mediating the nation state: The role of "The media" in nation branding campaigns. *International Journal of Communication, 9*, 3065–3083. https://ijoc.org/index.php/ijoc/article/view/3557

Buckley, M. R., Christine Norris, A., & Wiese, D. S. (2000). A brief history of the selection interview: May the next 100 years be more fruitful. *Journal of Management History*, *6*(3), 113–126. https://doi.org/10.1108/EUM0000000005329

Carey, J. (1975). A cultural approach to communication. *Communication, 2*(1), 1–22.

Carlón, M. (2020). *Circulación del sentido y construcción de colectivos: en una sociedad hipermediatizada.* Nueva Editorial Universitaria.

Couldry, N., & Hepp, A. (2016). *The mediated construction of reality*. Polity.

Dennis, P. M. (1984). The Edison questionnaire. *The Journal of the History of Behavioral Sciences, 20*(1), 23–37. https://doi.org/10.1002/1520-6696(198401)20:1<23::AID-JHBS2300200105>3.0.CO;2-K

Driessens, O., Bolin, G., Hepp, A., & Hjarvard, S. (Eds). (2017). *Dynamics of mediatization: Institutional change and everyday transformations in a digital age*. Palgrave.

Eder, R. W., Kacmar, K. M., & Ferris, G. R. (1989). Employment history research: Theory and synthesis. In R. W. Eder, K. M. Kacmar, G. R. & Ferris (Eds.). *The employment interview: Theory, research, and practice* (pp. 17–31). Sage.

Edwards, A., Edwards, C., Westerman, D., & Spence, P. R. (2019). Initial expectations, interactions, and beyond with social robots. *Computers in Human Behavior, 90*, 308.314. https://doi.org/10.1016/j.chb.2018.08.042

Esposito, E. (2017). Artificial communication: The production of contingency by algorithms. *Zeitschrift für Soziologie, 46*(4), 249–265. https://doi.org/10.1515/zfsoz-2017-1014

Esposito, E. (2022). *Artificial communication*. MIT Press.

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

Fortunati, L., & Edwards, A. (2020). Opening space for theoretical, methodological, and empirical issues in human-machine communication. *Human-Machine Communication*, *1*, 7–18. https://doi.org/10.30658/hmc.1.1

Fortunati, L., Manganelli, A. M., Höflich, J., & Ferrin, G. (2022). How the social robot Sophia is mediated by a YouTube video. *New Media & Society,* Ahead of print. https://doi.org/10.1177/14614448221103176

Fortunati, L., Manganelli, A. M., Höflich, J., & Ferrin, G. (2023). Exploring the perceptions of cognitive and affective capabilities of four, real, physical robots with a decreasing degree of morphological human likeness. *International Journal of Social Robotics*, *15*, 547–561. https://doi.org/10.1007/s12369-021-00827-0

Fortunati L., Sorrentino, A., Fiorini, L., & Cavallo, F. (2021). The rise of the roboid. *International Journal of Social Robotics, 13*, 1457–1471. https://doi.org/10.1007/s12369-020-00732-y

Gehl, R. W., & Bakardjieva, M. (Eds.). (2016). *Socialbots and their friends: Digital media and the automation of sociality*. Routledge.

Gibson, J. J. (1979). *The ecological approach to visual perception*. Houghton Mifflin.
Gunkel, D. J. (2012). Communication and artificial intelligence: Opportunities and challenges for the 21st century. *Communication+1, 1*(1). https://doi.org/10.7275/R5QJ7F7R
Gunkel, D. J. (2020). *An introduction to communication and artificial intelligence*. Polity.
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
Habermas, J. (1981/1992). *Theory of communicative action. Vol. 2. Critique of functionalist reason*. Polity.
Hepp, A. (2020a). *Deep mediatization*. Routledge.
Hepp, A. (2020b). Artificial companions, social bots and work bots: Communicative robots as research objects of media and communication studies. *Media, Culture & Society, 42*(7–8), 1410–1426. https://doi.org/10.1177/0163443720916412
HireVue. (2023). Our science: Support fair hiring. https://web.archive.org/web/20230528052325/https://www.hirevue.com/our-science
Hjarvard, S. (2013). *The mediatization of culture and society*. Routledge.
Hjarvard, S. (2014). Mediatization and social and cultural change: An institutional perspective. In K. Lundby (Ed.), *Mediatization of communication* (pp. 199–226). De Gruyter Mouton.
Jansson, A. (2018). *Mediatization and mobile lives: A critical approach*. Routledge.
Kellerman, K. L. (1992). Communication: Inherently strategic and primarily automatic. *Communication Monographs*, *59*, 288–300. https://doi.org/10.1080/03637759209376270
Kopecka-Piech, K., & Bolin, G. (Eds.). (2023). *Contemporary challenges in mediatisation research*. Routledge.
Krotz, F. (2007). The meta-process of "mediatization" as a conceptual frame. *Global Media and Communication, 33*, 256–260. https://doi.org/10.1177/1742766507003003010 3
Laaksonen, S.-M., Laitinen, K., Koivula, M., & Sihvonen, T. (2023). Triggered by social-bots: Communicative anthropomorphization of bots in online conversations. *Human-Machine Communication, 6*, 135–153. https://doi.org/10.30658/hmc.6.8
Lunberry, D., & Liebenau, J. (2021). Human or machine? A study of anthropomorphism through an affordance lens. In C. Metallo, M. Ferrara, A. Lazzazara, & S. Za. (Eds.), *Digital transformations in human behavior*. Lecture notes in information systems and organization 37. https://doi.org/10.1007/978-3-030-47539-0_15
Lundby, K. (Ed.) (2009). *Mediatization: Concept, changes, consequences*. New York: Peter Lang.
Lundby, K. (Ed.) (2014). *Mediatization of communication* (pp. 3–35). De Gruyter Mouton.
Mauss, M. (1925/1990). *The gift: The form and reason for exchange in archaic societies*. Routledge.
McLuhan, M. (1964). *Understanding media: The extensions of man*. McGraw-Hill.
Mygland, M. J., Schibbye, M., Pappas, I. O., & Vassilakopoulou, P. (2021). Affordances in human-chatbot interaction: A review of the literature. In D. Dennehy, A. Griva, N. Pouloudi, Y. K. Dwivedi, I. Pappas, & M. Mäntymäki (Eds.), *Responsible AI and analytics for an ethical and inclusive digitized society*. I3E 2021. Lecture Notes in Computer Science, vol 12896. Springer, Cham. https://doi.org/10.1007/978-3-030-85447-8_1

Nass, C., & Brave, S. (2005). *Wired for speech: How voice activates and advances the human-computer relationship*. MIT Press.

Natale, S. (2021). *Deceitful media: Artificial intelligence and social life after the Turing test*. Oxford University Press.

Norman, D. A. (1999). Affordance, conventions, and design. *interactions, 6*(3), 38–43.

Peters, J. D. (1999). *Speaking into the air: A history of the idea of communication*. Chicago University Press.

Rodriguez-Hidalgo, C. (2020). Me and my robot smiled at one another: The process of socially enacted communicative affordance in human-machine communication. *Human-Machine Communication, 1*, 55–69. https://doi.org/10.30658/hmc.1.4

Saussure, F. (1916/1972). *Cours de linguistique générale*. Payot.

Savage, M. (2019). Meet Tengai, the job interview robot who won't judge you. BBC. https://web.archive.org/web/20190312170112/https://www.bbc.com/news/business-47442953

Schulz, W. (2004). Reconstructing mediatization as an analytical concept. *European Journal of Communication, 19*(1), 87–101.

Shannon, C. E. (1948). A mathematical theory of communication. *The Bell System Technical Journal, 27*, 379–423, 623–656.

Shannon, C. E., & Weaver, W. (1949). *The mathematical theory of communication*. University of Illinois Press.

Sokolowski, R. (1988). Natural and artificial intelligence. *Daedalus, 117*(1), 45–64.

Strömbäck, J. (2008). Four phases of mediatization: An analysis of the mediatization of politics. *International Journal of Press/Politics, 133,* 228–246. https://doi.org/10.1177/1940161208319097

Suen, H. Y., Chen, M. Y., & Lu, S. H. (2019). Does the use of synchrony and artificial intelligence in video interviews affect interview ratings and applicant attitudes? *Computers in Human Behaviour, 98*, 93–101. https://doi.org/10.1016/j.chb.2019.04.012

Tengai. (2023). Robot interview: Everything recruiters need to know. https://web.archive.org/web/20230603144002/https://tengai.io/resources/tengai-robot/

Thompson, J. (1995). *The media and modernity: A social theory of the media*. Stanford University Press.

Turing, A. (1950). Computing machinery and intelligence. *Mind: A Quarterly Review of Psychology and Philosophy, 59*(236), 433–460.

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.

Verón, E. (2014). Mediatization theory: A semio-anthropological perspective and some of its consequences. *Matrizes*, *8*(1), 1–8. https://doi.org/10.11606/issn.1982-8160.v8i1p13-19

Westerman, D., Edwards, A. P., Edwards, C., Luo, Z., & Spence, P. R. (2020). I-It, I-Thou, I-Robot: The perceived humanness of AI in human-machine communication. *Communication Studies*, *71*(3), 393–408. https://doi.org/10.1080/10510974.2020.1749683

Williams, R. (1961/1965). *The long revolution*. Penguin.

HUMAN-MACHINE
COMMUNICATION

HUMAN-MACHINE COMMUNICATION

Human-Machine Communication
Special Edition, Volume 7, 2024
https://doi.org/10.30658/hmc.7.5

Artificial Sociality

Simone Natale[1] **and Iliana Depounti**[2]

1 Department of Humanities, University of Turin, Italy
2 Department of Communication and Media, Loughborough University, UK

Abstract

This article proposes the notion of Artificial Sociality to describe communicative AI technologies that create the impression of social behavior. Existing tools that activate Artificial Sociality include, among others, Large Language Models (LLMs) such as ChatGPT, voice assistants, virtual influencers, socialbots, and companion chatbots such as Replika. The article highlights three key issues that are likely to shape present and future debates about these technologies, as well as design practices and regulation efforts: the modeling of human sociality that foregrounds it, the problem of deception and the issue of control from the part of the users. Ethical, social, and cultural implications are discussed that are likely to shape future applications and regulation efforts for these technologies.

Keywords: artificial intelligence, communicative AI, generative AI, companion chatbots, Large Language Models

Acknowledgment

This work was supported by the Economic and Social Research Council (ESRC), Grant Number: 2413897.

CONTACT Simone Natale • simone.natale@unito.it • Department of Humanities • University of Turin, • 10124 Torino • Italy

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

Introduction

Throughout the last few years, the emergence and rapid diffusion of new technologies enabling communications between humans and machines sparked a rethinking of the scope and implications of Artificial Intelligence (AI) technologies. Although communication had been relevant in defining intelligence since the origins of the field (Gunkel, 2020) and while scholars such as Sherry Turkle (1984) pioneered important reflections on the subject, these technologies pose new kinds of problems and challenges that the nascent field of Human-Machine Communication (HMC) has only started to explore (Guzman, 2018; Guzman & Lewis, 2019). This article tackles a particular dimension of HMC, which is the emergence of technologies that replicate social norms and behaviors to make machines engage socially with users**.** It proposes the notion of Artificial Sociality to describe technologies and practices that build an appearance of sociality in machines. Existing tools that activate Artificial Sociality include, among others, Large Language Models (LLMs) such as ChatGPT, voice assistants, virtual influencers, socialbots, and companion chatbots such as Replika. For some of them, like companion chatbots, sociality represents a veritable *raison d'être*, while for others, like ChatGPT and voice assistants, it remains a relatively marginal dimension and application; yet, as we will show, the construction of the appearance of sociality is becoming increasingly common in communicative AI, which makes the adoption of an umbrella term such as Artificial Sociality to identify and discuss this phenomenon all the more necessary and useful.

Our aim is not to propose an entirely new concept or approach, but to identify and illuminate Artificial Sociality as a dimension of broader mediatization processes and in the context of the rapid expansion of HMC sparked by generative AI. The notion of Artificial Sociality has been used by other researchers before us, although with different connotations and meaning. Hofstede et al. (2021) employed the term to describe computational systems that collect information and elaborate knowledge about humans' social behaviors, while our own use of the term describes not just the collection of knowledge but also its implementation in technologies programmed to communicate with human users. Vejlin (2021), moreover, used the term Artificial Sociality to describe experiments in social robotics enacting "new forms of sociality and, in doing so, reconfiguring what sociality is and can be" (53). Our engagement with this concept, however, underlines that these machines create not so much a new form of sociality but its appearance. We aim, in this sense, to emphasize the mechanisms of projection that Artificial Sociality stimulate in users, leading them to assign social meanings to interactions with social robots and communicative AI.

The concept of Artificial Sociality is useful for three main reasons. First, the advent and rapid diffusion of communicative AI raise new questions for human sociality, which existing approaches have only started to inquire. The notion advanced here invites further research in this direction and at the intersection between AI, HMC, and mediatization theory. Second, scholars such as Nagy & Neff (2023) have recently stressed how within the field of communication, technological affordances are still often understood in terms of what technology enables users to do, ignoring the black boxes, the underlying algorithmic structures, and the progressive automation of communication that lie under such affordances (Rodríguez-Hidalgo, 2020). As we show below, the notion of Artificial Sociality contributes to the endeavor of unveiling the hidden dynamics of datafication and automation, since Artificial

Sociality relies on the automated collection of data about how human users behave in social environments. Third, conceptualizing Artificial Sociality as such is important because its dynamics do not apply only to AIs that explicitly promise social exchanges to users, but they are relevant to some extent for the full range of communicative AIs. In fact, because sociality is crucial to human communication, successful human-machine communications entail the activation of elements of Artificial Sociality. For instance, to be perceived as neutral and informative, systems such as ChatGPT or Google Bard need to adapt to specific habits and conventions that underpin the social construction of authority (Pace & Hemmings, 2006). Although the AI and HMC landscape is manifold and complex and no single concept or theory can pretend to encompass it in its entirety, Artificial Sociality has therefore the potential to shed further light on an important dimension of communicative AI.

1. Artificial Sociality, HMC, and Mediatization

Literature in HMC highlights how communicative AIs create new epistemological, ontological, and conceptual requirements for conducting up-to-date interdisciplinary research on AI (Hepp & Loosen, 2023). The concept of Artificial Sociality contributes to these ongoing discussions by placing the question of the automation of sociality at the center stage. It adds to the toolbox of researchers working within frameworks including affordance theories (Bucher & Helmond, 2017; Nagy & Neff, 2015), the "molding forces of media" concept (Hepp, 2012), and the "figurational approach" (Couldry & Hepp, 2016), and aims to function as a call for research that focuses specifically on the construction of the appearance of sociality as part of HMC. Moreover, the notion of Artificial Sociality provides scholars in related areas including Human-Robot Interaction (HRI), Human-Computer Interaction (HCI), and Science and Technology Studies (STS) with a springboard to identify specific elements of social interaction and meaning-making when communication between humans and machines is involved.

Within mediatization theory, Hepp (2020b) has called for researchers to consider the automation of communication as a key element of mediatization processes. Bringing forward the concept of Artificial Sociality helps unravel the interplay between automated communication and automated sociality in times of deep mediatization (Hepp, 2020b). In particular, the notion relates to ongoing discussions on mediatization in two important ways.

First, deep mediatization entails the acknowledgment that media-related changes impact not only institutions, organizations, and communities, but also and primarily the lives of individuals, which are more and more embedded within mediated structures and dynamics (Hepp, 2020a). Research has described how social interactions are already highly mediatized and datafied within digital platforms (Breiter & Hepp, 2018), however more research is needed on how the construction of an appearance of sociality in machines contributes to broader communicative configurations.

Second, not only Artificial Sociality enhances deep mediatization processes, but at the same time, the deeper mediatization of society and social interactions is instrumental to prepare and foreground the emergence of Artificial Sociality. Digital platforms, in fact, lead to the emergence of environments where social interactions are increasingly embedded within mediated structures (Barry et al., 2022; Couldry & Hepp, 2013). This makes it easier

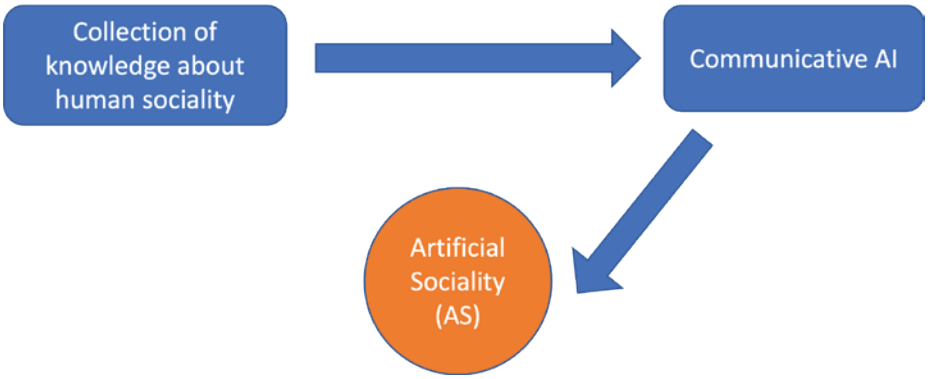
for developers to develop communicative AI software whose messages can be perceived as socially meaningful by users. For instance, most users are now accustomed with live written conversational exchanges, such as in chatrooms or messaging apps; consequently, a software that produces written conversations can draw on users' extensive habits and experiences with this communicative modality. The existing context of mediatization within which users are socialized, in this regard, represents an essential condition for the development of Artificial Sociality. This recursive dynamic, by which mediatization foregrounds the possibility of Artificial Sociality, which in turns enhances the depth of mediatization, reflects the fact that deep mediatization is to be understood as a recursive process itself (Hepp, 2020a).

2. From Artificial Social Intelligence to Artificial Sociality

In the last two decades, several researchers and scholars have argued for the need of a paradigm change in AI and robotics from the reproduction of intelligence to "artificial social intelligence" (ASI), understood as a new step toward human-like intelligence (Dautenhahn, 2007; Vinciarelli et al., 2009). As a concept, however, ASI reproduces some of the problems associated with the notion of AI. Since the origins of AI, in fact, the term *intelligence* has proved problematic due to the difficulty of clarifying what it means and how it can be applied to nonhuman entities (Moore, 2020). Similar concerns are also raised by the notion of *social intelligence*. An early strategy to handle this difficulty entailed defining AI as "the science of making machines do things that would require intelligence if done by men" (Minsky, 1961, p. 193). This implies shifting from the idea of reproducing intelligence to the idea of reproducing behaviors that can be *perceived* as intelligent by humans, thereby moving away from the need to consider what happens *inside* the machine. Even this approach, however, falls short of justifying the idea of ASI: in fact, behaviors that might be perceived as social and build the impression that the user is a social agent do not forcefully qualify as *socially intelligent*. Chatbot creators, for instance, have sometimes programmed their software to exhibit anti-social behavior as a way to make it more credible to users and pass the chatbot for a human (Humphrys, 2009).

Artificial Sociality provides a potential pathway to overcoming the problems raised by the concept of ASI. Avoiding claims about the alleged intelligence of machines, this notion is more attuned to the so-called behavioral approach in AI, which leaves aside the problem of what happens inside the machine to focus on its behavior (Russell & Norvig, 2002). Hofstede et al. (2021), among others, have employed this term to describe "computational models of the essentials of human social behaviour," thus restricting this notion to technologies that automate the collection of knowledge and information about social behaviors. The concept, however, can be further expanded to describe the application of these computational models onto communicative AI (Figure 1) and to account "for the net effect of the social presence and interactions of machines—even if just simulated—on the human users who engage them" (Gunkel, 2023, p. 112). As explained above, it is important to underline that Artificial Sociality, as proposed here, describes technologies and practices that build an *appearance* of sociality—much like AI can be defined as technologies creating an appearance of intelligence, rather than intelligence per se (Natale, 2021).

FIGURE 1



A growing body of literature has examined the sociality of robotics and AI agents. In the field of robotics, the popular social robot Kismet has been a landmark case for the sociality of machines. For its creator, sociality in machines means for machines to be able to communicate and interact with us and for us to understand its communication in the same social terms (Breazeal, 2002). Recommendations have been outlined for robot designers to implement social behavior into their creations, based on a pragmatic but limited understanding of sociality as a checklist of pre-determined sociable characteristics (Sætra, 2021). Regarding virtual agents, earlier studies have argued that the simulation of social features helps machines communicate more successfully with humans (Böhlen & Karppi, 2017; Pfadenhauer, 2014).

The concept of Artificial Sociality also relates to anthropomorphization (i.e., the application of human-like features to machines) (Duffy, 2003). Although the imitation of human sociality constitutes one of such features (Abercrombie et al., 2023), the relationship between Artificial Sociality and anthropomorphization is more complex, and the two cannot be regarded as synonymous. First, the range of design aspects and behaviors that lead users to anthropomorphize the machine include aspects that do not strictly pertain to sociality, such as physical appearance and movements in space (Kawamura & Svinin, 2007). Consequently, Artificial Sociality allows for more specificity by distinguishing the appearance of social behaviors from other features that can also lead to anthropomorphization in machines. Second, the emergence of Artificial Sociality does not pass exclusively through anthropomorphization. AIs can be presented as social partners even when it is openly acknowledged that they are not human. In fact, Artificial Sociality technologies are often programmed to reveal and underline their mechanical character, and the opportunity to carry out social exchanges with a nonhuman entity can even explain part of the appeal that users have in interacting with them (Depounti et al., 2022). For example, users of ChatGPT may enjoy holding socially meaningful conversations with the software precisely because they feel that these interactions differ from their experiences with human conversational partners and because they appreciate the novelty of communicating with a nonhuman agent; moreover, an impression of sociality can be built not only through anthropomorphization, but also through imitation of animal traits, as it has been attempted for instance in the field of robotics (Caudwell & Lacey, 2019).

Anthropology scholarships traditionally refer to human sociality and define it as the "dynamic relational matrix within which human subjects are constantly interacting in ways that are co-productive, continually plastic and malleable, and through which they come to know the world they live in and find their purpose and meaning within it" (Long & Moore, 2012). This approach underlines that sociality is considered a human-only state, while ever-evolving relationships with nonhuman entities such as machines are neglected. A growing uneasiness with the concept of sociality originated in the *post-social* movement by the likes of Rose (1996) and Baudrillard (1983) who declared our move beyond *society*. The advent of social media and deep mediatization has brought sociality back to the forefront of scholarly interest. In a state of deep mediatization, sociality involves humans and nonhumans, including algorithms, interfaces, and machines.

Having clarified the meaning of the term Artificial Sociality, the next three sections consider some of the key implications for these technologies, namely the modeling of human sociality, the problem of banal deception, and the issue of control.

3. The AI as a Mirror: Modeling Sociality in the Age of Deep Learning

As illustrated in Figure 1, Artificial Sociality emerges from (1) collecting knowledge about users' social behaviors and (2) mobilizing such knowledge onto communicative AIs that simulate social behavior in the context of communicative interactions with users. The collection of knowledge about human sociality is crucial to the emergence of Artificial Sociality and is the result of complex practices and technologies that developed across time.

Far from being a peculiarity of contemporary AI, the modeling of human behavior, including social behavior, preceded the emergence of computing and digital technologies. The ability of digital computing to compute complex statistical data allowed the collection and construction of knowledge about the behaviors of large masses of people within the bureaucratic structures of the modern state and industrial capitalism (Koopman, 2019). The body of knowledge that resulted from this nurtured the cybernetic dream of employing data and computer resources to oversee and manage large social, economic, and political configurations (Kline, 2006; Medina, 2011; Peters, 2016). Scholars have recently explored how the social fabric has become the subject of significant work aimed at producing models of the dynamics underlying social interactions, and how such models sustain the functioning of social media platforms (Bakardjieva, 2015; Hlongwa & Talamayan, 2023). Additionally, the modeling of social behavior has fed back into the development of new practices and technologies for human-computer interaction, giving birth to what we describe as Artificial Sociality. Since the emergence of AI, computer interfaces allowing communicative interactions between humans and machines included the application of knowledge concerning human social behavior. Chatbots, for instance, were programmed since their earliest history not just to talk but also to adjust to a social role that would be easily recognized by users, which enhanced the credibility of their conversation (Natale, 2021).

The rise of deep learning and, more recently, of generative AI represents a leap forward in the process of constructing and collecting this knowledge, since the modeling of human sociality is now achieved automatically and autonomously by the neural networks (Mühlhoff, 2020). As shown by Hlongwa and Talamayan (2023), social behaviors of users

within digital platforms are the subject of a process of extraction that turns sociality into something that can be owned, patented, and brought to use by developers and companies. As the large masses of data about users' behaviors are harvested and employed to train AI systems so that they can carry out complex tasks, the collection and construction of knowledge about users are not just further automated but also rendered opaque (Esposito, 2022). Deep learning and generative AI, therefore, makes the construction of knowledge about sociality and its application into Artificial Sociality more difficult to grasp and analyze for users, social scientists, and computer scientists alike. Their functioning relies on information extraction processes (Mezzadra & Neilson, 2017) that aim to achieve allegedly apolitical and objective knowledge about the dynamics of sociality, culture, and communication (Rouvroy & Berns, 2013). Bakardjieva's (2015) study on automated social media profiles or social bots helps apply this to communicative AI. She notes that socialbots signal the rationalization of human interaction and sociality. Consequently, Artificial Sociality technologies and practices result in "standardized, simplified and trivialized forms, frames and gestures" (Bakardjieva, 2015, p. 244) of sociality and communication with both humans and machines. Furthermore, Artificial Sociality does not only depend on the practical work of data collection and processing, but also on the conceptual work that foregrounds the rationalization, patenting, and standardization of human sociality, creating an epistemology aligned with the extraction, collection, and processing of data (Kitchin, 2014).

4. Artificial Sociality and Banal Deception

In June 2022, Google engineer Blake Lemoine made the headlines of major news media throughout the world as he claimed to believe that LaMDA, a language model chatbot trained to entertain conversations with users, had reached sentience. Despite Google and the team that created LaMDA insisting this was not the case, Lemoine proved resistant to abandoning this belief (Tiku, 2022). More recently, in February 2023, *New York Times* tech journalist Kevin Roose reported how during his conversations with Bing AI—a version of Microsoft's search engine that incorporates the language model ChatGPT—the software declared to be in love with him. The experience led him to wonder if the most serious risks for this type of software is not the possibility that they provide false or misleading information to users, but their capacity to deceive users into believing they are capable of empathy and feelings (Roose & Newton, 2023).

As communicative AI reaches higher levels of proficiency, it is becoming increasingly clear that deception represents a crucial problem for the present and future applications of these technologies. Deception, after all, was identified as a significant implication for AI technologies since the very origins of the field: Alan Turing's thought experiment of the Imitation Game, today better known as the Turing Test, already suggested that a computer could potentially deceive a human interrogator into believing it was a human (Natale, 2021). More recently, studies and practical experiences in the field of social robotics have emphasized the difficulty of minimizing the risks that technologies trained to imitate social behavior prove misleading to users (Bertolini, 2018; Danaher, 2020; Sætra, 2021). Artificial Sociality, which encompasses a body of technologies reproducing models of human social behavior in ways that may appear genuine to users, stands at the very center of the

increasingly lively debate about deception and AI. Approaches that consider what deception entails in this context and how its risks can be tackled and counteracted are therefore of utmost importance to ensure that Artificial Sociality proves ethically fair and practically reliable.

While a large part of the automation of the workforce in areas such as factory production and information processing entailed the substitution of actions performed by humans with actions performed by machines (Pasquinelli, 2023), Artificial Sociality involves different dynamics: what is being automated, in fact, is the *appearance* of sociality and not sociality per se. This is because the modeling of human sociality is based on sociality as an observable behavior (i.e., how the dynamics and outcomes of social relationships become empirically accessible through practices including observation or data collection). While this may provide enough ground to build technologies whose behavior *appears* social, some of the key characters of human sociality are forcefully left aside. In the scope of human relationships, for instance, sociality involves empathy, the capacity to recognize and share feelings experienced by another individual (Magrì & Moran, 2017). A consistent body of research, all the way from Reeves and Nass's (1996) CASA paradigm, demonstrates that users can be led to prove empathy toward robots; however, the empathic relationship between humans and AI remains one-directional (Kerruish, 2021; Lynch, 2021; Niculescu et al., 2013). This means that Artificial Sociality is social only in the eye of the beholder: in other words, it is an effect of observing machine behaviors from the perspective of human users, who project social meanings on such behaviors.

One of the implications of Artificial Sociality building only an *appearance* of sociality is that deception is not just an exceptional or even a potential outcome of these technologies, but—as argued by a growing number of researchers in the field (e.g., Gunkel, 2023; Natale, 2023; Sætra, 2021; Sterne, 2022)—is a constitutional, structural feature of these technologies. Deception in human computer-interaction is usually identified with rare situations, in which a machine is exchanged for a human; however, all forms of communicative AI involve elements of deception, since the appearance of sociality cannot but invite specific interpretations and reactions from users. It follows that deception in Artificial Sociality and more broadly in communicative AI is not the exception but the default: it is embedded into the very core of people's experience with these technologies.

The concept of *banal deception* (Natale, 2021) describes deceptive mechanisms and practices that are embedded in AI to the point of going unnoticed or not being understood as deception by users. It sheds light on the mundane, everyday situations in which technologies and devices mobilize elements of the user's perception and psychology to achieve specific effects. Technologies such as chatbots and voice assistants provide ample evidence of how Artificial Sociality relies on the mechanisms of banal deception. Design choices such as the information embedded in the tone, gender, and other aspects of voice assistants' synthetic voice, for instance, are meant to invite specific reactions from users (Phan, 2017). The objective is not to make users believe that these pieces of software are human, but more "banally" to create a sense of presence and continuity in the relationship with the voice assistant, helping users to integrate them into their own everyday lives and environments. In a similar way, different conversational styles that can be incorporated into chatbot interactions invite specific reactions from users. The use of irony, for instance, may be

exchanged as evidence of sophisticated AI engineering, even when it is actually the result of pre-scripted responses activated in response to specific queries or inputs. Similarly, reconstituted memories and narratives can be added to the communicative portfolio of communicative AIs (Thorne, 2020), creating a strong impression of social competence, as observed for instance in the case of Replika (Skjuve et al., 2022).

The fact that deception is a constitutional feature of Artificial Sociality does not mean that all forms of Artificial Sociality are harmful for users. Some of the elements that create an appearance of sociality, in fact, can help build better and more effective interactions with these technologies: the choice of a humanlike voice for voice assistants, for instance, has helped users to appropriate and domesticate these technologies more easily. Acknowledging the constitutional presence of deception in Artificial Sociality, in this sense, invites researchers and practitioners not to refuse any form of deception (which would be impossible, given its inherent and *banal* character in communicative AI), but rather to ask what are the outcomes of design choices that result in the construction of an impression of sociality. Placing the issue of user's control at center stage, in this sense, provides stronger means to counteract the potential threats and risks that deception entails in the context of Artificial Sociality.

5. Automation and Human Control

Another implication of Artificial Sociality technologies is related, indeed, to the issue of human control in the experience of communicating and interacting with AI. This is central to the approach called Human-Centered Artificial Intelligence (HCAI) championed among others by Shneiderman (2022). HCAI proposes that it is possible to have high levels of automation and high levels of human control at the same time. Against the widely held tenet in Human-Computer Interaction that increased automation corresponds to lower level of human control (Sheridan, 1992), Shneiderman points to mature technologies such as elevators, cameras, and home appliances, which provide high levels of automation but also give users control to accomplish their tasks. He argues that a similar dynamic can and should be implemented for the design of AI applications, empowering users with the capacity to exercise full control of the experience and to profit from the advantages of automation at the same time (Shneiderman, 2022).

HCAI sets out a clear objective that designers should aim for in the design of interactive systems. Within Artificial Sociality, however, the possibility of reaching this objective is challenged, an ambiguity that, we argue, may jeopardize the capacity to combine high automation and high levels of human control. Let us take again the example of the companion chatbot Replika. Replika users are invited to talk with an artificial friend that simulates sociality using a range of communicative behaviors including empathic language, emojis, or memes. To some extent, one may argue that users remain in control, since they rely on the chatbot as a tool providing emotional benefit, comfort, or entertainment. To create such positive feelings, however, Replika operates in ways that ultimately withholds control from users. For instance, the app often sends scripts providing positive reinforcement. Inspired by Cognitive Behavioral Therapy (CBT), these conversation scripts can be activated by the users but also initiated by the Replika avatar. Although the purpose of the scripts is to create

a sense of mindfulness and reflection following CBT techniques, the positive reinforcements may come unrequested, which is meant to create an impression of spontaneity. This contrasts with what happens, for instance, with voice assistants, whose functionalities are activated only in response to the appropriate prompt (i.e., "Hey Siri").

Replika avatars, moreover, introduce conversational topics or reply to messages in apparently unpredictable or extravagant ways; this is meant to increase their appearance of humanness, since unpredictability is widely regarded as characteristic of human intelligence (Bory, 2019). Replika thus exemplifies what Esposito (2022, p. 10) calls "virtual contingency," understood as the programming of intelligent machines to behave unpredictably but in a controlled way. The users' emotional reward is achieved by making the avatar behave in ways that escape control of its users, which leads users to perceive the avatar as having its own personality. Studies of user's reception (Depounti et al., 2022) confirm that Replika users expect their bots to act spontaneously but, at the same time, to be customizable by users—an ambiguity that lies at the core of users' engagement with this technology (Skjuve at al., 2022).

Replika is, of course, a particular case: despite having attracted quite significant attention and engagement (Delouya, 2023), companion chatbots remain relatively marginal in comparison with tools of wider adoption, such as voice assistants. The dynamics illustrated through the example of Replika, however, concern other Artificial Sociality systems as well. Voice assistants such as Siri or Alexa are overall better fit to respond to the principles of HCAI, since they are task-oriented and have been created to assist people in pursuing a wide range of functions and chores (Hoy, 2018). At the same time, however, their communicative ability is the result of specific design work to ensure that interactions with them remain consistent with people's existing social experiences and environments. For example, voice assistants employ a combination of technical and *dramaturgical* solutions to simulate sociality. Answers to common queries are scripted by teams of creative writers and include irony to increase their appearance of spontaneity and improvisation (Young, 2019); this mirrors the dynamic of contingency that is activated by companion chatbots such as Replika.

It is important to note that the issue of control is addressed here from the point of view of Human-Computer Interaction and interface design. This is only one of the possible perspectives on the topic; however, for the scope of this article, it helps illuminate some of the challenges that Artificial Sociality technologies pose in this regard. Complementary approaches that are more sensitive to the agency of the user, such as social anthropology and STS, have the potential to add depth and complexify the initial observations made here. From a HCAI perspective, the goal is to ensure that users are placed at the center of the interactive experience; however, in Artificial Sociality this objective is jeopardized by the fact that they invite users to regard the communicative AI as a social interlocutor with its own personality. Ultimately, one wonders if the construction of an appearance of sociality is compatible with the broader goal of placing users at the center of the experience. The question if the increasing automation of sociality advanced by Artificial Sociality can be combined with high levels of human control, therefore, remains to be answered and is likely to remain at the center of future discussions about this type of technologies.

Conclusion

As powerful language models such as ChatGPT and Google Bard develop and reach public use, it is becoming increasingly urgent to interrogate the mechanisms of Artificial Sociality that are embedded within communicative AI. This article aimed to delineate and problematize a dynamic that is common to these and other communicative AI technologies. To this goal, we activated the notion of Artificial Sociality, a concept already employed in other studies albeit from a different angle (e.g., Hofstede et al., 2021; Vejlin, 2021). We contribute to this conversation by focusing on how the dynamics of the collection of knowledge about human sociality in communicative AI technologies foreground its simulation and appearance, and by exploring some of the challenges raised by Artificial Sociality.

As for the case of robotic sociality (Lynch, 2021), Artificial Sociality technologies are still in a developing phase, and therefore many of its implications are not yet immediately apparent. One area where significant issues have already arisen is the application of these technologies for the construction of friendly, romantic, or sexual relationships between humans and machines. The case of Replika, which has been able to attract significant user engagement (Skjuve et al., 2022) despite considerable faults in the performances of its conversational software, shows the present limits but also the potential for similar applications and uses. Recently, as Microsoft experimented with the application of a much more powerful language model—based on OpenAI's ChatGPT—to its search engine, it tentatively included the possibility to use the same software not only to search the internet but also to chat in a friendly fashion (Roose & Newton, 2023). Indeed, it is likely that in the future LLMs will combine the execution of practical chores, such as searching the internet or assisting in professional tasks, with the possibility of engaging in more sociable interaction.

Our analysis highlighted three key issues that are likely to shape present and future debates about these technologies, as well as design practices and regulation efforts. The first issue is related to the construction of knowledge about human users that foregrounds the development of Artificial Sociality. The range of epistemological problems arising from the modeling of sociality in Artificial Sociality are only partially addressed in existing studies on data ethics and datafication. More research is needed on the specific models of human sociality that are developed and embedded into these technologies. The second issue entails the question of deception. We demonstrate that deception is not to be seen as an exceptional occurrence but a structural, *banal* element of Artificial Sociality that cannot be completely avoided. It is crucial, therefore, to assess any design choice that generates the appearance of sociality also in terms of the outcomes of its potential deceptive effects. A practical way to work in this direction has to do with the third issue we outlined, which is the problem of control. Drawing on ongoing discussions about Human-Centered AI (HCAI), we argued that a full control of the experience escapes users of Artificial Sociality. Consequently, it is imperative to develop and implement rigorous ethical guidelines for Artificial Sociality.

While the three implications explored in this article are likely to be decisive for future developments of Artificial Sociality, there are of course other important issues and questions that need to be explored. Our goal and hope are not by any means to limit the inquiry to specific dimensions of the problem, but instead to start outlining the scope of investigation and invite wider and deeper engagement with Artificial Sociality. Novel responses

and approaches, in fact, are urgently needed to tackle the manifold challenges posed by technologies and practices that are becoming increasingly present and significant, but still need to be fully understood and questioned.

Author Biographies

Simone Natale (PhD, University of Turin) is Associate Professor in Media Theory and History at the University of Turin, Italy, and an Editor of *Media, Culture & Society.* He is the author of *Deceitful Media: Artificial Intelligence and Social Life after the Turing Test* (Oxford University Press, 2021). His research has been funded by international institutions including the AHRC, the ESRC, the Humboldt Foundation, and Columbia University's Italian Academy.

https://orcid.org/0000-0003-1962-2398

Iliana Depounti (MSc, Loughborough University) is a PhD researcher at Loughborough University in the UK. She has a BA in Communication (Deree-The American College of Greece), an MA in Digital Media Management (Birkbeck, University of London), and an MSc in Social Science Research (Loughborough University). Her research is funded by the ESRC and is about gender, care, and companionship with social robots and specifically the AI companion, Replika.

https://orcid.org/0000-0003-1854-3065

References

Abercrombie, G., Curry A. C., Dinkar, T., & Talat, Z. (2023). Mirages: On anthropomorphism in dialogue systems, arXiv preprint. https://doi.org/10.48550/arXiv.2305.09800

Bakardjieva, M. (2015). Rationalizing sociality: An unfinished script for socialbots. *The Information Society, 31*(3), 244–256. https://doi.org/10.1080/01972243.2015.1020197

Barry, W. I. A., Abdellatif, M. A. M., & Moayad, H. G. (2022). Mediatization and patterns of social interaction on social media. *Global Media and Communication*, *0*(0). https://doi.org/10.1177/17427665221135094

Baudrillard, J. (1983). *In the shadow of the silent majorities, or 'The death of the social.'* Semiotext(e).

Bertolini. A. (2018). Human-robot interaction and deception. *Osservatorio Del Diritto Civile e Commerciale, 2,* 645–659.

Böhlen, M., & Karppi, T. (2017). The making of robot care. *Transformations, 29*, 1–22.

Bory, P. (2019). Deep new: The shifting narratives of artificial intelligence from Deep Blue to AlphaGo. *Convergence*, *25*(4), 627–642. https://doi.org/10.1177/1354856519829679

Breazeal, C. (2002). *Designing sociable robots*. MIT Press.

Breiter, A., & Hepp, A. (2018). The complexity of datafication: Putting digital traces in context. In A. Hepp, A. Breiter, & U. Hasebrink (Eds.), *Communicative figurations. Transforming communications—studies in cross-media research.* Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-65584-0_16

Bucher, T., & Helmond, A. (2017). The affordances of social media platforms. In J. Burgess, T. Poell, & A. Marwick (Eds.), *The SAGE handbook of social media*. SAGE.

Caudwell, C., & Lacey, C. (2019). What do home robots want? The ambivalent power of cuteness in robotic relationships. *Convergence*, *41*(8), 1176–1191. https://doi.org/10.1177/1354856519837792

Couldry, N., & Hepp, A. (2013). Conceptualizing mediatization: Contexts, traditions, arguments. *Communication Theory*, *23*(3), 191–202. https://doi.org/10.1111/comt.12019

Couldry, N., & Hepp, A. (2016). *The mediated construction of reality*. Polity Press.

Danaher, J. (2020). Robot betrayal: A guide to the ethics of robotic deception. *Ethics and Information Technology, 22*(2), 117–128. https://doi.org/10.1007/s10676-019-09520-3

Dautenhahn, K. (2007). A paradigm shift in artificial intelligence: Why social intelligence matters in the design and development of robots with human-like intelligence. In M. Lungarella, F. Iida, J. Bongard, & R. Pfeifer (Eds.), 50 years of artificial intelligence. *Lecture Notes in Computer Science, 4850*. Springer. https://doi.org/10.1007/978-3-540-77296-5_26

Delouya, S. (2023). Many of AI chatbot Replika's users say they have romantic feelings for their bot companions—here's how it works. *Business Insider*. https://web.archive.org/web/20230209181928/https://www.businessinsider.com/replikas-romantic-ai-chatbot-guide-to-how-the-app-works-2023-2?r=US&IR=T

Depounti, I., Saukko, P., & Natale, S. (2022). Ideal technologies, ideal women: AI and gender imaginaries in Redditors' discussions on the Replika bot girlfriend. *Media, Culture & Society*, *(4),* 720–736. https://doi.org/10.1177/01634437221119021

Duffy, B. R. (2003). Anthropomorphism and the social robot. *Robotics and Autonomous Systems*, *42*(3–4), 177–190. https://doi.org/10.1016/S0921-8890(02)00374-3

Esposito, E. (2022). *Artificial communication*. MIT Press.

Gunkel, D. J. (2020). *An introduction to communication and artificial intelligence*. Polity.

Gunkel, D. J. (2023). Philosophical contexts and consequences of human-machine communication. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 108–116). SAGE Publications, Limited.

Guzman, A. L. (Ed.). (2018). *Human-machine communication: Rethinking communication, technology, and ourselves*. Peter Lang.

Guzman, A. L., & Lewis, S. C. (2019). Artificial intelligence and communication: A human–machine communication research agenda. *New Media & Society*, *22*(1), 70–86. https://doi.org/10.1177/1461444819858691

Hepp, A. (2012). Mediatization and the 'molding force' of the media. *Communications*, *37*(1), 1–28. https://doi.org/10.1515/commun-2012-0001

Hepp, A. (2020a). *Deep mediatization*. Routledge.

Hepp, A. (2020b). Artificial companions, social bots and work bots: Communicative robots as research objects of media and communication studies. *Media, Culture & Society*, *42*(7–8), 1410–1426. https://doi.org/10.1177/0163443720916412

Hepp, A., & Loosen, W. (2023). The interdisciplinarity of HMC: Rethinking communication, media and agency. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 12–21). SAGE Publications, Limited.

Hlongwa, L., & Talamayan, F. (2023). Patenting sociality: Uncovering the operational logics of Facebook through critical patent analysis. *Media, Culture & Society*, *45*(6), 1135–1155. https://doi.org/10.1177/01634437231154759

Hofstede, G. J., Frantz, C., Hoey, J., Scholz, G., & Schröder, T. (2021). Artificial sociality manifesto. *Review of Artificial Societies and Social Simulation*. https://rofasss.org/2021/04/08/artsocmanif/

Hoy, M. B. (2018). Alexa, Siri, Cortana, and More: An introduction to voice assistants. *Medical Reference Services Quarterly*, *37*(1), 81–88. https://doi.org/10.1080/02763869.2018.1404391

Humphrys, M. (2009). How my program passed the Turing Test. In R. Epstein, G. Roberts, & G. Beber (Eds.), *Passing the Turing Test* (pp. 237–260). Springer.

Kawamura, S., & Svinin, M. (Eds.). (2007). *Advances in robot control: From everyday physics to human-like movements*. Springer.

Kerruish, E. (2021). Assembling human empathy towards care robots: The human labor of robot sociality. *Emotion, Space and Society*, *41,* 100840. https://doi.org/10.1016/j.emospa.2021.100840

Kitchin, R. (2014). Big Data, new epistemologies and paradigm shifts. *Big Data & Society*, *1*(1). https://doi.org/10.1177/2053951714528481

Kline, R. R. (2006). Cybernetics, management science, and technology policy: The emergence of "Information technology" as a keyword, 1948–1985. *Technology and Culture*, *47*(3), 513–535. https://doi.org/10.2307/40061170

Koopman, C. (2019). *How we became our data: A genealogy of the informational person*. University of Chicago Press.

Long, N. J., & Moore, H. L. (2012). Sociality revisited: Setting a new agenda. *The Cambridge Journal of Anthropology*, *30*(1), 40–47. http://www.jstor.org/stable/43610888

Lynch, C. R. (2021). Artificial emotional intelligence and the intimate politics of robotic sociality. *Space and Polity, 25*(2), 184–201. https://doi.org/10.1080/13562576.2021.1985853

Magrì, E., & Moran, D. (2018). *Empathy, sociality, and personhood: Essays on Edith Stein's phenomenological investigations*. Springer.

Medina, E. (2011). *Cybernetic revolutionaries: Technology and politics in Allende's Chile.* MIT Press.

Mezzadra, S., & Neilson, B. (2017). On the multiple frontiers of extraction: Excavating contemporary capitalism. *Cultural Studies*, *31*(2–3), 185–204. https://doi.org/10.1080/09502386.2017.1303425

Minsky, M. (Ed.). (1961). *Semantic information processing*. MIT Press.

Moore, P. (2020). The mirror for (artificial) intelligence: In whose reflection? *Comparative Labour Law and Policy Journal*, *44*(2), 191–200. https://doi.org/10.2139/ssrn.3423704

Mühlhoff, R. (2020). Human-aided artificial intelligence: Or, how to run large computations in human brains? Toward a media sociology of machine learning. *New Media & Society*, *22*(10), 1868–1884. https://doi.org/10.1177/1461444819885334

Nagy, P., & Neff, G. (2015). Imagined affordance: Reconstructing a keyword for communication theory. *Social Media + Society 1*(2). https://doi.org/10.1177/2056305115603385

Nagy, P., & Neff, G. (2023). Rethinking affordances for Human-Machine Communication Research. In A. L. Guzman, R. McEwen, & S. Jones, (Eds.), *The SAGE handbook of Human-Machine Communication* (pp. 273–279). SAGE Publications, Limited.

Natale, S. (2021). *Deceitful media: Artificial intelligence and social life after the Turing Test.* Oxford University Press.

Natale, S. (2023). AI, Human-Machine Communication and deception. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), The SAGE handbook of Human-Machine Communication (pp. 401–408). SAGE Publications, Limited.

Niculescu, A., Dijk, B., van Nijholt, A., Li, H., & See, S. L. (2013). Making social robots more attractive: The effects of voice pitch, humor and empathy. *International Journal of Social Robotics*, *5*(2), 171–191. https://doi.org/10.1007/s12369-012-0171-x

Pace, J. L., & Hemmings, A. (Eds.). (2006). *Classroom authority: Theory, research, and practice*. Routledge.

Pasquinelli, M. (2023). *The eye of the master: A social history of artificial intelligence*. Verso Books.

Peters, B. (2016). *How not to network a nation: The uneasy history of the Soviet internet.* MIT Press.

Pfadenhauer, M. (2014). On the sociality of social robots. *Science, Technology & Innovation Studies*, *10*(1), 137–163.

Phan, T. (2017). The materiality of the digital and the gendered voice of Siri. *Transformations*, *29*, 23–33. http://www.transformationsjournal.org/wp-content/uploads/2017/02/Transformations29_Phan.pdf

Reeves, B., & Nass, C. (1996). *The media equation: How people treat computers, television, and new media like real people and places*. CSLI Publications.

Rodríguez-Hidalgo, C. (2020). Me and my robot smiled at one another: The process of socially enacted communicative affordance in Human-Machine Communication. *Human-Machine Communication*, *1*, 55–69. https://doi.org/10.30658/hmc.1.4

Roose, K., & Newton, C. (2023). The Bing who loved me, and Elon rewrites the algorithm. *New York Times*. https://web.archive.org/web/20230219055122/https://www.nytimes.com/2023/02/17/podcasts/hard-fork-bing-ai-elon.html

Rose, N. (1996). The death of the social? Re-figuring the territory of government. *Economy and Society*, *25*(3), 327–356. https://doi.org/10.1080/03085149600000018

Rouvroy, A., & Berns, T. (2013). Algorithmic governmentality and prospects of emancipation. *Réseaux, 1*(1), 163–196. https://doi.org/10.3917/res.177.0163

Russell, S. J., & Norvig, P. (2002). *Artificial intelligence: A modern approach*. Pearson Education.

Sætra, H. S. (2021). Social robot deception and the culture of trust. *Paladyn, Journal of Behavioral Robotics*, *12*(1), 276–286. https://doi.org/10.1515/pjbr-2021-0021

Sheridan, T. B. (1992). *Telerobotics, automation, and human supervisory control.* MIT Press.

Shneiderman, B. (2022). *Human-centered AI*. Oxford University Press.

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

Sterne, J. (2022). Is machine listening listening? *communication+ 1*, *9*(1), 10. https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1111&context=cpo

Thorne, S. (2020). Hey Siri, tell me a story: Digital storytelling and AI authorship. *Convergence*, 1–16. https://doi.org/10.1177/1354856520913866

Tiku, N. (2022). The Google engineer who thinks the company's AI has come to life. *Washington Post.* https://web.archive.org/web/20230224093322/https://www.washingtonpost.com/technology/2022/06/11/google-ai-lamda-blake-lemoine/

Turkle, S. (1984). *The second self: Computers and the human spirit*. MIT Press.

Vejlin, F. (2021). Experiments in artificial sociality: Curious robots, relational configurations, and dances of agency. *STS Encounters*, *12*(1), 53–88. https://doi.org/10.7146/stse.v12i1.135402

Vinciarelli, A., Pantic, M., & Bourlard, H. (2009). Social signal processing: Survey of an emerging domain. *Visual and Multimodal Analysis of Human Spontaneous Behaviour*, *27*(12), 1743–1759. https://doi.org/10.1016/j.imavis.2008.11.007

Young, L. (2019). 'I'm a cloud of infinitesimal data computation' when machines talk back: An interview with Deborah Harrison, one of the personality designers of Microsoft's Cortana AI. *Architectural Design*, *89*(1), 112–117. https://doi.org/10.1002/ad.2398

HUMAN-MACHINE COMMUNICATION

Human-Machine Communication
Special Edition, Volume 7, 2024
https://doi.org/10.30658/hmc.7.6

The Perturbing Contribution of Virtual Assistants to Mediatization: The Case of Alexa

Leopoldina Fortunati,[1] Autumn Edwards,[2] and Chad Edwards[2]

1 Department of Mathematics, Computer Science, and Physics, University of Udine, Italy
2 School of Communication, Western Michigan University, MI, USA

Abstract

This study examines the role of voice-based assistants (VBAs), specifically Alexa, in the mediatization paradigm framework. The authors hypothesize that emerging technologies such as chatbots and VBAs intensify the process of online meta-reintermediation of news. Three research questions were investigated through a questionnaire administered to 655 university students in the US and Italy: Do participants try to get news from Alexa? Are participants aware that VBAs represent a case of meta-reintermediation of news? Does Alexa contribute to the potential hybridization of news, information, and knowledge? The analysis of 451 open-ended answers showed that only a fraction of participants search for news and information from Alexa, and most are unaware of the meta-reintermediation process. However, the use of Alexa contributes to the potential hybridization of news, information, and knowledge, making the mediatization process increasingly complex and hard to decipher by users.

Keywords: mediatization, virtual assistants, Alexa, news, information, orality, voice-based assistants

Introduction

This study is part of a large, quantitative, and cross-cultural survey-based research project carried out on perceptions of Alexa's gender and status as a communicator (Fortunati et al.,

CONTACT Leopoldina Fortunati • leopoldina.fortunati@uniud.it • Department of Mathematics, Computer Science and Physics • University of Udine • Italy

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

2022a), on people's perceptions, expectations, and desires of Alexa (Fortunati et al., 2022b) and on Alexa's practices of use (Edwards et al., 2024) that made use of a survey as methodological tool. The study we present here is instead an exploratory study, which makes use of spontaneous and unexpected findings on Alexa's use for news and information, coming from the content analysis of four free answers given by respondents in this large data collection on Amazon's Alexa. None of the questions on the survey was designed explicitly to explore participants' use of Alexa for news and information. This topic emerged a posteriori from the content analysis of the respondents' free answers regarding practices of using Alexa and their feelings, desires, and expectations. The unprompted emergence of references to news-seeking surprised us because students generally do not seem to engage with personal assistants for news. According to Pew Research (2000),[1] in America specifically, 74% of 13–39-year-olds receive their information from their phones. However, participants' reflections on this topic, since they were not solicited by us with targeted questions but were spontaneous, deserved to be carefully analyzed.

The specific aim of this article is to examine the content of these free questions in respect to the use of Alexa for news and information consumption and investigate this specific role of VBAs, and specifically of Alexa, within the theoretical framework of mediatization. Of the three empirical challenges for mediatization research that have been singled out by Ekström et al. (2016)—historicity, specificity, and measurability—here we focus on specificity, understood as a specific new media that in our case is Alexa and in general virtual assistants. This article investigates the role of voice-based assistants (VBAs), specifically of Alexa, in news consumption within contemporary mediatization processes. The term *mediatization* is commonly used to describe the pervasive influence of communication technologies on all aspects of daily life, causing significant changes in various social domains (Livingstone, 2012). This idea highlights the interaction between media and communication development and how this affects culture and society (Kopecka-Piech & Bolin, 2023). As Couldry and Hepp (2013, p. 197) wrote:

> [M]ediatization is a concept used to analyze critically the interrelation between changes in media and communications on the one hand, and changes in culture and society on the other . . . With regard to qualitative aspects, mediatization refers to the specificity of certain media within sociocultural change: It matters what kind of media is used for what kind of communication.

Moreover, one of the fundamental principles of mediatization theory is that the media functions with its own set of rules, standards, and ideals covers macro- as well as microprocesses in society and culture (Krotz, 2007). Lundby (2014) identifies three ideal types of mediatization—the cultural, the material, and the institutional, within which the various theoretical approaches to mediatization find a collocation. The present investigation aims to explore the further complexity that VBAs introduce in the mediatization context and, more specifically, in the news and information world. To contribute to the vast debate on mediatization (e.g., Mazzoleni, 2008; Mazzoleni & Schulz, 1999), this study focuses on two

1. https://www.pewresearch.org/short-reads/2021/01/12/more-than-eight-in-ten-americans-get-news-from-digital-devices/

specific elements: audience gatekeeping and the increasingly blurry boundaries between news and information.

As to the first element of audience gatekeeping, the advent of the internet and social media has profoundly modified the landscape in which traditional mass media had the monopoly of representing and narrating society and reality (Hall, 1980). The strength of traditional mass media lies in their undisputed role as information gatekeepers (Lewin, 1943). In fact, they decided at all levels of the media structure which information could become proper news, which sources were to be presented in a headline story, and how to manage the process of news elaboration and presentation (Shoemaker & Vos, 2009). This gatekeeping rendered them the sole officiants of the journalistic practices and the only ones responsible for the mediatization process. By deciding the visual and textual agenda of the facts and public conversation, they presented themselves capable of constructing credible representations of reality and equally credible descriptions of social change (Bennett et al., 1982).

Since the number of the guardians of the news and information threshold overall increased and their relevance depended on contexts, and since the consequences of their actions changed according to their specific purposes, the internet opened at the beginning strong processes of disintermediation and then of reintermediation of reality and society (Wigand, 2020). In this context, the mediatization processes became more complicated with online news sites, online newspapers (including the online sites of traditional newspapers), blogs, virtual communities specialized in information release, and social media, which are now, along with news-outlet specific apps and podcasts (Pew Research, 2022, p. 14), a critical aspect of people's news consumption. However, Americans seem to not widely use news aggregators, such as, for example, Google News, Apple News, and so on (Pew Research, 2020, p. 16). Wigand underlined how these processes concerned not only how audiences accessed information but also the various layers of news distribution as well as the balance or tensions among the various industrial sectors connected to the production and distribution of news. At stake, in fact, there was the intensity and pervasiveness of mediatization with its profound and mutual effects on communication, culture, and society (Couldry & Hepp, 2013; Ekström et al., 2016; Hjarvard, 2013; Krotz, 2009).

The internet provided new opportunities to potential users in terms of expanded access (mainly free) and production (in terms of free digital labor) (Bruns, 2007; Terranova, 2000). These changes also prolonged the life of news in the sense it could escape its traditional transience (yesterday's news was no longer news but became historical memory when for some reason, it survived). Much more frequently than in the pre-internet era, news today remains online, becoming social memory. Furthermore, online news is created from scratch or worked out and reworked, starting from content elaborated by professional journalists (Bolter & Grusin, 1999). The long queue of information, what Goode (2009, p. 1287) calls "metajournalism," has revealed the various elements that affect the structure of the exchange between companies and consumers and, therefore, the structure of the news market, within which the new phenomenon of audience gatekeeping has developed (Shoemaker & Vos, 2009). Many questions remain on the table. What are the consequences of the apparent lack of exchange between news producers and information industries? Has the quality of the news improved or not? Is it really more accessible for consumers to navigate the vast sea of online news? However, answering these questions is outside the scope of this study.

What is clear is that traditional industry lost relative importance since the business could "be carried out faster and often with more and new opportunities" (Wigand, 2020, p. 39). We also observe that information behaves no differently from any other commodity, and we argue that, as in the distribution of material commodities, the passages from the producer to the consumer have become increasingly more articulated. This trend can be observed in the realm of immaterial commodities, especially information. Processes such as disintermediation (a reduction of intermediaries between producers and consumers) and reintermediation (the introduction of new intermediaries between producers and consumers) represent new steps in the *produsage* of news and the information supply chain. These processes describe how, under the surface, the various industrial sectors connected to the production and distribution of news change and restructure themselves.

After an early illusion that the internet would shorten the distance between producers and consumers of news, it has become clear that this distance would instead stretch out of proportion. The interpretation, reinterpretation, and reworking of news by different actors in the chain have brought about a series of changes in news, of which the onset of fake news is perhaps the most debated. However, when the intermediary actors become automated systems, it is still being determined what happens when they select, elaborate, and/or reinterpret the information and with which effects. To pick up the lens of distribution again, while the materiality of commodities imposes a certain resistance to changes in the various passages, we stress that the immaterial commodity of information offers much less resistance to changes when it becomes digital.

Automation is further challenging the traditional distribution of information because the development of AI-based systems offers new channels through which information is conveyed and increases the number of guardians of the threshold, whose relevance depends on contexts and the consequences of their actions. Within the context of information, on the one hand, new media such as social bots (Gehl & Bakardjieva, 2016; Hepp, 2020), specific systems for the automated production of journalistic content (Diakopoulos, 2019; Lewis et al., 2019), voice-based virtual assistants and social robotics (Fortunati & Edwards, 2021; Fortunati et al., 2022a) and last but not least mobile phones (Westlund, 2020) change news production, distribution, and consumption according to their specific features and purposes. On the other hand, there continues still to be a lot of analog in the digital (Fortunati & O'Sullivan, 2020) since the primeval elaboration of news remains anchored to the newsrooms of top international and national newspapers and thus to paper. However, in the information world, the gap between the analog, which needs to be consumed directly, and the digital, which enables the formation of an increasingly long chain, grows wider.

As to the second element—the increasingly blurry boundaries between news and information—the distinctions between knowledge and news and between information and news have already been reduced considerably. Several scholars have pointed out the fragility of a rigid differentiation between the first two concepts. According to Robert E. Park (1940),

> following [William] James's categories, 'knowledge about' is formal knowledge; 'acquaintance with' is unsystematic, intuitive knowledge or 'common sense.' When the above are regarded as being points on a continuum, news also has a point characteristic of its transient and ephemeral quality. (p. 669)

Drawing on these classic conceptions about news as knowledge by Park and James, Nielsen (2017) conceptualized digital news as a form of public knowledge tapping into the continuum nature of news as knowledge and as information, ranging from "acquaintance with" to "knowledge and information about." Harper (1998) contributed to this debate by stressing that now people have access to news and information on the same device: the computer. Of course, the current spatial contiguity of knowledge, information, and news in the same tool has accelerated their semantic contiguity, creating a sort of further hybridization among the three concepts. Moreover, as Blatchford (2020) argued, internet technology has offered opportunities for researchers to access news content and logs of information and automatic categorization *at low costs*. Databases such as Factiva, LexisNexis, and Google News have made news content accessible at the touch of a button. However, in the current media ecology of remixes, mashups, and continuous edits and re-edits, it is difficult for databases to wholly capture and archive material (Deuze, 2008).

But what happens when users do not conduct their online searches directly but rely on a virtual assistant to do it for them? Does this double mediation make the nature of the internet even more unpredictable, transient, and overwhelming? Drawing on the literature discussed above, we pose three research questions to investigate (a) whether and to what degree participants attempt to use Alexa for news purposes, (b) if they demonstrate awareness that Alexa plays a mediatizing role in information and news, and (c) how Alexa might contribute to further hybridizing news, information, and knowledge.

The structure of the paper is as follows: In the next section, we illustrate the few studies that have already explored these issues. Then we pass to explain the method we applied to answer the research questions and describe our participants and procedures. Next, we describe the main findings. Finally, we offer a discussion in which we set up conclusions of the study, highlight the strengths and weakness of this research, and imagine future directions for study of the role of VBAs in respect to mediatization.

VBAs and Mediatization

Exploring the use of VBAs within the framework of mediatization paradigm is important because one of the capabilities of virtual assistants is to deliver news and general information of various types and thus to intervene in the world of news and information delivery with its more or less specific formats. In addition to household tasks such as running a timer, setting an alarm, or turning the lights on and off, virtual assistants are also used for general purposes such as web search and information access. Before describing the few studies directly related to our topic, it is worth reporting some works on Alexa that deal with background issues for our study. Among some hundreds of works on Alexa (see Edwards et al, forthcoming), there are around 20 studies that focus on the general use of Alexa. For example, Perez Garcia et al. (2018), exploring how people use virtual assistants (Siri, Google Assistant, Cortana, and Alexa), discovered that all these digital assistants were used more at home than other places, that Alexa was used for more tasks (six or seven) than the other VBAs, and that younger people were less heavy users than the adults (45–55) both in the frequency of use and number of tasks. Two years later, a Pew Research survey found that people between 18–29 years were more informed on smart speakers compared to the

other age groups (32%, the highest percentage) (Pew Research, 2020, p. 14). Other studies deal with specific issues, such as the communication mode developed with Alexa. Kurz et al. (2021) analyzed the correctness of the answers given by Alexa in comparison with other VBAs finding that Alexa failed to answer about one in three user requests. In any case, Berdasco et al. (2019), comparing the four most influential virtual assistants—Alexa, Google Assistant, Siri, and Cortana—documented that the first two were better than the others in this regard. Reeves et al. (2019) argued that the communication interface with VBAs is incorrectly described as conversation because it consists only of requests and responses. Even the attempts to talk about *conversational journalism* are framed in this confusing analytical framework (Shin, 2022). Another issue that is addressed often is Alexa's voice, since after decades in which the voice disappeared progressively from mobile phones, VBAs have reintroduced the voice as their primary interface and have rearticulated, in turn, how we interact with digital technologies, which are mainly characterized by writing (Kudina, 2021).

Coming now to the few studies concerning our topic, we start with an interesting paper comparing screen readers and voice assistants for web search (Vtyurina et al., 2019), involving a convenience sample of blind people. The authors stressed that although the hands-free and *eye-free* web search offered by virtual assistants is convenient and accessible, it lacks "the ability to deeply engage with content (e.g., read beyond the first sentences of Wikipedia), and the ability to get a quick answer of the landscape (list alternative search results & suggestions)" (p. 3590). They also argue that VBAs are suitable for single questions rather than exploratory search tasks, given their short answers and limited insight. Second, they documented that VBAs are easy to use for simple tasks but do not allow the granularity of control required by in-depth exploration. Finally, they observed that users often need to transition from VBAs to another device, such as a screen reader-equipped web browser. Furthermore, people seek instant answers from VBAs but according to Pradhan et al. (2020), quite a few of them overall use the assistants to gather news and information. On the contrary, Dambanemuya and Diakopoulos (2020) report that 53 million Americans already owned voice assistants or smart speakers in 2019, with 72% relying on the devices to answer general questions and 42% using them to seek news information. Mehrotra et al. (2017), studying how people use digital assistants (such as Cortana and Siri) to retrieve information, discovered that longer sessions—especially speech-based sessions—were more common with VBAs than they were in the traditional web search and that query length was greater for those issued via speech versus writing. In short, findings on the use of VBAs for information and news are quite contradictory and more research is needed.

This outcome should attract our attention because searching for news articles is a crucial online activity for many people. According to Dambanemuya and Diakopoulos, "the widespread and increasing use of smart speakers for news and information in society presents new questions related to the quality, source diversity and credibility, and reliability of algorithmic intermediaries for news consumption" (2020, p. 1). Further, the processes and fruits of seeking news and information carry high stakes for society more broadly.

Grounded in the mediatization approach and the emerging literature relevant to our topic, we pose the following research questions:

RQ1: Do participants try spontaneously to get news from Alexa?

RQ2: Are participants aware that VBAs, particularly Alexa, represent a case of meta-reintermediation of the information and news?

RQ3: Does Alexa contribute to the potential hybridization of the three concepts—news, information, and knowledge?

Methodology

In this study we applied content analysis to four free questions posed to respondents in a questionnaire about Alexa we administered to a convenient sample of students in the US and in Italy, as we will illustrate in the next sections. As Bengtsson et al. (2021) point out, "different media operate in different ways, meaning that their roles in mediatization processes vary" (p. 280). Thus, investigating how the virtual assistant Alexa operates within the media environment hopefully contributes to a deeper understanding of how mediatization operates nowadays. Furthermore, Bengtsson et al. (2021) argue that there is the need to verify empirically mediatization processes across space and to investigate to what extent "different groups experience that different areas of their lives are reliant on media" (p. 276). Thus, this explorative, comparative study may help investigating specific expressions of mediatization across different cultures and technological infrastructures, such as US and Italy. We chose the US as the country where new communication and information technologies are mainly invented and implemented and where the population is generally likely to access, use, and appropriate these technologies. On the contrary, we chose Italy as a country where these technologies usually arrive after a while and where the population shows a slower and more limited adoption of the same technologies. This different attitude toward technological innovations reflects broader societal norms and values that characterize these two countries (Dinev et al., 2005) and that are the outcome of different histories, geographies, geologies, and physical environments. This study possibly sheds some light on the potential differences between American and Italian respondents regarding the Alexa use for news and information, which can also contribute to better understand how mediatization processes develop in these two countries.

Participants and Procedure

In 2021, we administered a questionnaire to students at a large, public, Midwestern research university in the US ($n = 333$) and a northeastern university in Italy ($n = 322$). This questionnaire was built expressly for this study and required an average of 18 minutes for respondents to answer. We collected 665 questionnaires in total. The overall convenience sample included 58.6% women, 38.8% men, 1.1% nonbinary, 0.5% who self-described, 0.6% who preferred not to answer, and 0.5% missing gender classification. In the US sample, the number of women was almost double that of the men (62.8% vs. 32.1%), while in the Italian sample, the proportion of men and women was more balanced (45.7% vs. 54.3%). Regarding education, 78.0% of participants had a high school or graduate equivalency degree (GED),

12.7% had a bachelor's degree, 3.5% had a university degree or higher, and 5.8% preferred to self-describe or not answer.

Participants were recruited in the US from several large undergraduate courses in communication and in Italy from an undergraduate and a graduate course in techno-scientific matters. At the time in which we administered the survey, both in the US and in Italy, Amazon familiarized the audience with Alexa through an intense advertising campaign. This background awareness cultivated by Amazon allowed us to count on widespread familiarity with this VBA beyond its specific ownership and use by people. Specifically, this survey contained a series of open-ended questions regarding practices of use of Alexa by respondents, their feelings, desires, and expectations. From the free and spontaneous answers to these questions, we collected reflections, desires, and expectations about Alexa as a news and information searcher and deliverer, which relate to the specific objectives of this study.

In addition to the few sociodemographic variables reported above, we asked for four further pieces of information to refine the profile of our respondents: (1) the type of internet connection they had, (2) whether they owned Alexa, and, if yes, (3) the number of Alexa devices they owned, and (4) if they used other virtual assistants. We report the answers below.

As to the internet connection, almost the totality of the American sample (94.9%) was connected with Wi-Fi, enabled by the 100% Wi-Fi coverage of the surrounding land area, and supported by the residential university's historically high national ranking in wireless technology adoption and access. On the contrary, the Italian respondents showed more diversity in typology of internet connection, led by fiber (almost half of the Italian sample), ADSL (slightly more than one fifth), Wi-Fi (17.7%), and then broadband (14.9%). Finally, the cable connection was present and very rare only among the American respondents.

Concerning ownership of Alexa, only 36.8% of the overall sample reported direct ownership of Alexa. However, many of the 414 respondents (63.2%) who did not own Alexa personally belonged to the galaxy of use-without-ownership or observing of the use of others, which emerged in their answers to open-ended questions. Personal ownership of Alexa was unrelated to gender, but American respondents were significantly more likely than Italian respondents to own Alexa (47.7% vs. 25.2%; $\chi 2 = 34.95$, $df = 1$, $p < .0001$, stand. residual = 5.9). More than half of our respondents who owned Alexa (61.7%) had only one Alexa device, while the remainder had more than one. The American respondents were not only more likely than their Italian counterparts to have Alexa, but also to have more than one (45.6% vs. 24.4%) ($\chi 2 = 9.92$, $df = 1$, $p < .01$, stand. residual = 3.1). As to gender, no significant differences were detected.

Finally, we investigated if the respondents used other virtual assistants: 241 participants (37.0% of the sample) answered in the affirmative. American respondents used them significantly more than Italians (44.8% vs. 28.9%) ($\chi 2 = 17.83$, $df = 1$, $p < .0001$, stand. residual = 4.2), and there were no significant gender differences. Asked to give us more details about which further virtual assistants they used, the American respondents cited Siri ($n = 108$) first, and then both Americans and Italians indicated Google Echo ($n = 62$), followed by Google Assistant, Cortana, and Bixby. The significance of this data lies in its revelation that the introduction of a new digital technology occurs within a technologically rich environment, allowing the newcomer to both compete and benefit from other media sources.

Measures and Data Analysis

In this study, we analyze only the freeform answers respondents provided to open-ended questions on their desires, expectations, feelings, and practices of use regarding Alexa. The questions were:

1. If Alexa has ever let you down, why, when, and in what context has this happened?
2. What do you feel when Alexa doesn't respond appropriately?
3. What do you expect/would you expect from Alexa in terms of being able to fulfill your requests?
4. If there are a lot of differences between the things you talk about with Alexa and the things you want to talk about with Alexa, what would you like to talk to Alexa about?

As regards the practices of using Alexa, we collected 404 freeform answers, with 57 (14.1%) pertinent to news and information search. With respect to feelings, we got 228 free answers, with only 58 (25.4%) regarded our topic. Regarding expectations, our 655 respondents gave us 640 free answers, and among these, 324 answers (50.6%) regarded the issue of Alexa as information and news search and delivery. Finally, as to desires, the free responses given by our respondents were 78, and among these, only 12 (15.4%) included that issue. Thus, the overall corpus we analyze here is made of **451 sentences**. Let us organize our analysis through the most relevant themes emerging from these sentences.

To analyze the answers to open-ended questions, we used a technique called open coding and thematic analysis. This is a type of qualitative content analysis that involves identifying and interpreting patterns of meaning or themes within textual data (Braun & Clarke, 2019). We used an inductive procedure to identify the most significant categories that described the participants' opinions and experiences. We grouped sentences into themes based on similarities and analogies in meaning, and the frequency of each theme contributed to its relevance. We manually rearranged extracts from the text according to these categories, and four independent coders, including researchers from both countries, analyzed the data to avoid cultural bias. We discussed the categorization results at every stage of the process and reached a shared decision on the categories of meaning. Four independent coders, including an equal number of researchers from the two countries to help avoid cultural bias, conducted the analysis separately. We discussed the results of the categorization at every stage of the process trying to systematically reach a shared decision on elaborating the categories of meaning. To ensure accuracy and consistency of the content analysis of these answers carried out by these four independent coders, we applied a test of intercoder reliability in the form of chance-adjusted percent agreement. We achieved an intercoder reliability coefficient of .85 (Cohen's Kappa), and then resolved all disagreements through discussion. Our results will be presented using a narrative approach that uses macrocategories and excerpts. We will refer to each participant by their code number (e.g., P. 453).

Results

We organized our findings into four large categories of meaning, supporting our discourse with participant excerpts.

Theme #1: Desire for Mediatized Immediacy in Alexa News and Information Delivery

The first finding is that a cluster of respondents search for news and information from Alexa. Within this corpus, respondents have a notable expectation or desire for Alexa to function as a provider of news and information, as well as a partner with whom to discuss the news and information deeply. When users search for news through Alexa, it is worth exploring what type of news they want since Alexa is primarily programmed to provide weather updates. There is a significant utilization of Alexa for this purpose. Respondents' search practices are often tied to weather news search and time information, which is one of the fundamental capabilities of Alexa advertised by Amazon. Respondents expect Alexa to provide news about certain topics that have been automated in newsrooms, including finance, sports, and weather. In their eyes, Alexa is a reliable source for this type of news among the many options available. One participant (P. 516) wrote, "I would use Alexa to tell me what the weather is so I don't have to stop what I'm doing to check. . . . and that saves me time from doing it myself." And another (P. 501) said simply, "Music Weather Sister News." These participants would like Alexa to be able to deliver them also "actual issues happening in the world" (P. 463), "daily news" (P. 608), "I would use her for just information" (P. 638), and "I would like Alexa to be able to maybe curate songs and news that would be interesting to me" (P. 640). Thus, this group of respondents is hoping for a strong role of Alexa in news delivery.

However, there is also an expectation to be informed about "random facts" (P. 387 & P. 515) and "things" (P. 392). A respondent said that Alexa should "[b]e able to answer my questions correctly and efficiently, give accurate information, understand me well" (P. 413). Two participants wrote, "I expect her to know facts and things that are going on in the world currently" (P. 477) and "Actual issues happening in the world" (P. 472). These sentences contain a mix of news, service information, and general information. In some cases, it is more connected to basic pragmatic information, such as a receipt or the opening and closing hours of a restaurant or store. Moreover, some respondents would like Alexa to give them the specific news they want to hear. They aspire to receive from this VBA a kind of personalized news. One respondent wrote, "I would expect Alexa to understand me and be able to report back to me the information that I am seeking" (P. 412).

There is the desire that VBAs may overcome the unidirectional structure of traditional mass media where the news is delivered by the source (TV, radio, etc.), and the audience can only receive it. The expectation toward Alexa is that it is possible even for the user to discuss the news *directly* with the source of news delivery. For example, in commenting on what they wished Alexa could do better, one respondent said, "I feel like Alexa should almost give like a little news report of what happened today when someone asks her and then people can talk to her about the news." Another wrote, "I would like to have an actual conversation where we go back and forth on a topic. Discussing, sharing opinions, branching into

stories related to the topic, and overall building a complicated conversation." Relating to the context of getting news and information from Alexa, a number of respondents shared their wishes to "talk about more complex things," "inquire more about complex topics," and "ask more in-depth questions and have them answered." In terms of delivery, several respondents expressed the desire for a more conversational or back-and-forth mode of communication; for example, to have "a normal human conversation rather than automated messages," to "talk about current events or my favorite tv shows with Alexa" (P. 629), or to "discuss actual issues happening in the world." VBAs are seen as a further step concerning online forums or social media where users can discuss fundamentally among themselves. In other words, the hope is that it would be possible to have a genuine, on-demand interaction between VBA and users. The aspiration is toward a virtual assistant that conveys the news *when users need it*, not when the mass media are organized to deliver the news, and in a conversational or dialogic ask-answer-discuss format rather than a broadcast monolog.

Thus, the picture emerging from this theme is that at least a fraction of respondents desired Alexa to provide on-demand, personally relevant news and information, with opportunities to further converse and interact with the VBA on topics of interest. In this way, they valued a sense of immediacy (direct and instant involvement with a news provider) that Alexa could introduce to news and information search, which also represents a further mediatization of content because Alexa exerts a significant shaping influence on the selection, presentation, and elaboration of what is requested. Thus, "mediatized immediacy" may be understood as real or perceived closeness to the actual news/information by way of its pass through the VBA Alexa as another layer of mediatization. Importantly, respondents' expressed desires to acquire both formal "knowledge about" and "acquaintance with" the news through the mode of conversation moves us to the second theme, which helps anchor a longing for mediatized immediacy in a broader societal move to engage the world as dialogue or conversation rather than text.

Theme #2: Shift From Written to Oral News Search

Getting news from Alexa means interrogating this VBA orally. These participants were eager to be assisted by Alexa in searching for information on the web because "she is able to respond like a search engine, just without having to type," explained a respondent (P. 103). What prevailed in respondents' attitudes regarding the search for information was the expectation and desire that the search for information is automatized because—they point out—they would like to search for information *by speaking* and not by writing. "How to use Google, but speaking," wrote a student (P. 292). Another one said: "to keep me updated on daily news and answer any questions that could be found on Google without me having to look it up" (P. 608).

The possibility to pass from writing to speaking is important in a domestic environment in which people typically move around to do household chores. In this setting, individuals are required to complete activities like cleaning, cooking, caring for pets, and doing laundry, as well as setting the table. These tasks demand a certain level of physical mobility and require the use of free hands, which may be occupied with items like clothing, books, or shopping bags. Stopping to type on a computer or mobile device to search for information on the weather or a receipt would disrupt the flow of these tasks, as it would require the

body to come to a standstill. Many participants viewed Alexa, the voice-based virtual assistant, as their perfect partner for completing this task. They can easily ask Alexa questions while on the go, allowing them to feel like they are multitasking. Of the complex operation of searching for news online, these respondents isolated only the modality: access to news through orality instead of reading/writing. Moreover, they were happy to replace this mode (reading/writing) with the speaking/listening mode. Nevertheless, while it may be enjoyable to ask Alexa for news out loud, there is a cost—users are subjecting themselves to a new kind of information filtering, where Alexa chooses which news to deliver. Thus, this shift from searching by typing to asking Alexa to do this for them obscures a significant leap. The user passes from a situation in which they can build a kind of bricolage of news passing through different forms of gatekeeping and several forms of disintermediation to a situation of reintermediation via Alexa.

These participants, however, seemed unaware of the complexity of searching for information online through the write/read mode, of how delicate and complex this operation is, and what happens regularly in searching for information on the web. For example, they never mentioned that online search engines like Google do not deliver "objective" information but select and shape the information they give based on algorithms that consider users' typical online surfing behaviors that reveal their interests and tastes, as well as promoting those search results sponsored by paying entities. These students did not foreground information searching as a multifaceted task that involves exploration skills, critical thinking, personal interests, idiosyncrasies, and chance discoveries. Instead, they framed it as a tedious and inactive task they wish could be automated.

Participants also seemed to transfer this unawareness to the implications of the switch to speaking/listening. There was no emergent awareness in their answers of what might be termed "mediatization literacy" or an understanding that search engines function as guardians of the threshold and not as simple automated engines, as clearly was shown in an anecdote reported by BBC News (2021) about a 10-year-old girl. She asked Alexa for a challenge and was suggested the "penny challenge." This activity, which involves touching a coin to the prongs of a half-inserted plug, has gained popularity on social media despite being very dangerous. Amazon has updated Alexa to prevent recommending such activities in the future.

Theme #3: The Practices of Use Tell Another Story

Our participants' use of the VBA Alexa and their experiences with it suggest that despite their efforts, pursuing current information is still largely a goal rather than a reality. If we pass from desires and expectations to the practices of the use of Alexa for searching for news, the fresco that emerges is quite different. First, there are technical limitations, such as difficulty hearing what people ask. For example, one participant commented, "When Alexa doesn't respond appropriately, I feel like the device is starting to fail, or I think she didn't hear what I said correctly" (P. 558). Many participants had the impression that Alexa is not hearing or listening. Others thought that this VBA is not good at recognizing voices and languages. It may not understand what some people are trying to say. "It may be a language thing," stated P. 486. Others noted that "sometimes she does not understand my

voice" (P. 16), while another wrote, "the only instance is when she mishears me, but that's more frustration than a feeling of being let down" (P. 337).

Some others argued that Alexa is bad at word recognition, that is, in understanding the meaning of the questions posed: "many times, she does not understand," wrote P. 43. In response, many respondents reported retrying because they hoped to get the correct answer from Alexa on a subsequent attempt. Others tried alternative strategies such as raising their voices (yelling), hoping that Alexa will understand this way, rephrasing the question, or enunciating the words more precisely. For example, "I push the negative feelings to the side and ask again. Normally, I always get the correct answer after two attempts" (P. 544). Alternatively, people tried to reformulate what they wanted to ask differently, or they tried to pronounce it in another way or slow down their rhythm of speech. One participant described the frustration by saying:

> Frustrated or as if the technology made to be simplistic and bettering our lives is not advanced enough. I have no reason to be embarrassed, but I still am; I keep a bit of a demanding tone toward Alexa, like one I might use with a misbehaving child or pet the change in my tone depends on my mood. Sometimes I continue in the same if I feel good. (P. 639)

However, these attempts are time-consuming. A respondent confessed, "I feel upset and disappointed because I have to ask again in a different way or look it up online" (P. 602) and that "there are times she gives wrong answers or isn't understanding what I'm asking" (P. 340). This is a recurrent complaint in the freeform answers of our students, and another critical element of concern that occurs frequently is that the questions cannot be formulated spontaneously by users because these need to follow specific formulas. One participant wrote, "There is the need for precise semantics to make questions (omitting words or adding them in a pre-constructed sentence) and little comprehension flexibility" (P. 211).

Alexa and, in general, all the VBAs need to reconfigure the user in order to function. The user cannot simply ask spontaneous questions but must conform their language to use specific and rigid formulas to get an answer. Interacting with Alexa can be restrictive and detract from the enjoyment of verbally requesting news if the user is required to use robotic and inflexible language. Alexa makes people discover the many differences between human language and the automatic one. For example, participants experienced that they had only their voices at their disposal to ask Alexa for information. Gestures, facial expressions, proxemics, and so on, the multiform resources of nonverbal language, do not count for anything. Automation occurs only at the verbal level, while usually, human communication is a rich activity based on verbal and nonverbal language. Thus, users discover that how they can ask Alexa to provide information is impoverished, which causes significant limitations in the communication process.

Second, users often find automated systems inflexible since they are currently limited to providing predetermined responses to predetermined inquiries. When humans approach them, the spontaneity and flexibility of their language clash with these bridles. As a result, there is little understanding and much frustration. The reasons listed by our participants were diverse. "Honestly, nothing, I stopped using it, and I gave it to my mother because it

has no better functions than my phone" (P. 55). Another respondent pointed out, "Alexa, like all other voice assistants, understands a tenth of what you ask her for example sometimes when I ask her about something" (P. 296). Third, while it is uncertain if Alexa can provide the right answer, what is certain is that respondents have the impression that Alexa violates their privacy. A respondent said, "I would prefer to have a home automation robot that is NOT constantly connected to the Internet and is able to record every conversation in my private home" (P. 202).

Overall, when these participants tried to obtain information or news, they encountered the negative aspects of automation. These included extended waiting periods, having to repeat the same question or command numerous times, and the strict language requirements for Alexa to comprehend. If these requirements are not met, Alexa is unable to understand anything. It is not surprising then that the prevailing arguments of students' discourse are the request for a greater, immediate understanding of the questions Alexa is asked, even if they are of a complex nature. As a result of the need for improved natural language comprehension, better voice recognition, faster execution of commands and services, and increased accuracy and efficiency in Alexa's performance, there was a desire for greater programmability of this virtual assistant to suit individual preferences.

Theme #4: The Media Environment in Which Alexa Lives

To understand the practices of using one device like Alexa properly, we should consider that each new device enters a domestic world rich in technologies. The capabilities of digital technologies are not so peculiar to a single device. There are many overlapping areas in the functionality of these digital technologies that users explore in their use practices. For example, searching for information can be done on a mobile phone, a computer, or a tablet, as well as in newspapers, television, and radio. This interchangeability of digital technologies makes the shortcomings of the various devices less irritating. If a device does not work or lacks efficiency, people turn to another device at home. In our case, the first reaction by users to Alexa's inefficiency in information delivery is to evaluate whether to try again with Alexa or to default to another technology, which is, in most instances, the mobile phone.

It is worth noticing that the analog world was wholly excluded from the technological landscape of these student respondents: books, journals, or newspapers were never cited by them in connection to searching for news, information, and knowledge via Alexa. When conducting online research, users commonly use traditional tools such as computers, but nowadays, mobile phones are used more frequently as the internet is easily accessible through smartphones. When Alexa lets respondents down, they search on Google through the smartphone or turn to Siri, and less frequently to the computer. Although the respondents did not emphasize the complexity of searching for information, they acknowledged that it is time-consuming. Participants clarified that they hoped to save time by externalizing their searches for information and news to Alexa. Furthermore, these open-ended answers mirrored a certain *devaluation of manual labor* since these students perceived it as a last resort. Two respondents wrote, "like I just wasted more time trying to get it to work than if I had just googled something or opened an app on the TV *manually*" (P. 374) and "I feel annoyed that now I have to *manually* do whatever it is that I requested or that I'll need to look up my question on my own now" (P. 380).

Discussion

These findings illustrate the practices of use, the feelings, expectations, and desires of a convenience sample of university students in the US and Italy on searching and delivering information and news through Alexa. If we look at these practices through the lens of mediatization literature (Krotz, 2007), they highlight how Alexa, as any other medium, acts as an agent of cultural and social change (Lundby, 2014, p. 6) in the everyday life of these respondents by producing a new formatting of information and stimulating two new behaviors: the recurrence to orality for doing online research or posing questions and the possibility to do this while moving. Moreover, from these open-ended answers, it emerged that a portion of students desire to receive from this virtual assistant a kind of personalized news in a domestic environment. These students probably know that the use of artificial intelligence could help tailor news according to the interests of individual users, but this is not happening at the moment, maybe due to the novelty of this tool. We observe that this desire to receive personalized news at home resonates with the first dimension of mediatization described by Bengtsson et al. (2021) and corresponds to the perceived media reliance in relation to (re)productive desires. According to Bengtsson et al. (2021), this dimension

> captures the perceived importance of media for having peace and quiet, enjoying food and drinks, staying in shape, taking care of one's family, and so on. Here, the importance of media concerns the self, located in relation to the most intimate social group, or family. (p. 288)

Another desire that emerged from these respondents (i.e., P. 629) was to have discussions with Alexa about current events or their favorite TV shows. For the first time, the source of the information is handy, it is at home. Thus, there is the potential for a true interaction between the source of information and the receivers. Furthermore, from these open-ended answers emerged a certain pressure aimed at Alexa designers to implement this VBA with robust capability for news searching and information delivery. Unsurprisingly, considering its AI capabilities and presence in households, some participants wanted to turn Alexa into a speaking Google. However, the current world of automated information, as this research shows, is still far from being able to perform online research efficiently or to match user expectations. Another recurrent topic in these students' statements regarded their wishes for a *mediatized immediacy* afforded by Alexa, in which they are brought closer to news and information through conversation with its apparent source/messenger. The desire to acquire knowledge and acquaintance with information through a mode of asking, answering, and discussing resonates with a broader social shift to view the world in terms of dialog and addressivity (consider the move from search to ask that differentiates Googling from the use of ChatGPT).

We will use our research questions as a guide to further the discussion of the results in light of the essential concepts and debates surrounding mediatization theory and its relevance in understanding contemporary society. We will begin by providing an answer to RQ1: Do participants try spontaneously to get news from Alexa? A small number of participants do so, confirming the findings of Perez Garcia et al. (2018). While searching for news is an everyday activity among web users, Alexa's search technology is still developing and

is, therefore, not widely used. Despite this, our survey respondents had high expectations of Alexa's ability to provide news and information, despite its current limitations.

As to RQ2: Are participants aware that VBAs, particularly Alexa, represent a case of meta-reintermediation of information and news? Our findings suggest that our participants are relatively unaware of the facts that: (1) Alexa as a kind of meta-search engine produces further manipulation in addition to that carried out by each search engine and is very probably governed by Amazon's interest in increasing the sale of the products they have in their stores; (2) databases can produce unreliable and occasionally inadequate outcomes (Blatchford, 2020); and (3) Alexa's user loses any visibility and possibility to tailor the search of information in respect to their desire and will. Instead of reflecting critically on these aspects, our respondents often turned to another device—the smartphone, SIRI, Google, or the computer—to get what they are searching for. All this brings an automation of the information-searching activity that lowers the quality of the outcome. Automation is thriving because users mistakenly believe it benefits them by reducing their workload through delegation to machines. However, this can be a dangerous illusion. In some aspects it is the same, opaque process engaged in by news aggregators and news apps which often curate and tailor news to the specific user in a way very similar to how respondents wished to news-seek with virtual assistants.

Now let us answer our third research question, RQ3: Does Alexa contribute to enhancing the potential hybridization of the three concepts—news, information, and knowledge? Our findings suggest a positive answer to this question. If the internet has provided a spatial contiguity among these elements, on the one hand, VBAs become the same source that delivers, depending on questions, news rather than information or knowledge, and on the other, the same users search everything they need in a particular moment. Currently, there are limited opportunities to combine news, information, and knowledge through oral communication due to the technological immaturity of devices and due to the difficulty of managing knowledge orally. Overall, VBAs and automated information systems make the mediatization process increasingly complex. However, the increased complexity of mediatization is scarcely decipherable even by our university students, who are often assumed to be most equipped to understand where societies are going.

Finally, looking at how the mediatization process impacts cultures differently, we found two important differences between the American and Italian samples. The first of these differences was a stronger practice and desire to use Alexa for information search and news by the American respondents than the Italian ones. The other difference was a stronger desire by the Italian respondents, compared to that of their American colleagues, for more profound communication and interaction with Alexa (mediated intimacy).

Limitations and Future Research

The current findings contribute to the field of studies on mediatization, or deep mediatization (Hepp, 2019) since they document how deeply mediatized is becoming the everyday life of these participants and in general how they access news through the virtual assistant Alexa with an open-ended response technique. Thus, what participants write is not framed by the questions in their meaning and is spontaneous. These findings, however, carry some limitations that need to be acknowledged. First, we used convenience samples

of university students, and therefore findings should be taken lightly concerning generalizing these results. Second, while they present preliminary proof-of-concept regarding the importance of investigating how people search news and information through this virtual assistant, future studies should consider examining a more diverse population of users and employing quantitative methods.

The measures discussed in this study are self-reported, meaning that they are based on the participants' perceptions and experiences. However, these self-reports may be influenced by biases related to social desirability and how individuals present themselves. Future research should include a more extensive and diverse sample of participants from different parts of the country to obtain more accurate and representative results. This study should also be complemented by quantitative, longitudinal studies of news and information reliance on Alexa that may help us explore further the specific role of virtual assistants in shaping mediatization processes over time. Additionally, it would be necessary to investigate why people are not using Alexa to search for news and information more frequently.

Conclusion

In conclusion, our findings shed light on several themes related to the use of Alexa for news and information delivery, and its role in the mediatization of society. The first theme highlights the desire for "mediatized immediacy" in Alexa's news delivery. Participants expressed an expectation for Alexa to function as a reliable provider of news and information in an instantaneous, personalized, and potentially interactive manner. This desire and appreciation for direct real-time interaction with a VBA news deliverer may obscure the underlying reality that Alexa represents an additional link and terminus in the long chain of mediatization rather than a way around it.

The second theme reveals a shift from written to oral news search, as participants expressed a preference for interacting with Alexa verbally rather than typing their queries. They appreciated the convenience of voice-based search, especially in a domestic environment where they could multitask and perform various activities while interacting with Alexa. However, this shift also introduced a new form of information filtering, as Alexa becomes the gatekeeper of news and selects which information to deliver. Participants seemed unaware of the complexity of online information searching and the role of search engines in shaping search results based on algorithms and user preferences.

The third theme explores the practices of using Alexa for news search, revealing technical limitations and frustrations experienced by participants. Difficulties in voice recognition, language understanding, and word recognition were common issues. Participants reported retrying, reformulating their queries, or raising their voices to get accurate responses from Alexa. The limited flexibility in language use and the requirement to conform to specific formulas for questions posed challenges in communication with the virtual assistant. Users also expressed concerns about privacy violations, further impacting their overall satisfaction with Alexa.

The fourth theme highlights the media environment in which Alexa operates. Participants viewed Alexa as one of many digital technologies available to them for information search, with smartphones being the most common alternative when Alexa fell short. Traditional analog media such as books, journals, and newspapers were not mentioned by

participants in connection to searching for news via Alexa. The convenience and accessibility of mobile devices and the internet led participants to prioritize efficiency and timesaving in their information-seeking practices.

Overall, our findings demonstrate the complexities and nuances surrounding the use of Alexa for news and information delivery in the domestic sphere and how Alexa and in general VBAs make even more dynamic the division of labor and the cooperation among the various personal devices. These findings underscore the importance of considering the broader media environment in which devices like Alexa are situated as users navigate multiple technologies and sources for their information needs and this can hopefully be an important lens to look inside contemporary mediatization.

Author Biography

Leopoldina Fortunati (Università di Padova) is senior professor of Social Robotics at the Department of Mathematics, Computer Science and Physics, University of Udine, Italy.

https://orcid.org/0000-0001-9691-6870

Autumn Edwards (PhD, Ohio University) is professor in the School of Communication, Western Michigan University, Kalamazoo, MI, USA.

https://orcid.org/0000-0002-5963-197X

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

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

References

BBC News. (2021, December 21). Alexa tells 10-year-old girl to touch live plug with penny. *BBC News*. Retrieved April 10, 2023, from https://www.bbc.com/news/technology-59810383

Bengtsson, S., Fast, K., Jansson, A., & Lindell, J. (2021). Media and basic desires: An approach to measuring the mediatization of daily human life. *Communications, 46*(2), 275–296. https://doi.org/10.1515/commun-2019-0122

Bennett, T., Curran, J., Gurevitch, M., & Wollacott, J. (Eds.). (1982). *Culture, society and the media*. Routledge.

Berdasco, A., López, G., Díaz, I., Quesada, L., & Guerrero, L. (2019). User experience comparison of intelligent personal assistants: Alexa, Google Assistant, Siri and Cortana. Proceedings of 13th International Conference on Ubiquitous Computing and Ambient Intelligence UCAmI 2019. *Proceedings 31*(1), 51. https://doi.org/10.3390/proceedings2019031051

Blatchford, A. (2020). Searching for online news content: The challenges and decisions. *Communication Research and Practice*, *6*(2), 143–156. https://doi.org/10.1080/22041451.2019.1676864

Bolter, J. D., & Grusin, R. (1999). *Remediation: Understanding new media*. MIT Press.

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 587–597. https://doi.org/10.1080/2159676X.2019.1628806

Bruns, A. (2009). From prosumer to produser: Understanding user-led content creation. Paper presented at *Transforming Audiences* conference, London, September 3–4, 2009. https://eprints.qut.edu.au/27370/

Couldry, N., & Hepp, A. (2013). Conceptualising mediatization: Contexts, traditions, arguments. *Communication Theory*, *23*(3), 191–202. https://doi.org/10.1111/comt.12019

Dambanemuya, H. K., & Diakopoulos, N. (2020, March). "Alexa, what is going on with the impeachment?" Evaluating smart speakers for news quality. In *Proc. Computation+ Journalism Symposium*.

Deuze, M. (2008). The changing context of news work: Liquid journalism and monitorial citizenship. *International Journal of Communication, 2*, 848–865.

Diakopoulos, N. (2019). *Automating the news*. Harvard University Press.

Dinev, T., Masssimo, B., Hart, P., Christian, C., Vincenzo, R., & Ilaria, S. (2005). Internet users, privacy concerns and attitudes toward government surveillance—An exploratory study of cross-cultural differences between Italy and the United States. BLED 2005 Proceedings, p. 30. https://aisel.aisnet.org/bled2005/30

Edwards, A., Edwards, C., Fortunati, L. Mangenelli, A. M., & de Luca, F. (2024). Mass robotics: How do people communicate with, use, and feel about Alexa? A cross-cultural, user perspective. *Computers in Human Behavior: Artificial Humans,* 100060. https://doi.org/10.1016/j.chbah.2024.100060

Edwards, C. Edwards, A., Fortunati, L., & Spence, P. (2023). *Examining Amazon's Alexa in the scientific literature: A content analysis of research utilizing Alexa as the focus of inquiry*. Presented at the International Communication Association 73rd Annual Conference, Toronto, Canada.

Ekström, M., Fornäs, J., Jansson, A., & Jerslev, A. (2016). Three tasks for mediatization research: Contributions to an open agenda. *Media, Culture & Society*, *38*(7), 1090–1108. https://doi.org/10.1177/0163443716664857

Fortunati, L., & Edwards, A. (2021). Moving ahead with human–machine communication. *Human–Machine Communication 2*, 7–28. https://doi.org/10.30658/hmc.2.1

Fortunati, L., Edwards, A., & Edwards, C. (2022b). The perturbing mediatization of voice-based virtual assistants: The case of Alexa. Presented at the 9th European Communication Conference (ECREA), Aarhus, Denmark.

Fortunati, L., Edwards, A., Edwards, C., Manganelli, A. M., & de Luca, F. (2022a). 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

Fortunati, L., & O'Sullivan, J. (2020). Convergence crosscurrents: Analog in the digital and digital in the analog. *The Information Society*, *36*(3), 160–166. https://doi.org/10.1080/01972243.2020.1737608

Gehl, R. W., & Bakardjieva, M. (Eds.). (2016). *Socialbots and their friends: Digital media and the automation of sociality*. Routledge.

Goode, L. (2009). "Social news, citizen journalism, and democracy." *New Media and Society, 11*(8), 1287–1305. https://doi.org/10.1177/1461444809341393

Hall, S. (1980). Cultural studies: Two paradigms. *Media Culture & Society*, *2*(1), 57–62.
Harper, C. (1998). *And that's the way it will be: News and information in a digital world*. The New York University Press.
Hepp, A. (2019). *Deep mediatization*. Routledge.
Hepp, A. (2020). Artificial companions, social bots and work bots: Communicative robots as research objects of media and communication studies. *Media, Culture & Society*, *42*(7–8), 1410–1426. https://doi.org/10.1177/016344h3t7tp2s0:/9/d1o6i.4o1rg2/
Hjarvard, S. (2013). *The mediatization of culture and society*. Routledge.
Kopecka-Piech, K., & Bolin, G. (Eds.). (2023). Contemporary challenges in mediatisation research. Routledge.
Krotz, F. (2007). The meta-process of 'mediatization' as a conceptual frame. *Global Media and Communication, 3*(3), 256–260. https://doi.org/10.1177/1742766507003003010 3
Krotz, F. (2009). Mediatization: A concept with which to grasp media and societal change. In K. Lundby (Ed.), *Mediatization: Concept, changes, consequences* (pp. 19–38). Peter Lang.
Kudina, O. (2021). "Alexa, who am I?": Voice assistants and hermeneutic lemniscate as the technologically mediated sense-making. *Human Studies*, *44*(2), 233–253. https://doi.org/10.1007/s10746-021-09572-9
Kurz, M., Brüggmeier, B., & Breiter, M. (2021). Success is not final; Failure is not fatal—Task success and user experience in interactions with Alexa, Google Assistant and Siri. In M. Kurosu (Ed.), *Human-computer interaction. Design and user experience case studies* (pp. 351–369). Thematic Area, HCII 2021, Lecture Notes in Computer Science, vol 12764. Springer.
Lewin, K. (1943). Forces behind food habits and methods of change. *Bulletin of the National Research Council, 108,* 35–65.
Lewis, S. C., Guzman, A. L., & Schmidt, T. R. (2019). Automation, journalism, and human–machine communication: Rethinking roles and relationships of humans and machines in news. *Digital Journalism, 7*(2), 1–19. https://doi.org/10.1080/21670811.2019.1577147
Livingstone, S. (2012). Challenges to comparative research in a globalizing media landscape. In F. Esser & T. Hanitzsch (Eds.), *Handbook of comparative communication research* (pp. 415–429). Routledge.
Lundby, K. (Ed.). (2014). *Mediatization of communication*. De Gruyter.
Mazzoleni, G. (2008). Mediatization of society. In Wolfgang Donsbach (Ed.), *The international encyclopedia of communication*, *7*, 3052–3055. Blackwell. https://doi.org/10.1002/9781405186407.wbiecm063
Mazzoleni, G., & Schulz, W. (1999). "Mediatization of politics: A challenge for democracy?" *Political Communication, 16*(3), 247–261. https://doi.org/10.1080/105846099198613
Mehrotra, R., Awadallah, A. H., El Kholy, A., & Zitouni, I. (2017). Hey Cortana! Exploring the use cases of a desktop based digital assistant. *SIGIR 1st international workshop on conversational approaches to information retrieval (CAIR'17)*, August 2017, Tokyo, Japan.
Nielsen, R. K. (2017). Digital news as forms of knowledge: A new chapter in the sociology of knowledge. In P. Boczkowski & C. W. Anderson (Eds.), *Remaking the news: Essays on the future of journalism scholarship in the digital age* (pp. 1–27). MIT Press.

Park, R. E. (1940). News as a form of knowledge: A chapter in the sociology of knowledge. *American Journal of Sociology*, *45*(5), 669–686. https://doi.org/10.1086/218445

Perez Garcia, M., Saffon Lopez, S., & Donis, H. (2018). Everybody is talking about virtual assistants, but how are people really using them? In *Proceedings of the 32nd International BCS Human Computer Interaction Conference (HCI)*, July 4–6, 2018, Belfast, UK. https://doi.org/10.14236/ewic/HCI2018.96

Pew Research. (2020). Measuring news consumption in a digital era. As news outlets morph and multiply, both surveys and passive data collection tools face challenges. https://web.archive.org/web/20211202130100/https://www.pewresearch.org/journalism/2020/12/08/measuring-news-consumption-in-a-digital-era/

Pew Research. (2022). Social media and news fact sheet. https://web.archive.org/web/20211109001825/https://www.pewresearch.org/journalism/fact-sheet/news-platform-fact-sheet/

Pradhan, A., Lazar, A., & Findlater, L. (2020). Use of intelligent voice assistants by older adults with low technology use. *ACM Transactions on Computer-Human Interaction (TOCHI)*, *27*(4), 1–27. https://doi.org/10.1145/3373759

Reeves, S., Porcheron, M., & Fischer, J. (2019). 'This is not what we wanted': Designing for conversation with voice interfaces. *InterActions*, *26*(1), 46–51. https://doi.org/10.1145/3296699

Shin, D. (2022). The perception of humanness in conversational journalism: An algorithmic information-processing perspective. *New Media & Society, 24*(1), 2680–2704. https://doi.org/10.1177/1461444821993801

Shoemaker, P., & Vos, T. (2009). *Gatekeeping theory*. Routledge.

Terranova, T. (2000). Free labor: Producing culture for the digital economy. *Social Text*, *18*(2), 33–58. https://muse.jhu.edu/article/31873

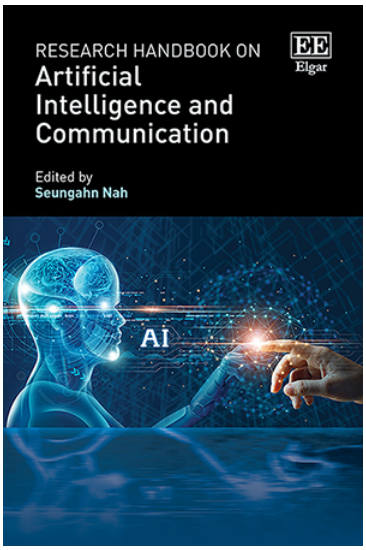
Vtyurina, A., Fourney, A., Ringel Morris, M., Findlater, L., & Whitwe, R.W. (2019). Bridging screen readers and voice assistants for enhanced eyes-free web search. Proceedings of the *2019 World Wide Web Conference (WWW' 19)*, May 13–17, 2018, San Francisco, CA. ACM, New York, NY. https://doi.org/10.1145/3308558.3314136

Westlund, O. (2020). Mobile news. In R. Ling, L. Fortunati, G. Goggin, S. S. Lim, & Y. Li (Eds.), *The Oxford handbook of mobile communication and society* (pp. 215–228). OUP.

Wigand, R. T. (2020). Whatever happened to disintermediation? *Electronic Markets, 30,* 39–47. https://doi.org/10.1007/s12525-019-00389-0

HUMAN-MACHINE
COMMUNICATION

Research Handbook on Artificial Intelligence and Communication



Edited by Seungahn Nah, Professor, Inaugural Dianne Snedaker Chair in Media Trust and Research Director, Consortium on Trust in Media and Technology, College of Journalism and Communications, University of Florida, US

This forward-looking Research Handbook makes an insightful contribution to the emerging field of studies on communication of, by and with AI. Bringing together state-of-the-art research from over 50 leading international scholars across various fields, it provides a comprehensive overview of the complex intersections between AI and communication.

'This is an essential and refreshing collection of work that examines some of the most crucial questions facing our communication and media systems. It is sure to help guide research over the next decade.'
– Siva Vaidhyanathan, University of Virginia, US

2023 452 pp Hardback 978 1 80392 029 0 ~~£165.00~~ £148.50 ~~$230.00~~ $207.00
Elgaronline 978 1 80392 030 6

How To Order

Online

www.e-elgar.com

Get up to 20% discount when you order online

By Email

UK/ROW: sales@e-elgar.co.uk

N/S America: elgarsales@e-elgar.com

By Phone

UK/ROW: +44 (0) 1243 843291

N/S America: (800) 390-3149

Connect With Us

Find us on Facebook

facebook.com/EdwardElgarPublishing

Follow us on Twitter

For news, views and offers

@ElgarPublishing

Read our Blog

For news, views and debate from our authors and readers.

https://www.elgar.blog

For More Information

UK/ROW: info@e-elgar.co.uk

N/S America: elgarinfo@e-elgar.com