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## **Bridging Communication Studies and Science and Technology Studies:**

### **Some Recent Developments**

#### **Chapter for the International Encyclopedia of Communication Theory and Philosophy**

Pablo Boczkowski, Roderic Crooks, Leah Lievrouw, and Ignacio Siles

#### *Introduction*

Scholars from both communication and media studies and science and technology studies (STS) have devoted significant attention to media and information technologies. In communication studies, researchers have sought to better understand how the production, circulation and reception of these technologies and their messages have had important social, cultural and psychological consequences. In STS, work has been devoted to examining media and information technologies as cultural artifacts situated within complex social, temporal, political and economic contexts and networks.

This chapter examines contemporary scholarship on media and information technologies at the intersection of communication and media studies and STS. We extend and update the arguments made by Boczkowski and Lievrouw (2007) by considering how researchers in both fields have recently analyzed different aspects of media and information technologies. The proposed term of “media and information technologies” is used to bring together a variety of frameworks from both communication and media research and STS that seek to capture symbolic, social, cultural, or political aspects of technology. This body of work emphasizes broad historical scope, infrastructural dimensions, and the distinctive interplay of symbolic content and meaning with materiality.

Since the publication of Boczkowski and Lievrouw's essay, researchers have explicitly reflected on the heuristic potential of bringing these two fields together (Baldwin-Philippi, 2011; Couldry, 2008a; Gillespie, Boczkowski, & Foot, 2014a; Paré, Millerand, & Heaton, 2014; Proulx, 2012; Siles & Boczkowski, 2012; Wajcman & Jones, 2012). As they grapple with the rise of a variety of technologies and processes, scholars have also developed conceptual tools to accomplish this bridge-building exercise (Boczkowski, 2010; Gillespie, 2007, 2009; Gillespie, Boczkowski, & Foot, 2014b; Greenberg, 2008; Lievrouw, 2011; Sterne, 2012; Streeter, 2010). In particular, there have been significant attempts to theorize how the notion of materiality can be applied to the case of the digital in both communication and media studies and STS (Blanchette, 2011; Dourish & Mazmanian, 2012; Leonardi, Nardi, & Kallinikos, 2012; Lievrouw, 2014; Packer & Wiley, 2012). Furthermore, the emergence of notions such as "texto-materiality" (Siles & Boczkowski, 2012), the "imbrication" of the social and the material (Leonardi, 2011, 2012a, 2012b), the "configuration" of imaginaries and materialities (Suchman, 2012), and the "articulation" of the symbolic and the material (Hartmann, 2006; Livingstone, 2007; Morley & Silverstone, 1990; Silverstone, 1994) attests to the increasing interest in integrating some of the key dimensions of media and information technologies traditionally addressed by each field.

To make sense of this growing body of work at the intersection of both fields, we organize the discussion around three key conceptual bridges between the two fields—identified by Boczkowski and Lievrouw (2007)—that have emerged through their mutual interest in media and information technologies: (a) prevailing notions about *causality* in technology-society relationships, that is, the factors that have shaped the relationship between technology and social forces and dynamics; (b) the *process* of technology development, that is, the privileging of either production or consumption as the main locus of analysis; and (c) the social *consequences* of

technological change, that is, conceiving of media and information technologies as either revolutionary or evolutionary. We present these three bridges as dialectic relationships between two opposing concepts, respectively: determination and contingency; production and consumption; and continuity and discontinuity. Each half of the duality presumes, critiques, and builds on the other. We conclude by considering some broader implications of the contemporary landscape of research at the intersection of communication studies and STS for continued intellectual dialogue between the two fields.

### *Bridging Communication and Media Studies and STS*

In what follows, we examine each issue that has served as a bridge between both fields (that is, causality, process, and consequences) by discussing and illustrating recent literature in the study of media and information technologies.

#### *Causality*

As Boczkowski and Lievrouw (2007) noted, issues of causality in the technology-society relationship have preoccupied scholars in recent years. Work on media and information technologies has typically espoused one of two main perspectives on this issue. On the one hand, research in communication and media studies has tended to view technology as a factor with distinctive social effects (Eisenstein, 1979; Lubken, 2008; McLuhan, 1968). The focus in this field has been on identifying the social, cultural, and psychological effects introduced by the rise of technological artifacts. On the other hand, research in STS has often envisioned technology not as cause but as consequence of social forces and processes (Bijker, 1995; Bijker, Hughes, & Pinch, 1987; Latour, 1996). Scholars in this field have focused on how society shapes technology but have often remained hesitant to discuss technology's societal consequences. Thus, Boczkowski and Lievrouw (2007) concluded, whereas scholarship in communication studies

privileged the *determination* of society by technology, studies in STS focused instead on the *contingency* involved in the social shaping of technology.

Despite the contributions that each perspective has offered individually, conceiving them in terms of an opposition “limit[s] the understanding of phenomena that may exhibit evolving combinations of the features that are portrayed as mutually exclusive” (Boczkowski & Lievrouw, 2007, p. 957). Combining work in the diffusion of innovations tradition and the social shaping of technology approach, Lievrouw (2002) thus argued for turning this binary into “a dynamic relationship” (p. 192).

In a similar manner, recent scholarship on media and information technologies at the intersection of communication studies and STS has sought to overcome this binary by recasting the determination-contingency opposition in terms of a “mutual shaping” between technology and society. This approach emphasizes how technological features and societal forces, process, and relations shape one another in interdependent and constant manners. The mutual shaping approach has gained widespread adoption in both fields (Streeter, 2010; van Dijck, 2013; Wajcman, 2007, 2009, 2010; Wajcman & Jones, 2012). For example, in her examination of the “culture of connectivity” that characterizes so-called “social media,” van Dijck (2013) adopts this view to argue for the need to study both how digital artifacts get made but also what kind of forms of sociality they promote. To this end, van Dijck combines actor-network theory and Manuel Castells’ political economy of communication, an exercise that involves two dynamics: on the one hand, to “disassemble” technologies (as microsystems), that is, to take “apart single platforms into their constitutive components” and, on the other, to “reassemble” these technologies (into an ecosystem) through a recognition of the “norms and mechanisms [that] undergird the construction of sociality and creativity” (van Dijck, 2013, p. 25).

In this sense, the widespread adoption of the mutual shaping approach confirms Boczkowski and Lievrouw's (2007) argument that researchers prefer to treat media and information technologies as socio-material configurations characterized by different degrees of determination and contingency at different moments.

### *Process*

The study of *production* or *consumption* dynamics has constituted another key binary in the study of media and information technologies. As Boczkowski and Lievrouw (2007) note, researchers in communication and media studies and STS have adopted different orientations to make sense of the process of technological development. Communication and media researchers have devoted significant attention to understanding how audiences decode and consume media texts in different forms (Fiske, 1992; Hall, 1980; Livingstone, 1998). Scholars in the political economy tradition in communication studies have also analyzed the factors and dynamics involved in the production of those media texts (Mosco, 1982, 1996; Wasko, 1982, 2001). In their search for alternatives to technological determinism, STS scholars have traditionally focused on how society “enters” technology as early as in its conception, production, and design stages (Bijker et al., 1987). The attention to users of technological artifacts has been much more recent than the study of the production of “black boxes” (Cowan, 1987; Kline & Pinch, 1996; Oudshoorn & Pinch, 2007). Thus, although scholars have analyzed both production and consumption dynamics, they have worked “less on the connection between the spheres of production and consumption” (Boczkowski & Lievrouw, 2007, p. 959).

The study of either production or consumption issues remains a common analytic strategy in recent scholarship on media and information technologies in both fields. A prime instance of the interest on the former is the development of “production studies” in communication and

media research (Caldwell, 2008; Mayer, 2011; Mayer, Banks, & Caldwell, 2009b). According to Mayer, Banks, and Caldwell (2009a), this body of work has been particularly concerned with understanding the production of culture as a kind of skilled labor in an intensely mediated society: “We want to look up and down the food chains of production hierarchies, to understand how people work through professional organizations and informal networks to form communities of shared practices, languages, and cultural understandings of the world” (p. 2). These studies have typically proceeded through an assessment of the role of often-unexplored actors (such as television set assemblers, gaffers, cameramen, editors, and casters), the hierarchies of production spaces (which result in the constitution of centers and peripheries at both national and international levels), and the way producers have experienced significant transformations in media industries in both historical and contemporary settings.

Alternatively, recent studies in both communication and media studies and STS have also paid significant attention to the practices of audiences, publics, and users in appropriating artifacts and media texts, without necessarily considering their connections with production dynamics (Burrell, 2012; Jenkins, 2006; Jenkins, Ford, & Green, 2013; van Oost, Verhaegh, & Oudshoorn, 2009). For many researchers, the focus on consumption is warranted given that audiences and users—acting as producers in their own right—have gained unprecedented capacities to shape media industries (Fisher, 2010; Ritzer & Jurgenson, 2010). Even for those who, like Jenkins et al. (2013, p. 154, emphasis in original), “believe that there are still people who are primarily *just* ‘listening to’ and ‘watching’ media produced by others,” the exclusive attention to consumers is justified by the new degree of reflexivity they exhibit in their consumption practices: “We argue that even those who are ‘just’ reading, listening, or watching do so differently in a world where they recognize their potential to contribute to broader

conversations about that content than in a world where they are locked out of meaningful participation” (Jenkins et al., 2013, pp. 154-155, emphasis in original).

Boczkowski and Lievrouw (2007) also identified early efforts to bridge the production-consumption binary. In STS, for example, this was achieved through an exploration of how producers conceived of users during the design and development of technologies, and how these representations shaped the material configuration of artifacts (Akrich, 1992, 1995; Bardini, 2000; Woolgar, 1991). More broadly, work at the intersection of both fields that unpacked user agency dynamics also made visible the links between consumption practices and production dynamics. Boczkowski and Lievrouw (2007) argued that three strands of research had made significant contributions in this particular regard: work on the domestication of new artifacts, the role of users as agents of technological change, and the resistance to new technologies.

More recently, a handful of studies have expanded these bridge-building efforts. These bridges have developed along three lines of inquiry. First, recent scholarship in both fields has further theorized the *interconnections* between production and consumption (Boczkowski, 2010; Hyysalo, 2010; Leonardi, 2009). For example, Hyysalo (2010) claimed that research on media and information technologies has been hindered by studying either development or use only. To solve this problem, he elaborated on the concept of “biographies of technologies and practices.” In his words, this approach “does not stop at any one design or appropriation episode and consequently can reveal dynamics in how exactly the changing of technological practices happens over time” (Hyysalo, 2010, p. xxvii). Second, recent studies have problematized traditional understandings of producers and users as established *categories* (Millerand & Baker, 2010; Pollock & Williams, 2009). In his study of how Twitter was invented, Siles (2013) combined theories of remediation in media studies and work in STS on user agency. He showed



how producers acted as users to develop new technological features and how users acted as producers by building new applications for Twitter and by employing it in ways different than originally anticipated. Both dimensions—and the feedback loops established between them—were crucial in the early configuration of Twitter. In a similar manner, Ross (2014) suggested treating the identities of producers and users as “synthetic roles” that can be constantly exchanged. Finally, researchers have sought to reconceptualize technological processes by including other *loci of analysis* (Hyysalo, 2010). Oudshoorn (2011), for example, demonstrated how telecare technologies implicate and reconfigure “new geographies of care” (p. 29). In particular, she argues, care is dispersed over various locations (such as homes and telecare centers) and is distributed among a variety of actors and intermediaries between production and consumption (including patients and telenurses). Scholars in STS have also argued for considering practices, most notably repair and maintenance, which blur traditional understandings of place and time in the enactment of the production-consumption binary (Denis & Pontille, 2014; Jackson, 2014).

### *Consequences*

The third bridge between communication studies and STS centers on debates about the social consequences of media and information technologies. As with notions of causality and process, Boczkowski and Lievrouw (2007) identified two opposing approaches to make sense of this issue. On the one hand, some scholars have stressed the revolutionary character of media and information technologies, that is, they have emphasized how technologies have introduced a radical departure from previous social configurations and imposed specific practices and arrangements (Beniger, 1986; Castells, 1996, 2001; Eisenstein, 1979). Boczkowski and Lievrouw (2007) refer to this view as the *discontinuity* perspective. On the other hand, scholars

have emphasized how the consequences of media and information technologies are much more gradual and incremental than suggested by discontinuity authors (Mosco, 1996; Robins & Webster, 1999; Schiller, 1981). This approach, which Boczkowski and Lievrouw characterize as the *continuity* perspective, highlights how these consequences need to be situated within a matrix of existing technologies, practices, and institutions. STS scholars and authors associated with the political economy tradition in communication have typically espoused this view.

Boczkowski and Lievrouw (2007) argue that, “influenced by the political economy of media, the critical/cultural turn [...] and the critique of technological determinism advanced by STS, younger researchers in both communication and STS have increasingly tended to reject the revolutionary ‘new technologies, new society’ discourse of information society research and have focused on the micro-scale, everyday, social and cultural contexts, uses, and meanings of newer communication technologies” (pp. 963-964). However, a look at recent literature on media and information technologies reveals that revolutionary talk is still relatively common. For example, Rainie and Wellman (2012) argue that three social and technological “revolutions,” namely, the social network revolution, the Internet revolution, and the mobile revolution, have created fertile grounds for a new social order or, in their words, a new “social operating system” that they label “networked individualism.” By this, they refer to the “ways in which people connect, communicate, and exchange information” (p. 7). As an operating system, networked individualism stands in contrast to bureaucracies and small groups as the main forms of social organization and interaction. In his theoretical treatise on digital media practices, Couldry (2012) also describes a “digital revolution” characterized by private ownership, prevalent inequality patterns, and hegemonies over user territories. Yet, Couldry warns, several “uncertainties” distinguish this revolution.

Debates about “mediation” or “mediatization” dynamics, which have garnered significant attention from scholars in communication and media studies, can be considered an extension of the interest in the social consequences of media and information technologies (Couldry, 2012; Hepp, 2012; Hjarvard, 2013; Lievrouw, 2009, 2011, 2014; Livingstone, 2009; Lundby, 2009). In the 1970s and 1980s, scholars in communication studies employed the notion of mediation to blur traditional boundaries between the study of interpersonal and technologically mediated communication (Lievrouw, 2009). More recently, researchers have focused primarily on the institutional dimension of mediation, that is, on the role of media institutions in daily life. The discontinuity-continuity binary has characterized the dominant positions in this body of work. On the one hand, there is a more discontinuous view of the media’s social consequences that posits mediatization as “[the] transformation of social and cultural life through media operating from a single source and in a common direction, a transformation of society by media, a ‘media logic’” (Couldry, 2008b, p. 376). This view thus emphasizes the radical transformations that occur when a “media logic” alters various fields of social activity, such as politics, religion, play, and daily life (Hjarvard, 2013). On the other hand, a more continuous approach defines mediation as the “dialectical process in which institutionalized media of communication (the press, broadcast radio and television, and increasingly the world wide web), are involved in the general circulation of symbols in social life” (Silverstone, 2002, p. 762). This view, as Couldry (2008b) has noted, stresses not revolutionary transformations but rather the conditions that make possible specific patterns in the production, distribution, and reception of media and information technologies.

Boczkowski and Lievrouw (2007) discussed work on infrastructures in STS as part of continuous approaches to the consequences of media and information technologies (Star &

Bowker, 2006; Star & Ruhleder, 1996). This body of work reveals how, in many contexts, technologies tend to “disappear” from the attention of their users as they are integrated within existing sets of systems and practices. More recently, this strand of research has expanded as scholars from both communication and media research and STS have advanced conceptual tools within what they call “information infrastructure studies” (Bowker, Baker, Millerand, & Ribes, 2010; Millerand & Baker, 2010; Ribes, 2009; Sandvig, 2013). According to various authors, this body of work holds potential not only for rethinking issues of the social consequences of technology by situating artifacts within longer temporal frameworks, but also for contributing to the bridge-building exercise between communication studies and STS by bringing together the knowledge and insights generated in both fields (Sandvig, 2013).

#### *Concluding Remarks*

This chapter has reiterated Boczkowski and Lievrouw’s (2007) argument that three bridging concepts—causality, process, and consequences, each expressed as a dialectic relation of productive tensions—can incorporate a variety of approaches to understanding media and information technologies in communication studies and STS. Although the confluence of these intellectual approaches has been fruitful, a number of potentially incommensurable challenges persist in how these two fields approach a shared set of objects and concepts. We conclude by elaborating on three of these challenges.

First, as multidisciplinary and interdisciplinary studies of media and information technologies proliferate, traditional divisions between them threaten to become perfunctory and institutionally situated, rather than intellectually motivated. It is not clear to what extent the intersection between communication studies and STS is more vibrant and robust than at the time when Boczkowski and Lievrouw’s (2007) argument was first articulated. Overcoming these

disciplinary commitments might lead to the development of new theoretical approaches, methodological designs, and pedagogical strategies to explore the territories that cut across these two fields (Boczkowski & Siles, 2014). Second, as our analysis of recent literature reveals, socio-material approaches that foreground the importance of materiality, infrastructure, and built systems have found a welcoming home in both communication and media studies and STS. However, how to integrate the study of materiality and content remains a challenge for researchers in both fields. Further research is required to clarify whether the exclusive focus on materiality is at the expense of the centrality of content, messages, and meaning as theorized in communication and media studies. Finally, despite the more nuanced and contingent sense of historical development advocated by STS approaches, popular and scholarly discourses continue to portray emerging media and information technologies as revolutionary and to focus on their putative social effects. This framing, as we have explained, ontologically separates technology and society. The persistence of this trope calls into question the tacit, continued acceptance of the discontinuity thesis in the face of the aforementioned empirical and theoretical works that should complicate such a view.

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