

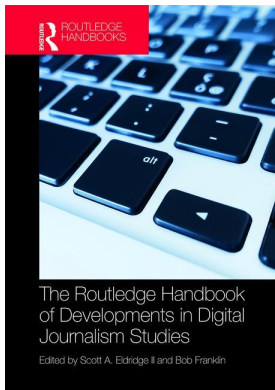
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Access details: *subscription number*

Publisher: *Routledge*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: 5 Howick Place, London SW1P 1WG, UK



The Routledge Handbook of Developments in Digital Journalism Studies

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Ethical Approaches to Computational Journalism

Publication details

<https://www.routledgehandbooks.com/doi/10.4324/9781315270449-24>

Konstantin Dörr

Published online on: 30 Aug 2018

How to cite :- Konstantin Dörr. 30 Aug 2018, *Ethical Approaches to Computational Journalism from: The Routledge Handbook of Developments in Digital Journalism Studies* Routledge
Accessed on: 17 Jan 2019

<https://www.routledgehandbooks.com/doi/10.4324/9781315270449-24>

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23

ETHICAL APPROACHES TO
COMPUTATIONAL JOURNALISM*Konstantin Dörr*

Since the implementation and evolution of the personal computer and the internet in the 1980s and 1990s, the way that news is selected, produced, distributed, and consumed has changed significantly (Domingo and Paterson, 2011; Mitchelstein and Boczkowski, 2009; Powers, 2012). Today, algorithms are supporting and replacing work autonomously as operations, decisions, and choices are increasingly delegated to software (Acemoglu and Restrepo, 2016; Arntz et al., 2016; Autor, 2015; Just and Latzer, 2016). Algorithms decide which news is visible on Twitter and Facebook. They determine the results from a Google search query; they also recommend which news items are worth reading and how they are consumed (Anderson, 2012; Bucher, 2012; Latzer et al., 2016; Resnick and Varian, 1997; Rieder, 2005). They predict the demand for specific journalistic products as well as observe the audience. They are news producers, demand predictors, and gatekeepers (Napoli, 2014; Vos and Heinderyckx, 2015). Thus, the border between professional actors, as well as between the intersection of production and distribution technologies, is vanishing (Neuberger, 2009; Weischenberg and Hienzsch, 1994: 478). Algorithmic applications, e.g., WordSmith for automated text creation, can select, contextualize, and assign relevance to certain pieces of information, generate journalistic value, and consequently fulfill the functions of professional journalism, e.g., with automated sports reports (Caswell and Dörr, 2017; Dörr, 2016b). As journalism has the task of selecting, processing, and publishing news in accordance with professional norms and values (Brosda, 2010: 259), algorithmic applications are to be evaluated not only in terms of design – to fulfill the task they are programmed to complete or respectively to proceed toward a pre-defined goal – but also ethical norms (Moor, 2006: 17). This increasing complexity in human-computer-interaction is challenging the ways in which professional journalism, the public, and communication studies assess and analyze the normative and ethical challenges of digital news production like objectivity, accountability, and transparency from a technical as well as theoretical perspective (Dörr et al., 2017; Ward, 2017). Along with this advent and variety of algorithmic applications and the datafication of news production, the values and responsibilities assigned to journalism and journalists are changing accordingly and must be addressed from an ethical perspective (Brosda, 2010; Culver, 2016; Ward, 2017).

To provide ethical guidance along with normative questions for journalism practice, this chapter locates the ethical discussion within media ethics and focuses on journalism ethics as a reference point for an ethical and normative analysis of computational journalism. The chapter shows how an ethical analysis of the question of responsibility can benefit from the theoretical

approaches of the sociology of technology, with a particular focus on Rammert and Schulz-Schaeffer's (2002) concept of distributed agency. Thereby, it is possible to open an ethical debate for normative questions without being solely limited to human agency and to integrate the role of technology, as both developments are mutually dependent (Lewis, 2017).

Ethical challenges of computational journalism

It is important to clarify the state of the art of digital journalism to address normative questions. The number of definitions and concepts like data or data-driven journalism (Gray et al., 2012), computer-assisted reporting (Mayo and Leshner, 2000), and algorithmic, robotic, or automated journalism (Anderson, 2012; van Dalen, 2012; Dörr, 2016b; Thurman et al., 2017) complicates the theoretical demarcation and analysis (see Coddington, 2015, and this volume, Chapter 17; Borges-Rey, this volume, Chapter 21; and Dörr, 2016a, for a classification). Each of these concepts focuses on different use cases of data and software, ranging from research methods to story visualization and automated text generation. However, it is agreed that computational journalism serves as an umbrella term for technical innovations in journalism (Diakopoulos, 2017; Flew et al., 2012; Koliska and Diakopoulos, this volume, Chapter 19; Neuberger and Nuernbergk, 2015). This understanding encompasses the focus on tooling and designing “practices or services built around computational tools in the service of journalistic ends” (Coddington, 2015: 6). With reference to Diakopoulos (2010, 2017: 177), computational journalism is here understood as “the application of computing and computational thinking to enable journalistic tasks such as information gathering, organization and sensemaking, storytelling, and dissemination”.

While automation processes have always been part of journalism (Pavlik, 2017), the rapid growth and use of digital data is not a new phenomenon, either (Buhl et al., 2013; Gandomi and Haider, 2015; Zikopoulos et al., 2013). The term ‘big data’ summarizes the economic and societal risks and opportunities of mostly unstructured digital data and evokes normative challenges itself, e.g., on transparency, objectivity, and accountability (Mayer-Schönberger and Cukier, 2013; Richter, 2016).

This influence of algorithms and the increasing use of digital data raise new ethical questions for professional journalism, which arise on various levels and are detected and discussed at the following levels:

- data search, origin, and use (Bradshaw, 2014; Zion and Craig, 2014; Zwitter, 2014),
- algorithmic accountability (Diakopoulos, 2015, 2016; Dörr and Hollnbuchner, 2016; Dörr et al., 2017),
- algorithmic authority (Carlson, 2014; Kraemer et al., 2011; Young and Hermida, 2015),
- algorithmic objectivity (e.g., Gillespie, 2014), and
- algorithmic transparency (Diakopoulos and Koliska, 2016; McBride and Rosenstiel, 2014; Montal and Reich, 2016).

As journalism ethics draws on and has been influenced by other ethical fields of application, this chapter briefly explains the essential theoretical approaches that deal with the impact of technology.

The terms ‘ethics’ and ‘morality’ must be distinguished at the outset. In general, ethics is a discipline of practical philosophy dealing with and reflecting the morality of human action. In contrast to ethics, morality means the variety of values, norms, and rules of human action that is valid in a particular group, community, or society (Köberer, 2014: 21). Morality is “a system of rules for guiding human conduct, and principles for evaluating those rules” (Tavani, 2011: 36). It is a social phenomenon based on the social acceptance of norms and values. Norms, on the one

hand, are generally applicable regulations for human action that follow social values. Values, on the other hand, are desired social conceptions used to establish or legitimize norms.

Due to the development in information and communication technologies (ICT), the field and cluster of ethical problems is dynamic. For example, in the case of technology design, norms and values are either embedded at an organizational level – as part of the software development in tech companies or media organizations – or are starting to be adapted in machine learning processes autonomously due to the progress in artificial intelligence. Machine learning is “any methodology and set of techniques that can employ data to come up with novel patterns and knowledge, and generate models that can be used for effective predictions about the data” (Van Otterlo, 2013). This latest development raises ethical questions whenever existing or future technology is causing normative uncertainty (Grunwald, 2016: 25). Therefore, ethical approaches to new technologies “pose new versions of standard moral problems and moral dilemmas, exacerbating the old problems, and forcing us to apply ordinary moral norms in uncharted realms” (for computer ethics, Johnson, 1985: 1, 2009). Until the late 1990s, technology was seen only as an intermediary, a tool, without the possibility of acting morally (Grunwald, 2016; Kroes and Verbeek, 2014). But the complexity of software systems and recent developments in artificial intelligence show that technology is more than just a simple tool. Human actors are no longer the sole moral authority when it comes to the selection and the processing of data and data signals (Adam, 2005). Consequently, it is necessary to analyze the degree of agency of algorithmic applications in addition to their human counterparts and within the ethical discourse in journalism (Heise, 2016: 205; Mittelstadt et al., 2016).

Not only linked to computational systems and more of an encompassing approach, the ethics of technology focuses on the social context of technology, its prospects, its intended use, and on possible implications for society. It serves as a guide in the social discourse and is part of the political, economic, and scientific discussion on technology in general. Counseling in these areas, for example, provides ethical reflection on political debates about the regulation of the internet, on the impact of autonomous software (artificial intelligence), the relationship between technology and life (e.g., biotechnology, nanotechnology), or on questions of distributive justice and digital divide (Grunwald, 2016, 30–32; Ropohl, 1995). The ethics of technology serves as a guide in the early stages of a technical development, providing exploratory considerations on possible consequences. Today, the transition to other ethical fields is permeable, as they intertwine.

Within technology ethics, machine ethics – sometimes referred to as robot ethics or algorithm ethics – is another subfield. Emerging from artificial intelligence research, it specifically focuses on the task of ensuring the ethical behavior of artificial agents (Shulman et al., 2009; Wallach et al., 2008), e.g., on the morality of machines, or autonomous systems such as agents, robots, or self-driving cars (Anderson and Anderson, 2011).

With relation to the field of journalism, media ethics and journalism ethics in particular allow the ethical discussion of algorithms to be framed. Media ethics – a form of applied ethics – has the task of constituting moral concepts for media-related actions and combining theoretical and practical views in relation to ethical and normative standards (Köberer, 2014: 25). In the literature, media ethics is often placed on a par with journalism ethics, but journalism ethics is a subfield of media ethics. In addition to journalism ethics, media ethics also focuses on ethical questions in other fields of application, such as advertising and public relations.

Within media ethics, journalism ethics serves specifically as a guide to approved societal moral values as well as helps to define journalists’ work as professionals (Ward, 2017). In the scientific discourse, there are various systematic approaches to journalism ethics (for an overview, see Brosda and Schicha, 2010). In this chapter, journalism ethics is conceptualized as a part of media ethics and as normative ethics, related as a subfield to the ethics of philosophy. Within journalism ethics, the differentiation into various levels of action allows the attribution of responsibility

at an individual and a social ethical level, referring to individual journalists as well as to actors at the organizational and social levels (Debatin, 1998: 121). In media ethics, both individuals (media maker and media user) as well as companies and media organizations (e.g., publisher) and editorial offices are defined as actors (Dörr et al., 2017: 124). Ethical questions of responsibility were and are still solely linked to these stakeholders, as only human actors are able to act reasonably (e.g., Kant KpV, 1788; Wunden, 1999). This chapter emphasizes the inclusion of socio-technical approaches of the role of technology into the ethical discussion of journalism (Kroes and Verbeek, 2014). Although not emphasizing ethics, research is already beginning to address this issue by focusing on actor-network theory (Latour, 2005; Lewis and Westlund, 2015; Salovaara, this volume, Chapter 30). However, the increasing differentiation of journalistic tasks leads to questions of whether and how human beings or technology is assigned with responsibility. This calls for a graduated approach. From a theoretical perspective, the concept of distributed agency by Rammert and Schulz-Schaeffer (2002) allows the interplay between human agency and software outcomes to be analyzed, and the distribution, as well as attribution, of responsibility in journalism to be framed for algorithmic applications. With the adoption of this concept, it is possible to include technical questions for a broader normative analysis in journalism. This approach of techno-social interaction helps to overcome the dichotomy of technological and social determinism, as the concept of distributed agency focuses on the interplay between technology and society (Latzer, 2013; Rip, 2002).

Socio-technical concepts of agency

While questions of responsibility were throughout the philosophical and ethical discourse only assigned to human actors, such as journalists, programmers, or service providers, it is valuable to discuss the concept of agency and the moral status of technology in the light of algorithms and developments in artificial intelligence (Kroes and Verbeek, 2014). To do so, this chapter refers to socio-technical concepts of agency that help to visualize and theoretically frame the interplay between journalistic actors and algorithms (Matsuzaki, 2011; Rammert, 2003, 2007).

In general, technical innovations like algorithmic search, text production, or recommendation applications can be classified as organizational, political, cultural, and institutional change (Werle, 2007: 31). There are three different approaches to analyzing the impact of technology on society. Technology can be seen as an actor, institution, or a system (Dolata and Werle, 2007: 17). Concepts of agency – e.g., the actor-network theory of Bruno Latour (2005) or the previously mentioned concept of distributed agency (Rammert and Schulz-Schaeffer, 2002) – focus on the micro-level. Institutional and system approaches focus on the impact of technology on an organizational (meso-) and social (macro-) level (Lessig, 1999; Winner, 1986). Central to this classification is the question of whether software can be analyzed as an independent entity with autonomous agency (Dolata and Werle, 2007: 46).

Within this theoretical discussion of agency, there are four different positions (Matsuzaki, 2011: 301). The first is sociological concepts, which solely attribute agency to human actors (Collins and Kusch, 1998). The second is the approach of Bruno Latour (1987), in which agency is related to the state of change, whether caused by human or technology. Third, there are approaches that directly criticize this operationalization of agency, focusing instead on a more complex and graduated approach to agency (Rammert and Schulz-Schaeffer, 2002). Finally, there are approaches that operationalize technology as a fictional actor (Werle, 2002).

In this chapter, I argue that rather than attributing to technology aspects of intention or consciousness in its operation – the selection and the assignment of relevance to data – solely from a techno-deterministic point of view (Häußling, 2014), an ethical discussion should analyze technology in interdependence with human actors and as a part of collaborative activities.

At the same time, this involves moving away from Giddens' three-level model of action (1984) and Latour's (1987, 2005) concept of agency (Rammert, 2008: 10). For this reason, the chapter focuses on the concept of "distributed agency" (Rammert and Schulz-Schaeffer, 2002). This approach helps to frame the action independently from the nature of the agent – whether human or technical – and to classify its action into various levels. It permits the ethical questions of responsibility to be posed in empirical research. From a technological perspective, agents are specific computer programs:

That means that actions are delegated to them. The agents divide and delegate the action among other agents. They cooperate with one another, thereby moving, being initiative and addressing others. They coordinate the cooperation themselves and communicate the result of their activities to the human user.

(Rammert, 2008: 4)

Agency is here conceptualized as a three-level process to theoretically analyze the interaction levels between human actors and algorithms as advanced technologies show signs of increased self-activity, as "they are written with the intention that software agents can execute actions like human agents" (Ibid.). This concept enables the discussion about the level, the linking, and the attribution of agency to journalistic actors and computational processes in relation to the technical development and the status of the social discourse (Rammert and Schulz-Schaeffer, 2002: 43; Rammert, 2007, 2008). Within this concept of distributed agency, the simplest form of action is to cause a difference (level 1: causality). This is similar to Latour's term "actant" or Callon's term "translation" (Callon, 1986; Latour, 2005). On this level, it does not make any difference whether humans, machines, or programs execute the action.

The second level focuses on the action in which the actor has the space and capacity to act differently and to choose between options (level 2: contingency). When technologies reach this level of contingency, they no longer follow the mathematical paradigm of command and execution. For example, dialogical interfaces and internal user modeling increase this level of action (Rammert, 2008: 11). Within this concept, there are different degrees of freedom. On level 2, the spectrum ranges from the selection of predefined routines of software to self-adapting learning algorithms.

Rammert and Schulz-Schaeffer (2002) also identify an even more complex form of action, in which the actors can reflect their actions and add meaningful explanation (level 3: intentionality) (see Table 23.1). Therefore, the question of which level of agency is present depends on the interactive relationship between human actors and the software (Rammert and Schulz-Schaeffer, 2002: 50).

Table 23.1 Levels and grades of agency (c.f. Rammert and Schulz-Schaeffer, 2002; Rammert, 2008: 11)

Levels	low	Degrees	high
III. Intentionality:		up to guidance by complex semantics from ascription of simple dispositions	
II. Contingency:		up to self-generation of actions from selection of preselected options	
I. Causality:		up to permanent restructuring of action from short-time irritation	

Implications for journalism

The theoretical concept of distributed agency permits the inclusion of the role of technology as an equal actor in news production. But without specific technical knowledge about the research object, it is difficult to determine the potential and ethical impact of algorithmic applications (Rath, 2006). Algorithmic processes are often invisible – described as a black box (Diakopoulos, 2015). Therefore, it is necessary to deconstruct these processes for algorithmic applications in journalism to provide ethical implications. Most of the computational processes include prioritization, classification, association, and filtering (Diakopoulos, 2016). This approach is a part of studies in technology assessment (Guston and Sarewitz, 2002). On a technical level, the concept of reverse engineering, the “process of extracting the knowledge or design blueprints from anything man-made”, is valuable (Eilam, 2005: 3; Diakopoulos, 2015: 404). This deconstruction into input-throughput-output processes of algorithmic applications can lead to decision trees that help to visualize decision-making rules and to apply an ethical analysis. These decision trees are prevalent in business administration, informatics, and artificial intelligence research but less frequently used in journalism (Bendel, 2015). However, the complexity of “decision-making structures can quickly exceed the human and organizational resources available for oversight” (Mittelstadt et al., 2016: 7; Kitchin, 2016). Therefore, it is necessary to embed computational thinking as an aspect of news production as well as to create awareness of the use of software and computational processes and emerging ethical challenges.

Furthermore, the analysis of ethical challenges in computational journalism should not only focus on professional journalists. IT specialists, project managers, information architects, product developers, and programming technicians as well as systems designers are already an essential part of news production and the ethical debate, as “a designer must envision the design, the algorithms, and the interfaces in use so that technical decisions do not run at odds with moral values” (Friedman and Nissenbaum, 1996: 344). For example, the “ethical protocols design-approach” can help to fulfill ethical requirements in media production, as it implements normative constraints in autonomous systems (Turilli, 2007). But this complexity also increases the demands placed on media makers and media owners, as they must guarantee journalistic services in line with ethical and normative standards. Alongside journalistic actors, this responsibility is to be extended to data suppliers, software companies, and programmers, as “[a]utomated systems must be designed with transparency and accountability as their primary objectives, so as to prevent inadvertent and procedurally defective rule-making” (Citron, 2007: 1308). It is the combination of empirical approaches to deconstructing algorithmic applications with the concept of distributed agency that enables a discussion of different levels of agency and the weighting of ethical challenges. It can help to clarify which actor – whether man or machine – has a certain degree of agency at a specific level in media production. This can be the deconstruction of a search query or the process for automated text generation. It can clarify the following:

- who is responsible for a specific action,
- for the consequences of the action,
- who is affected,
- and at which level.

(Debatin, 1998: 117)

This hierarchy is characterized and influenced by different and often contradictory structural conditions of the media system, e.g., economic and technological pressure. With a theoretical framework, it is possible to identify and reorder the levels of responsibility before, during, and after production regarding the impact of technology on journalism (Dörr and Hollnbuchner,

2016). However, it is difficult to attribute responsibility to specific individual actors. News production is a complex and often multi-level process including several actors. An example of journalistic action is the gap between the decision-making editorial team, the journalist, and the responsible editor. Now, data suppliers, programmers, and autonomous software complicate the differentiation even more. Therefore, it is necessary to attribute responsibility depending on the specific technical application, the level of agency, and the specific setting in news production.

Outlook

This chapter is an attempt to extend the ethical discussion of responsibility in computational journalism to approaches of the sociology of technology. The theoretical concept of distributed agency allows the distinct interplay of and tension between humans and technology in news production to be framed. It also helps to include different actors in the ethical analysis. As it is unclear what will happen if normative demands are changing and programmers, software, or data provider – none socialized in professional journalism – start to play an even more important role in news production, it is necessary for the impact of algorithmic applications, new actors, and their increasing influence to be embedded within an analysis of how to govern these powers adequately. Recently, Saurwein et al. (2015) identified and framed several governance options for algorithmic applications ranging from market mechanisms to command and control regulation by state authorities as well as alternative modes of governance including self-organization of individual companies and collective self-regulation by industry branches and co-regulation – a regulatory cooperation between state authorities and the industry. The governance of algorithmic applications in journalism includes, for example, questions of manipulation, bias, censorship, the violation of privacy rights, or social discrimination (Saurwein et al., 2015: 38). With technical developments challenging journalism on a daily basis, it is important to frame the ethical debate within these regulatory choices. First and foremost, the main task is to restore the public's declining trust in journalism (Henry, 2007). To build trust in algorithmic applications, it is necessary to show how the data are collected, where they come from, to reveal parts of the code, and to indicate which actors took part in the programming (Diakopoulos, 2016). It is necessary to assess the technical innovations in journalism and their specific impact on society, and ethicists, media experts, technicians, and journalists as well as regulators will play a significant part in this discussion. The variety of structural and ethical challenges facing journalism can only be solved jointly. To name a few tools for confidence building in professional journalism: media organizations should build up and strengthen organizational and institutional committees of (self)control, for example, calling for a digital press council as a self-regulatory measure. They should adapt and renew their ethical guidelines for the new digital challenges and visualize computational power structures to ensure transparency and consequently to build trust. They should collect data on their own to guarantee the highest standards of journalistic quality. If possible, computational tools with an impact on the content and distribution of news should be developed in-house. They should integrate the audience in the ethical discussion, e.g., for crowd-based application development and data collection (open code and open data).

Further reading

Although it is regrettably available only in German, I recommend *Handbuch Medien- und Informationsethik* (Stuttgart: J.B. Metzler, 2016), edited by Jessica Heesen, for a broad overview of various ethical approaches and the present challenges of technology and data in journalism. To investigate the influence of technology on society, I recommend *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, MA, 2012) edited by Bijker, W.E., Hughes, T P., Pinch, T., and Douglas, D.G.

Note: Here and elsewhere, this chapter draws on material published in Dörr and Hollnbuchner (2016) and Dörr et al. (2017).

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