Archiving, ordering, and searching: search engines, algorithms, databases, and deep mediatization

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Abstract
This article argues that search engines, algorithms, and databases can be considered as a way of understanding deep mediatization. They are embedded in a variety of social and cultural practices, and as such, they change our communicative actions to be shaped by their logic of archiving, ordering, and searching. I argue that, increasingly and in particular ways, search engines, algorithms, and databases shape our everyday communicative actions as they make us think, internalize, and act along the lines of their particular modes of communication action. After having briefly reviewed recent trends in mediatization research, the argument is discussed and unfolded in between the material and social constructivist-phenomenological interpretations of mediatization. In conclusion, it is discussed how deep this form of mediatization can be taken to be.

Keywords
algorithms, communicative plan, databases, deep mediatization, phenomenology, search engines

Introduction

With digital media, we are witnessing a cultural moment encouraging new forms of communicative actions: ordering, listing, organizing, structuring, tagging, searching, or archiving events, people, topics, knowledge, or information in structured collections of items, for example, a database, search engine, or archive, by means of algorithms,

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hypertext, or humans (Manovich, 2001). Based on this, ordering, archiving, and searching for items may be seen as a specific media-based everyday activity and a form of communicative action in digital culture (Andersen, 2017a, 2017b). In current digital culture, the practices of ordering, searching, or archiving are underscored by the presence of search engines, algorithms, and databases. However, they are not only present as a set of new communicative actions. Their ideology of ordering, archiving, filtering, and searching contributes to a potential change in our ordinary activities when we appropriate them for our own purposes or when we are interpelled by them in our everyday life.

Such an interaction between media saturation and the corresponding socio-cultural change animated by media is of great concern in mediatization research (Couldry and Hepp, 2017; Hepp, 2013; Hjarvard, 2013; Lundby, 2009, 2014). The aim with the concept of mediatization is to understand how, and to what extent, media are embedded in everyday life shaping our ways of acting in and making sense of our social worlds. As new influential forms of media, search engines, algorithms, and databases are embedded in our everyday life, affecting our sense of and participation in our social worlds. For example, the 2016 US election and the fake stories about the candidates generated by Google's and Facebook's algorithms testify to the fact that search engines, algorithms, and databases are powerful agents shaping our ways of making sense of the social world surrounding us. Moreover, search engines, algorithms, and databases are grounded in the idea of data to be collected, stored, processed, and manipulated in order to produce sociality (Van Dijck, 2013). This situation suggests that issues of digitization and datafication are inscribed in everyday life more than ever (Schäfer and Van Es, 2017; Van Dijck, 2014).

Couldry and Hepp (2017) have recently suggested the notion of deep mediatization to designate '… a much more intense embedding of media in social processes than ever before …' (Couldry and Hepp, 2017: 34) due to digitization and datafication. In this article, I am going to contribute to and continue these recent discussions in mediatization research about the consequences of how technological, data-driven, and communicative infrastructures increasingly shape and mediate our conceptions of our everyday life and social reality. By looking at search engines, algorithms, and databases, I am going to argue that they increasingly shape our communicative actions as they make us think, internalize, and act along the lines of their particular modes of communicative action, that is, searching, archiving, ordering, and filtering (cf. Sundin et al., 2017). In doing this, the purpose is to bring the discussion about deep mediatization a step forward.

The reason why I have chosen to focus on search engines, algorithms, and databases is the fact that media of today can also be understood with reference to, for example, data, search, archiving, and software (Manovich, 2013), aspects that are a significant part of search engines, algorithms, and databases. We might go as far as to say that the 'logic' of archiving, searching, and ordering items has led not only to a change in the meaning of media but also to a change in culture insofar as the latter is understood in terms of its means and modes of communication. Put in phenomenological terms, we might say that people carry out the activities of ordering, archiving, and searching as part of their daily habitualized communicative interactions, suggesting that these activities also become objects of interest in media and communication research.

In this article, for that reason, the selected set of literature on search engines, algorithms, and databases is brought into a conversation with the discussions in mediatization

theory about the changes in modes of communication caused by media. While mediatization theory is concerned with understanding current social and cultural changes effected by media, the literature introduced here on search engines, algorithms, and databases does not necessarily see them within a wider frame of media such as mediatization. As search engines, algorithms, and databases make up an influential part of our current communicative infrastructure, it seems reasonable to connect this body of literature with mediatization research in order to show how they stimulate changes in modes of communication, a key concern in mediatization research.

At the outset, I am media-centered in my analysis. There are two reasons for that: first, mediatization research is not always particularly clear as to what exactly it is about media that make them capable of influencing or animating social and cultural change; second, with my focus on search engines, algorithms, and databases, I suggest that by being more sensitive toward their forms of communicative actions, we get a more genuine understanding regarding how deep this form of mediatization might be.

This set-up results in the following structure. I begin with outlining some of the recent concerns in mediatization research. I am going to situate my argument between a material conception of digital media and the social constructivist and phenomenological approaches to mediatization. Next, by pulling together some of the literatures, I examine the social and communicative consequences of search engines, algorithms, and databases within the frame of mediatization. By briefly recapitulating the main points made in the article, the article ends with a discussion of how deep mediatization processes are.

Between media change and socio-cultural change: the mediatization approach to media

A number of media and communication scholars have in recent years discussed, critiqued, and developed the theory of mediatization (e.g. Couldry and Hepp, 2017; Finnemann, 2011, 2014; Hepp, 2013; Hjarvard, 2013; Krotz, 2007, 2009; Schulz, 2004). Although mediatization theory is not one single thing, a general thread is that current changes in social and cultural processes can be understood with reference to the omnipresence of media in our society and culture and that these processes are long-term processes. The social and cultural changes we are witnessing at the beginning of the 21st century cannot be grasped and explained without a proper understanding of how media as independent institutions mold communication and inspire social and cultural changes. It is a theoretical approach to media and society trying to explain and understand the growing role of media in everyday life and in society as a whole and the corresponding changes in modes of communication and social interaction. The assumption being that everyday activities increasingly are not only media-based but are also changed by the omnipresence of media or particular forms of communication. Thus, mediatization theory offers a position from where to consider how media may 'cause' social and cultural change in terms of how media become embedded in particular social and cultural practices. In this section, I will briefly review what Lundby (2014) respectively has named the material interpretation of mediatization and the phenomenological or social constructivist interpretation as my argument is situated between both.

One scholar stressing the importance of understanding digital media in discussions of mediatization is Niels Ole Finnemann (2011, 2014). He directs our attention to some of the characteristics of digital media that play out differently compared to other forms of media and with different social and cultural implications:

> Digital media emerge as materials of stored content, as a repertoire of methods for search, analysis, and presentation, and as media for communication. Digital media always convey some sort of digital material, and they are always also search engines which provide a repertoire of possible methods for analysing and presenting in a perceptible form otherwise invisible, stored digital materials. (Finnemann, 2014: 304)

Connecting digital media with search and communication, Finnemann points to how our interactions with digital media require something different from us than hitherto because digital materials must be approached by means of search. Seeing communication and media in connection with search as a means of communication was almost inconceivable before digital media penetrated and shaped all spheres of society.

We cannot understand properly, Finnemann continues, the social and cultural changes caused by media in our contemporary society if we do not understand how digital media differ from traditional analogue media. Such an understanding is needed in a contemporary theory of mediatization:

> Digital materials can only be accessed by means of digitally supported search and retrieval methods to establish the re-presentation of the invisible, stored content on a screen or another output device. This relation is not conceivable in phenomenological interpretations of media communication, but it is a part of all forms of digital media and a fundamental part of the contemporary processes of mediatization, if digital media should be included. (Finnemann, 2014: 306)

This focus on how digital materials are to be accessed by digital search and retrieval methods suggests how digital media affect processes of mediatization. Communication is part and parcel with modes of digital search and retrieval. Accordingly, Finnemann invites us to pay attention to the role of storing, search, and search engines as defining characteristics of digital media as communication media. With this, Finnemann not only assigns a crucial role to digital media in a theory of mediatization, he also emphasizes that to store, search, and access digital materials are key aspects of communication in digital media.

While Finnemann insists on the material characteristics of digital media as necessary in order to understand the social and cultural changes taking place due to media saturation, the more phenomenological or social constructivist inclined approaches to mediatization emphasize the role of communication practices and communicative action in order to pinpoint changes in everyday life due to media.

In his book *Cultures of Mediatization*, Andreas Hepp (2013) offers his argument about the molding forces of the media: '… media as such exercise a certain "pressure" upon the way we communicate' (Hepp, 2013: 54). In Hepp's terms, the molding forces of media are also to be understood with reference to the claims in medium-theory that there are specific features of media that must be taken into account when looking at changes in

communication. But Hepp makes a point that also separates him from medium-theory. He argues that these features are produced by people's activities and are therefore contextual and not a direct effect of the materiality of media: 'The moulding forces of media become concrete only in the process of media communication, depending on the form of appropriation in very different ways' (Hepp, 2013: 54–55). Developing this line of thought a step further, Hepp goes on to argue about media that they are

> … complex human actions that have 'congealed' into institutions and technological apparata … Media are as such only conceivable in terms of human action, but they do reveal in their entirety a particular potential for action; this we can call the *moulding forces of media*. (Hepp, 2013: 57; author's own emphasis)

Such an understanding of the molding forces of the media Hepp further translates as a convergence of the institutionalization and reification of communicative action (Hepp, 2013: 58). People's activities with media then correspond to habitualized actions (Hepp, 2013: 58), and he contends that media in this sense '… far exceed the customary idea of the "use" of particular media' (Hepp, 2013: 60). Thus, not only do media affect various forms of communication to perform in certain ways. Media also represent a potential for human action, in particular communicative action (Hepp, 2013: 60). With this, Hepp suggests particular cultural localities will have to appropriate media for their own purposes. When media are appropriated and put into action by people, they can become a molding force. Media in themselves are not a molding force but depend on how they are contextualized and appropriated in given local forms of activity, culture, and by given groups of people.

Knoblauch (2013) is another scholar exploring mediatization within a theory of communication. He introduces his concept of communicative constructivism based on Habermasian ideas of communicative action, Schutz's social phenomenology, and Berger and Luckmann's phenomenological inspired form of social constructivism. Knoblauch argues that study of mediatization '… is the study of the changing structure of communicative action' (Knoblauch, 2013: 310). Thus, Knoblauch explicitly links mediatization with communicative action and not with media as such.

Knoblauch's argument informs Couldry and Hepp's (2017) recent contribution. Arguing that the history of media and communication can be understood as three waves of mediatization (mechanization, electrification, and digitalization; Couldry and Hepp, 2017: 34–56) and datafication as a possible fourth wave of mediatization, Couldry and Hepp (2017) propose the concept deep mediatization to correspond to the waves of digitalization and datafication as '… they are associated with a much more intense embedding of media in social processes than ever before …' (p. 34), an embedding that goes deeper into our lives because of, among other things, the data traces we leave when appropriating media. With this notion of deep mediatization and their argument about a materialist phenomenology, Couldry and Hepp set out to produce a framework capable of accounting for the social and cultural transformations taking place because of digital media and data-driven infrastructures. A materialist phenomenology begins

> … from the fact not just of digital media but also of the new data-driven infrastructures and communications on which today's social interfaces increasing rely. It means understanding

how the social is constructed in an age of *deep mediatization* when the very elements and building-blocks from which a sense of the social is constructed become themselves based in technologically based processes of mediation. As a result, the ways in which we make sense of the world phenomenologically become necessarily entangled with the constraints, affordances and power-relations that are features of media as infrastructures of communication. (Couldry and Hepp, 2017: 7; italics in original)

Thus, with deep mediatization, Couldry and Hepp recognize the shaping power of digital media and data-driven infrastructures. They shape our ways of making sense of a form of social reality that is partly also made up of 'technologically based processes of mediation'. Furthermore, deep mediatization is connected to datafication

… as a further deepening of the relations of interdependence between media and people, when an increasing proportion of communication relies on infrastructures of communication that is based on the collection and processing of data. (Couldry and Hepp, 2017: 52)

Accordingly, Couldry and Hepp explicitly link the collection and processing of data with media and communication. But while they maintain a fundamental phenomenologically based interpretation of mediatization, Couldry and Hepp continue and further develop the phenomenological or social constructivist interpretation of mediatization in a direction that takes into account some of the material aspects of digital media proposed by Finnemann.

So, what I want to carry further from this brief overview of mediatization theory in my argument is the emphasis given by Finnemann (2011, 2014) – to digital media and its unique features of search and storage combined with the more social constructivist and phenomenological approaches to mediatization. In the latter approaches, emphasis is on media as molding forces (Hepp, 2013), mediatization as a changing structure of communicative action (Knoblauch, 2013), and, finally, Couldry and Hepp's (2017) re-articulation of mediatization as deep mediatization due to digitization and datafication. These material understandings of mediatization and the social constructivist-phenomenological approaches to mediatization may be seen as incompatible. Finnemann (2014: 306) explicitly critiques phenomenological interpretations for not understanding the materiality of digital media and questions the notion of the media as molding forces (Finnemann, 2014: 317). However, even though Couldry and Hepp (2017) do not go deep into the materiality of digital media, they nevertheless offer a useful position from where to grasp both materiality and media, shaping our sense of the social and the everyday in a digital and datafied world. By maintaining the phenomenological component, Couldry and Hepp remind us that materiality is not enough if the goal is to understand how media and communications contribute to the construction of the social world and human sense-making (Couldry and Hepp, 2017: 5).

Deep mediatization: search engines, algorithms, and databases

I will now consider how search engines, algorithms, and databases help us understand features of deep mediatization. I do that by looking at what kind of change they bring

about in terms of communicative actions. In digital culture, our sense of the social and of communication is largely influenced by how we are able to reach others by means of, for instance, tagging, linking, liking, tweeting, or friending. Therefore, the intention is to suggest how the idea of ordering, archiving, and searching for items becomes embedded in our everyday interactions due to digital media and data and how this idea becomes one means of making sense of the mediated construction of reality (Couldry and Hepp, 2017).

Search engines – search as communicative action

Search indexes and search engines dominated communication on the Web in its first years of public experience (Introna and Nissenbaum, 2000). The first players on the market were, among others, Yahoo!, Infoseek, and AltaVista. These were actually search indexes, as their opening pages would consist of an index and its categories. In addition, humans did the indexing. In the case of Yahoo! you would have to suggest to them your own page or material to be considered for indexing. With the entrance of Google on the search market, the idea of search changed. The content of Google is not humanly indexed and humanly selected by Google. Instead, Google presents search results as a result of their page-rank algorithm. In consequence, Google started to capitalize search and quickly became the leading and most powerful player on the market of search (Hillis et al., 2013). As pointed out by Machill et al. (2008), '… it was only with Google's rise to fame, and the market dominance of one internet company, that the discussion about the use of search engines reached a wider audience' (Machill, 2008: 592). But not only have the discussion about the use of search engines reached a wider audience. For better or worse, we may attribute to Google how search has become an everyday form of communicative action: a 'culture of search', as expressed by Hillis et al. (2013). Of course, humans have been searching for information before search engines. Earlier people might go to a library or use an encyclopedia in order to look things up. But this activity has never been considered 'a culture of search' as it was not a habitualized form of social action in everyday life. Search engines change this situation. They have turned the very activity of search into a mundane cultural activity; to search is '… a way of life' argue Hillis et al. (2013: 4). Search engines, in other words, have given shape to search as a habitualized form of communicative action not present before. In one single medium, they offer speedy access to entertainment, goods, news, and information on a scale and to an extent not seen before in the history of media and communication. In addition, today search engines or a search function is part of other forms of social, networked, or mobile media, thereby institutionalizing search.

   Also, we may consider search engines as the big mass medium in digital culture. But not the old sense of a mass medium where one medium produces content to many. Search engines do not produce content. They rely on the reverse mechanism: many audiences deliver content to one search engine. The means of connection are to bridge between keywords and an infinite number of content suppliers. As such, search engines hold a central place in digital culture because the kind of content they provide access to is in many cases content that touches upon every corner of our life (e.g. shoes, flight tickets, clothes, food, news). As noted by Halavais (2009): 'The search engine, far from being an isolated modern artifact, represents a touchstone of digital culture, and a reflection of the

culture in which it exists' (p. 5). Search engines reflect an increasing cultural expectation of being able to search for items, the ready access to items, and search as a form communicative action in general. Search is the communicative action by which we can deploy search engines as a form of media. They introduce the verb 'to search' as complementary to other verbs of mass media: to read, to watch, or to listen. This further entails that search engines are a significant part of our current system of media: 'As our use of digital media converges, mixing and combining computer applications with more traditional media, we also find search engines becoming part of our entire media ecosystem' (Halavais, 2009: 10). Being part of a broader system of media also shapes the kinds of questions we can (or should) pose about search engines: to see and appraise search engines as not only (if at all) questions of efficiency and technological improvements. It is to recognize the fact that '… search engine design is not only a technical matter but also a political one' (Introna and Nissenbaum, 2000: 181). As a form of mass media, Introna and Nissenbaum argued that search engines should be considered a part of the public sphere. Given that, they questioned their democratic role given the way search engines favor particular topics, debates, and other sorts of information relevant to a public sphere at the expense of others by means of their indexing practices. Hillis et al. (2013: 5), for instance, highlight that search engines like Google tend to make search look like a utilitarian and neutral activity. But content produced for search engines is produced by somebody trying to capture our attention by paying for having their product to appear on the top of search results. Similar kinds of critique have been put forward in recent years by, among others, Halavais (2009), Hillis et al. (2013), Eklöf and Mager (2013), and Mager (2012, 2014) In general, what these critiques suggest is that search engines perform like all other media by trying to connect commodities and advertising with the attention of a particular audience. Bermejo (2009) observes that

> … searches and advertising seem like a natural fit. If the role of advertising is to show consumers what they do not have, and convince them that they should have it, search is a means for users towards getting what they do not have: information, products, etc. (p. 147)

The means are the cost-per-click pricing model coupled with a system of keyword auctions (Bermejo, 2009: 148).

With reference to Knoblauch (2013: 310) and his claim that the study of mediatization is the study of the changing structure of communicative action, search engines represent a changing structure of communicative action. As a form of media with a potential for communicative action, the way search engines change the structure of communicative action is by means of search the dominant form of action. Search as communicative action still holds on to the old idea in communication of belonging or connecting to someone (Peters, 1999), and Jensen notes, 'Search engines also enact communicative relationships' (Jensen, 2013). But search realizes this idea in a different way and under different circumstances. To connect by means of search is to connect through keywords and the corresponding hope of hitting something or someone with that keyword or these keywords. The idea of the keyword and the search request changes the structure of communicative action as this is shaped by data traces, search histories, and what other people have previously searched for, all calculated and made representable by algorithms and databases.

Moreover, as a changing structure of communicative action, and recalling Finnemann's claim that digital media are always also search engines (Finnemann, 2014: 304), search and search engines are also embedded in other mobile, networked, and social media, thereby making these forms of media perform along the dimensions of search, storage, and tagging as forms of communicative actions. By means of this, it is not only changing the structure of communicative action; search is also an institutionalizing power shaping the actions of other forms of digital media and thereby underscoring search as a social and cultural practice in modern everyday life. Thus, the power of search and search engines in our everyday life is that they force us to frame and understand our communicative actions in terms of their actions. Search and search engines put '… a certain pressure upon the way we communicate' (Hepp, 2013: 54) because they are a part of our habitualized everyday communicative actions. At the same time, our habitualized actions shape search engines as these actions are created out of the cultural expectation that everything can be searched for or uploaded for search. This is similar to what Sundin et al. (2017) call search-ification of everyday life and mundane-ification of search. As a result, the molding power of search engines is located exactly at the intersection between search as a form of communication and our integration of these forms of communication into our own habitualized actions.

Algorithms – calculating communicative actions

In addition to databases and their relation to media and communication, we can also observe some emerging critical concerns with algorithms and their social, political, epistemological, and cultural consequences (e.g. Beer, 2009, 2013; Bucher, 2012, 2017; Cheney-Lippold, 2011; Gillespie, 2014, 2016; Hallinan and Striphas, 2016; Kitchin, 2017; Natoli, 2014; Striphas, 2015). Gillespie (2016) has called this concern for a 'critical sociology of algorithms'. While algorithms always have been an ordinary part of computers and software programs, they are now also a part of our everyday lives because of the omnipresence of digital media and computation. They filter, sort, and structure our actions with digital media. With networked, ubiquitous digital media, algorithms enter our lives, although a rather invisible entrance but yet powerful. The rise of algorithm studies suggests that algorithms are not only technical features of software but must be recognized as active agents in shaping what kind of knowledge is organized, given access to and our perceptions of what counts as knowledge (Gillespie, 2014) and what kind of power structures algorithms may generate (Beer, 2009). Moreover, our online identities of use to online vendors are algorithmically constructed on the basis of sampled and aggregated data, creating profiles not recognizable to a particular individual (Cheney-Lippold, 2011).

Gillespie (2014) claims about algorithms that they are '… a means to know what there is to know and how to know it, to participate in social and political discourse and to familiarize ourselves with the publics in which we participate' (p. 167). At first sight, this may sound like a huge claim about a piece of software. Nevertheless, this claim is useful as it recognizes algorithms beyond software and as part and parcel of our communicative infrastructures and how we make sense of these in our everyday life. Algorithms are powerful means of shaping how we make sense of things we search for,

like, link, tag, or tweet, as they are '… designed to calculate what is "hot" or "trending" or "most discussed" …' (Gillespie, 2014: 267). Correspondingly, what we search for, like, tag, or tweet can also be, or is, surveilled and aggregated by algorithms in order to tailor future actions. Changing communicative action in this way suggests how algorithms are influential agents in constructing and mediating our sense of social reality.

With Hepp's (2013: 54) argument about the molding forces of the media and how they put a pressure upon the way we communicate, we can come to grasp the mediatization effects of algorithms. Algorithms mold communication because we are aware that they are present in communication. For instance, in her study of how users see or aligned with algorithms, Bucher (2017) demonstrated how bloggers reflected upon how to frame their blog postings in order to hide from or be visible to algorithms. They molded, so to speak, their blog communication by making it what Gillespie (2014: 184) calls algorithmically recognizable. Also, algorithms are a molding force when companies are employing search engine optimizers (SEOs) to tweak algorithms in order to make sure that their products are tied to particular keywords and to show up in the appropriate search results. Thus, with algorithms putting a pressure upon the way we communicate, audiences at the same time develop a corresponding sense of how to make their communicative actions recognizable or ready-made for algorithmic processing. The more we are going to witness algorithms as social actors in communication, it seems likewise reasonable to assume that making our communications algorithmic recognizable will become part of our habitualized actions with algorithms, thus producing the molding power of algorithms.

Suggesting the notion of 'algorithmic culture', Hallinan and Striphas (2016) and Striphas (2015) underscore the social and cultural aspect of algorithms. 'Algorithmic culture' is '… the use of computational processes to sort, classify, and hierarchize people, places, objects, and ideas, and also the habits of thought, conduct, and expression that arise in relationship to those processes' (Hallinan and Striphas, 2016: 119). With the emphasis on the habits of thought, conduct, and expression arising in relation to computational processes given by Hallinan and Striphas (2016), we can use their notion of algorithmic culture to emphasize how algorithms gain a molding power because of the habits of thought, conduct, and expression arising in relation to the activity of algorithms in a variety of contexts. That is, algorithms, like media, are not capable of changing communication and having a molding power by themselves. A practice surrounding them is needed in order to produce communicative change.

Moreover, such an idea of an 'algorithmic culture' speaks directly into the ideology of search, archiving, and ordering as activities involved in determining what culture is and with what means we deem something as culture. With algorithmic processing, we may be able to see patterns in, for instance, cultural consumption that we cannot see otherwise, hence challenging our concept of culture or cultural participation. With the notion of 'algorithmic culture', we can say that algorithms are involved in a social and political question of what culture is. It seeks to underline how the practice of ordering, archiving, and searching for items is inscribed in our everyday life due to the omnipresence of digital and networked media.

Furthermore, the idea of 'algorithmic culture' suggests how algorithms are deeply involved in mediatization processes when understood as a change in the structure of communicative action (Knoblauch, 2013). Culture and cultural products are increasingly

understood as something that can be searched, tagged, archived, or downloaded (Beer, 2013; Diamant-Cohen and Golan, 2016). In contrast to the presence of cultural critics, public opinion makers, or journalists, our communicative (inter)actions with culture and cultural products are increasingly determined by automation, calculation, and data. The changing structure of communicative action with cultural products is thus produced, at once, by our own digital actions feeding into automated systems and platforms (e.g. Netflix, Amazon, YouTube, or Instagram) and coming back to us in a ranking mode of communication based on the calculation and prediction of our tastes. This form of algorithmic communication amounts to what Beer (2013) refers to as 'culture finding-us' (pp. 94–97). 'Culture finding-us' is therefore an articulation of a change in the structure of communicative action in the cultural sphere, a change that implies that cultural products track and trace consumers based on their previous communicative actions.

The database – a form of discourse and a cultural form

The database and its communicative logic of listing and ordering items have been with us for centuries. For instance, the list may be understood as its precursor introducing a potential change in our mode of thought by ordering items in rows and columns (Goody, 1977). Several writers have noted the form and function of the database in human communication (e.g. Bowker, 2005; Castelle, 2013; Dourish, 2014; Manovich, 2001; Poster, 1995; Ruppert, 2013). Arguing from a Foucauldian point of view that the database is a new form of discourse operating in the social field, Mark Poster (1995) asserted about the database that it effected '… a constitution of the subject' (Poster, 1995: 85), a form of constitution not necessarily recognized by the particular subject being described by the database and its principles of categorization. With this argument, Poster wanted to show how the database was the latest in a range of cultural technologies (e.g. television, telephone, computer writing, video and audio recording) with discursive effects (Poster, 1995: 90). Poster's idea of database as discourse may be off target. But in this context, the implication of his argument is illuminating. In order for the database to perform as discourse, it can only do so exactly because of its practice of sorting, listing, and retrieving (Poster, 1995: 88–89), resulting in a different kind of discursive effect than previous media. In other words, Poster shows us the value of understanding the database as a form of communicative action and not only as a means of representation.

From a rather different angle and with a different motivation, Lev Manovich launched his argument about the database as cultural form in his book *The Language of New Media*. Here, Manovich (2001) claimed, 'Information access has become a key activity of the computer age […] a new key category of culture' (p. 217). This claim helps to underscore what we may phenomenologically witness in our current everyday life: that ordering, archiving, organizing, and searching for information (i.e. information access) *is* a key activity in our daily encounters with digital media. Manovich claimed that the database was a new cultural form because it is '… a new metaphor that we use to conceptualize individual and collective cultural memory, a collection of documents or objects, and other phenomena and experiences' (Manovich, 2001: 214), and further a general way '… used by culture to represent human experience, the world and human existence in the world' (Manovich, 2001: 215). Against narrative as a cultural form and

as database's 'natural enemy', '… the database represents the world as a list of items, and it refuses to order this list' (Manovich, 2001: 225). The database, argues Manovich, makes it possible to (re)present, (re)configure, and appropriate culture in new media in ways we have not been used to approach culture before:

> The user's experience of such computerized collections is, therefore, quite distinct from reading a narrative or watching a film or navigating an architectural site … It is this sense of database as a cultural form of its own which I want to address here. (Manovich, 2001: 219)

From the user's point of view, many new media appear *as* databases because users can perform various actions with them like viewing, navigating, and searching in contrast to actions (to watch, read, or listen) associated with 'old' media (Manovich, 2001: 219). Thus, with the argument about the database as a new cultural form, Manovich offered a first clue as to understand how it is that the idea and practice of ordering, structuring, or archiving items become a media-based everyday cultural practice. But if the database refuses to order its list of items, it still needs narrative or communicative actions in order for us to make sense of the form of communication the database introduces. Thus, N. Kathrine Hayles (2012) argues that database and narrative are 'natural symbionts' in new media because the database '… needs narrative to make its results meaningful' (p. 176). Narrative in digital culture, on the other hand, needs database '… to enhance its cultural authority and test generality of its insights' (Hayles, 2012: 176). With this comment to Manovich, Hayles in effect points out that every media and communication product needs action and domestication on the part of a potential user in order to make sense socially and culturally.

In a similar vein as Manovich, Paul Dourish (2014) has recently underscored the social and cultural implication of the database when stating that the '… very spread of digital forms means that we increasingly understand, talk about, think about, and describe the world as the sort of thing that can be encoded and represented in a database' (p. 1). Accordingly, with Poster, Manovich, and Dourish's arguments and with Hayles' reminder, we have an indication of the social and cultural significance of the database, the cultural practices it entails, and how it is embedded in digital media. In short, how it is part of shaping communicative action in digital culture.

The social and communicative functions of databases are recognized by Couldry and Hepp (2017: 129–132). But how can a simple technical instrument whose mode of being is a structured collection of items become capable of molding and changing communicative action? First, databases are fundamental to the actions of search engines and algorithms. What to search for and what data to calculate on, predict, and aggregate are determined by what is contained in the database. What is in the database raises further social and political questions of who decides to include what, how to describe the include items and with what principles, and how to make the categories and categorizations (Bowker and Star, 1999). These decisions are not only automated. They are also the result of deliberate actions on the behalf of database owners or providers. For instance, Google is on the surface of course an automated search engine. But Google as a company, at some point, has made deliberate policy decisions as to what to cover, include, and describe (Stalder and Mayer, 2009). It is the embedding of databases in search engines, digital

news media, and social network sites that make their communicative actions possible. That form of communication takes place through the categorizations of items made beneath the surface. Thereby, databases produce a potential change in our modes of thought and communicative actions as we will have to, and we do, align with their way of looking at the world, that is, through categories and categorizations, a feature we in particular witness with film and music streaming services like Netflix or Spotify.

Conclusion

Search engines, algorithms, and databases are examples of deep mediatization, as this is formulated by Couldry and Hepp (2017). Our sense of our social world is strongly constructed and mediated through search engines, algorithms, and databases given their infusion of their communicative actions in our everyday lives. But how *deep* are the processes of mediatization? To search, order, or archive have become communicative actions we routinely perform in order to make sense of our everyday world as it is articulated and represented to us by search engines, algorithms, or database. As routine communicative actions, we also internalize them, thus shaping our ways of appropriating and dealing strategically with them in our everyday communication. Our social worlds and their objectivations are the products of both our own communicative actions, and the algorithmically generated representations of these worlds.

Moreover, search engines, algorithms, and databases force us to see the products of culture and society as something that can be searched for, as actions that can be automatically calculated and manipulated, and stored as data to be retrieved in databases. Learning to make sense of our world means learning to make sense of the statistically generated set of categorizations, representations, and calculations offered to us by search engines, algorithms, and databases.

Thus, 'deep' mediatization implies a different form of human interaction and cognition than any previous set of media has demanded from or forced upon us. The changes brought about by deep mediatization are, besides social and cultural, also epistemological changes to the extent they make us act, understand, and get to know about things according to the 'logic' of data and algorithmic processing, archiving, or ordering. Consequently, to study deep mediatization is, among other things, to study practices of archiving, ordering, and searching for items in structured collections and how they are entangled with and appropriated by people in their everyday communicative actions. In materialist phenomenology terms, this means that

> If we take seriously the possibility that the automated digital tools that measure behavior and activity online are now a key part of everyday life's background, then phenomenology has been complicated irreversibly. *A materialist phenomenology must register how everyday actors are involved in bringing the workings of those tools into their everyday awareness. All are processes of categorization*. (Couldry and Hepp, 2017: 141; italics added)

Digital tools are not only information technology (IT) products or appendices. Digital media and data make up the self-consciousness, actions, and representations of social institutions and social structures. Digital media and data saturate deeply into the actions,

practices, and consciousness of humans and societies. They are the means and modes of communication and sense-making we live by.

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