

6-15-2020

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Recommended Citation

Norström, Livia; Islind, Anna Sigríður; and Lundh Snis, Ulrika M., "Algorithmic Work: The Impact of Algorithms on Work with Social Media" (2020). *ECIS 2020 Research Papers*. 185.

https://aisel.aisnet.org/ecis2020_rp/185

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ALGORITHMIC WORK: THE IMPACT OF ALGORITHMS ON WORK WITH SOCIAL MEDIA

Research paper

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Abstract

Working with social media in professional settings is a complicated task. The operations of social media platforms are based on complex algorithms that are adjusted based on a constant stream of data created when users interacting with each other. Making sense of, and professionally acting on, algorithmically mediated data that influences the way the work tasks are performed, is what we call “algorithmic work.” The research questions addressed are: (i) What is algorithmic work? and (ii) How is algorithmic work with social media performed? Based on qualitative text analysis, in-depth interviews and participatory workshops from a longitudinal study with professional municipal communicators, we analyze Facebook interaction and how algorithms impact and influence the work with Facebook over time. The findings show how the social media algorithms push the communicators to rethink how they phrase their posts and how they approach the audience while constantly considering their professional role. The main contribution is the conceptualization of algorithmic work as socio-technical processes of: i) balancing openness and closeness of platform operations; ii) adjusting the work operations and performative interactions as the algorithms change; and iii) strategizing on how to understand and utilize advantages of algorithmic logic for the organizational and professional mission.

Keywords: Algorithmic work, Platforms, Social media, Sociotechnical interplay.

1 Introduction

A substantial part of people’s daily activities is supported by the use of digital platforms. The digital platforms rest on algorithms, making it increasingly important to understand the influence of changes in the algorithms and how to govern them in order to serve both private and work-related purposes and goals. Consequently, ambitions to understand the influence of algorithms is no longer merely a concern for computer scientists and mathematicians. The interest in algorithms and the influence from the way algorithms are designed is advancing beyond computational understanding of optimization and efficiency, towards human, organizational and societal understandings of its applications and effects (Seaver, 2019; Kersting, 2018). In this paper we shed light on the sociotechnical interplay that takes place when people try to understand the way algorithms function, and how algorithms impact work.

Algorithms are step-by-step instructions for solving a problem. We use algorithms constantly for completing various tasks in everyday life, for instance when buying products online, when predicting the most

efficient travel route on our way to work, and for forecasting how a pandemic outbreak can be detained. Algorithms are in that way unambiguous computer procedures that consist of specifications and a precise description of what steps to take in order to solve a task or a problem. However, the way they operate can be ambiguous to users. How platform algorithms operate and how they affect our personal life, work and society has been discussed from the perspective of individual users (Orlikowski and Scott, 2015), organizations (Norström et al., 2019) and society at large (Zuboff, 2019). The core of the discussion on all levels revolves around two foundational aspects of algorithms related to i) their capability to formalize and quantify informal and qualitative data such as people's taste or preferences and ii) their highly technical, complex and secret architecture that is difficult for even the most technically competent persons to interpret (Seaver, 2019).

As platforms are also used professionally there is an emerging striving among professionals to manipulate platform algorithms for work purposes (Faraj, Pachidi, and Sayegh, 2018). Most computer programs are built up by algorithms that aim to bring the user to a predefined goal in as few steps as possible (Hodder, 2009). Work that involves using social media platforms such as Facebook, Instagram and Twitter is one area that is heavily influenced by algorithms (Norström, 2019). The algorithms of social media platforms are composed and constantly redefined by the platform owners and different types of user data consisting of encoded users' behaviors (likes, shared posts, written comments, search terms, connections and interaction with others, etc.) as well as by other kinds of information about the user (such as age and occupation). Users are intentionally or unintentionally choosing to share the data with the social media provider (Alaimo, Kallinikos, and Roth, 2015). The vast amount of data, continuously flowing into social media platforms, makes the lifecycle of the algorithms short, and as the algorithms change, the users' work of understanding how they operate is subject to change. Users' interactions online and their willingness to share data are in that sense crucial resources for social media platform owners' data production (Varian, 2010) and algorithm construction. The algorithms are therefore important agents in sociotechnical, two-sided arrangements of platform users and platform owners (Gawer, 2014; Islind, 2018), and the understanding of how they operate is crucial for professional social media workers. In this article we thus argue that the increasing pace of change and the ambiguity of the algorithms, in combination with the vast amount of user data, impacts and changes the way professionals perform work with social media.

From the perspective of professionals, the way information spreads on platforms such as Facebook (i.e., its reach), and the algorithms behind how such platforms operate are partly unknown, and moreover a platform such as Facebook is not static. Rather, platforms such as Facebook can be understood as ever-changing, growing infrastructures where the algorithms are changed and cultivated over time. Due to uncertainty about how algorithms operate and change, the work of the professionals using social media platforms is also continuously subject to change. Work with social media platforms is therefore seen here as an evolving practice of entanglement of technology and professional tensions where adapting to the changes is a key component. The work that is needed to make sense of how the algorithms work and how to adapt to the ever-changing algorithms is what we define as *algorithmic work*.

In this paper, we want to dig deeper into the influence of algorithms on work. We draw from a five-year longitudinal engaged scholarship study in Swedish municipalities. We have investigated what strategies municipal communicators use when working professionally with social media and how they make sense of these strategies by negotiating how they believe the social media platform algorithms operate - and the mission of their work. The research questions addressed are: (i) What is algorithmic work? and (ii) How is algorithmic work with social media performed? The main contribution of this paper is a conceptualization of algorithmic work through empirical data on how communicators understand their strategies and how they reason regarding successful social media practice and the impact of algorithms on work.

2 Working with Social Media in a Governmental Context

Social media platforms have become widely popular for professional use targeted towards increasing citizen participation efforts in municipalities since these are platforms that citizens are already familiar with from private use (Ellison and Hardey, 2013; Hanna, Rohm, and Crittenden, 2011), and social media

platforms stimulate creativity and sociality in a way that traditional government platforms do not (Mergel, 2013). Boyd and Ellison (2007) argue that Facebook, Instagram and Twitter are a group of social media platforms that are distinctive in the sense that they allow people to self-design and increase visibility of their social networks to others. Social media platforms enable editability of content before posting or re-posting, allow persistence of posts and discussions over time, and afford associations between people and between people and content (Leonardi, Nardi, and Kallinikos, 2012). Social media platforms have been ascribed with the potential to connect people with the same interests and enable them to create content and share views and ideas together in a shared space (Kaplan and Haenlein, 2010; Yates and Paquette, 2011). Bucher (2015) however refers to Boyd and Ellison (2007) and argues that “being social” in social media is not simply an act of making your network visible to a group of already known people. It is rather a performance, constituted by users’ constant engagement in content and connections (that do not have to be human), and that are inspired and driven by social media platform business logic and algorithms. The interplay of users’ engagement and algorithms, Bucher (2015) argues, evolve the individual network beyond the boundaries of individuals clicking, liking and commenting, and ultimately reshapes the notion of “being social.” The “social” in social media is an activity, she argues, hence it is a complex doing, enacted by both humans and technology alike (Bucher, 2015). This sociotechnical interplay of the human and the technological, is what we will study through the empirical case presented in this paper.

The use of social media platforms is especially suitable at the local government level (henceforth “municipality”), where the work of government administration is conducted in close relation to citizens and the facilities that affect citizens in their everyday lives (Mossberger, Wu, and Crawford, 2013). There are several motivations for municipalities to use social media. First, people (e.g. citizens) increasingly rely on social media platform operations for their news consumption, believing that organizations and news organizations they trust will ensure that important news reaches them (Napoli, 2015). Second, social media is an important strategy for municipalities to increase transparency of municipal services and activities. Municipalities have, to some extent, overall responsibility for citizens’ well-being in the Swedish context, and they are held accountable by citizens for what they are doing. To manage this responsibility, providing information to citizens is of vital importance (Hofmann et al., 2013). Third, social media platforms enable new opportunities for municipalities to reach out to a variety of groups and to make people feel they are closer to the municipality, which can lower the threshold of wanting to participate in processes of decision making (Bonsón, Royo, and Ratkai, 2015). Fourth, social media is used for promotional reasons to make people proud of the municipality and to make new inhabitants come and live there (Bellström et al., 2016). Consequently, social media platforms have become one channel (of several) where municipalities manage information dissemination, citizen participation and marketing activities. The activities involve a range of different topics such as housing, public works, town planning, upcoming events, safety warnings, job vacancies, upcoming meetings at city hall, etc. (Bonsón et al., 2015).

Making use of social media professionally can however be difficult. As we argue in this article, due to sociotechnical arrangements, professional use of social media requires new ways of working, i.e., unique working skills that are different from skills needed for offline communication or information delivery via email or websites (Norström, 2019; Simmons, 2014). Even though social media platforms offer more available data and more easily accessible connections, the filtering and ranking of content has become an increasingly difficult task (Mergel, 2017). High-quality content is difficult to separate from low-quality content, and beyond the content itself, a range of non-content information is available (Agichtein et al., 2008). Using social media professionally in a municipal context is about balancing logics of the platform owners (e.g. Facebook’s rating of content and connections) and logics of the municipality (e.g. the mission to be transparent, responsive and accountable) (Norström, Bernhard and Lundh Snis 2019). This balancing effort has been conceptualized as sociomaterial work processes in which algorithms play an important role to impact and be impacted by the professional communicators’

interactions with the platform (Norström, 2019). In the next section we explain in more detail how we think that the concept of algorithms can be understood as a sociotechnical phenomenon (rather than purely technical and computational) related to the work practice of using algorithmic technologies such as social media.

3 Sociotechnical Interplay of Algorithms and Work

As work with social media is being more and more common, a professional understanding of the interwovenness of platform algorithms and work has become increasingly salient (Norström, 2019). Van Dijck and Poell (2013) conceptualize social media platforms as enablers of a set of double logics and describe the duality as a “double-edged sword of empowerment—of users and platforms” (p. 11). What that means is that on the one hand platforms steer content and connections to the users according to their own business logic, while on the other hand the platforms are all dependent on users to share their interaction data with the platform. We argue that it is in this interplay between platform owners’ and users’ business interests that the algorithms become interesting. The algorithms serve as a boundary object between the platform owner and the users and both sides are equally interested in “harnessing” the algorithms to serve their respective purposes. In this article we study the user side of this sociotechnical process of conducting control of the algorithms.

3.1 The Algorithms of Facebook

Relevance and *rating* are important aspects of social media platform algorithms. Relevance is based on what the user in previous interactions online has shown interest in, i.e., the type of content that has been clicked on, “liked,” shared or commented on, or the type of content that is produced by people with whom the user has previously interacted. Depending on how platform users adapt to the algorithms, other users will react differently to social media posts. Also, depending on the level of engagement on posts and the positive or negative reactions from users, the professionals working with social media will be rated by the algorithms and the users. That rating is valuable data that is fed into algorithms of the social media platforms. The algorithm will then shape future content and connections visible to the users, i.e., the algorithm structures the relevance of content to its users. As such, the platform algorithms collect, extract and analyze interaction data to be used for improvement of the social media service. The aim of the platform owners is to develop even more relevant services for users and to make even better predictions of future user demands (Zuboff, 2015).

Algorithms are surrounded by a large amount of business secrecy that makes it difficult for users (e.g. professional communicators) and end users (e.g. residents of a municipality) to understand how they operate and what data controls their decisions (Zuboff, 2015). The algorithms also change frequently, often without notice, as they are operated by large companies and platform owners that depend on the algorithms for their economic growth. An economic interest of the platform owners, in combination with a fast scaling of content and connections, is argued to reinforce “hidden” intentions embedded in the algorithms, governing users’ activities and decisions (O’Neil, 2017). Algorithms are thus value-loaded and permeated with previous decisions as well as prejudices, and as such colored by individual human judgments and underlying business models that can influence or harm especially disadvantaged or vulnerable groups in different ways (Kroll et al., 2016; O’Neil, 2017; Twomey, 2018). Algorithms can repeat historical problems by filtering out information based on old and outdated values and politics (Barocas and Selbst, 2016) and thus influence future work in various ways.

Since Facebook is the social media platform most used among Swedish municipalities and among people living in Sweden (Davidsson and Findahl, 2018), and since Facebook is part of the empirical case in the study, below is a description of special features of Facebook algorithms in particular. The primary interaction functions of Facebook evolve around likes, shares, comments and reach. In the beginning of the Facebook era, when a user clicked “like” on a page, the user got future posts from that page visible

in his or her private Facebook feed. As Facebook (and the Internet overall) grew bigger and there was just too much information for one user to handle, Facebook started to change its algorithms so that only the most relevant posts were visible in the user's feed. Since then sorting and presenting have been important aspects of Facebook algorithms (Silverman and Huang, 2017). The Facebook algorithms are developed to change the order and presentation of posts so that users will only see what Facebook thinks are the most relevant posts to the user and with a focus on posts centered on family and friends rather than business relations. This focus has intensified even more since 2018 (Mosseri, 2018), which on the one hand may be a problem for organizations, while on the other hand it may strengthen the importance of Facebook to people. As a consequence, organizations need to create even more authentic posts and real engagement. In other words, they need to be "friends" with their customers. The change does not mean that businesses are not promoted at all in the feed of the users, it merely means that the algorithms promote quality content, based on authentic interaction and meaningful encounters. This prioritizing by the algorithms increases pressure on those posting on Facebook to create content that will drive interactions that are meaningful to people. If a Facebook account is not creating quality interactions, future posts will be less likely to pop-up in users' feeds, even though the users have "liked" or "followed" the page, whereas if posts are creating genuine interactions, the page as a whole gets greater reach and thus becomes more widely visible.

One important argument for the change to prioritize authentic interactions was to get rid of so-called "click bait" or "engagement baiters," which had been a huge problem on Facebook. Engagement bait is a marketing strategy that tries to "game the system" by attracting engagement that is not genuine. An example of an engagement bait can be the following post: "Are you going to the Light Festival this weekend? Please post YES if you are going." In the old algorithms, these types of posts would have spread like wildfire due to the number of comments, whereas the recent algorithm update does not promote posts that attract identical comments, because they are recognized as spam (Zuckerberg, 2013).

Lastly, Facebook prioritizes "native content," i.e., content posted on its own platform, rather than links to another platform. By doing so, Facebook gets more data to analyze and use for refinement of algorithms. For organizations, that means that posting a link to their own websites on Facebook will lower the chance of reach. Instead, they should create unique content and post that to their Facebook page (Zuckerberg, 2013).

It is not only the function of each algorithm that is tricky for users to understand and act upon. Each algorithm also interacts with other algorithms, making work with algorithms not only dependent on the most apparent algorithms but on a whole network of algorithms and big data (Janssen and Kuk, 2016). Understanding and finding ways to enact the above-described types of changes, within a network of algorithms, are considered the core of being a competent user of Facebook.

3.2 Sociotechnical Interplay

As we see it, the change elements above and algorithmic work as a concept, are a sociotechnical interplay. Originally, the sociotechnical approach was a response which aimed to overcome the opposition between technological and social determinism, but it has been criticized for being an instrumental, normative tradition, and the practical impact of the practices involved in sociotechnical research has also been questioned over the years (Bjerknes and Bratteteig, 1995; Kraft and Bansler, 1994; Kyng, 1994; Leonardi et al., 2012). Sociotechnical research has also been criticized for either favoring the technical or the social (Cecez-Kecmanovic et al., 2014; Leonardi et al., 2012; Orlikowski, 2009). However, in recent years, the focus of research done from a sociotechnical perspective has shifted. In the early years the research focused on altering the practices to fit the technical system, whereas today the focus is more on a sociotechnical interplay where both the practices involved and the technology used are viewed in a relationship where both need to be carefully considered in order to enhance the understanding of how technology affects practice, and how practice affects technology (Leonardi and Barley, 2010). There is, however, an inherent ontological distinction preserved between the social and the material (i.e., technol-

ogy) even in recent sociotechnical studies, which validates “the viability of a socio-technical approach in which the ontological distinction between the social and the technical reality is maintained” (Robey, Anderson, and Raymond, 2013, p. 385). Conceptualizations of sociotechnical studies, where the practice of interacting with technology is studied, are for example found in Sarker, Chatterjee, and Xiao (2013), Sawyer and Jarrahi (2014) and Winter et al. (2014). Following that line of reasoning, the notion of being attentive to technology as a driving force for organizational change and going beyond being a “facilitator” (Mumford, 2006, p. 334), the sociotechnical approach further develops and reemphasizes that the logic that functions as the basis on which appropriate organizational processes and structures form, is impacted by the existing technological phenomenon. Sociotechnical studies further reconsider the relationship between technological phenomenon and its matching organizing processes when technological trends change (Winter et al., 2014).

Orlikowski (1992) argued in previous studies that the role of technology and how interaction between technology and organizations is defined, is yet to be genuinely understood. Almost 30 years later, we still see that the literature has yet to dig deeply into how ever-changing algorithms and the ambiguity of how they operate, affect the way professionals are performing their work tasks. When Orlikowski did her studies, the hardware view prevailed as a multiple context-specific definition of technology and was running in organizations that mainly employed machinery in the productive activities, whereas the changes today, which we have elaborated on above, are on a different level. We still see the need to dig into the sociotechnical interplay and what truly happens during the work that is affected by ever-changing elements in the platforms used for work tasks.

There is a need to rethink organizing and work inheritance structure through the wave of social media platforms. The algorithms are important agents in sociotechnical arrangements, and understanding how they are perceived and actualized, and how they affect work, is crucial. The effort needed to make sense of technology use benefits from bringing in perspectives and tensions related to the interwovenness of technology and social settings. Hence, the new mindset to be analyzed aims further to incorporate adaptation and change as a sense-making process in which we pose the individual as well as collective knowledge of the workers (professionals) as central to the sociotechnical phenomenon under our study (cf. Arghavan Shahlaei, Lundh Snis, and Stenmark, 2019; Islind et al., 2019; Bednar, 2000; Silver and Markus, 2013).

4 Research Approach

The case of Facebook algorithms as the bearing element for this study will first be contextualized. Thereafter we present the results from the municipality where communicators were found to conduct algorithmic work when interacting and performing with Facebook specifically.

This paper is based on a four-year (2014-2017) collaboration project between researchers and municipal communicators (herein also called professionals). The purpose of the project was to develop understanding of the role of social media in the municipality and investigate what new competences would be needed when social media becomes an integrated part of work.

The empirical data included in this paper is based on a qualitative approach mainly framed as engaged scholarship (ES) (Van de Ven, 2007). ES allows for an interactional and participatory approach to research that allows research and professional practices to meet and take advantage of each other's knowledge and benefit development of both domains (cf. Benbasat and Zmud, 1999; Davenport, Markus, and Lynne, 1999; Van de Ven, 2007). Striving towards relevant results for practice without compromising the study's rigor is a known part of the discussion around ES.

In our ES study, a total of 16 municipalities participated, of which five were more intensely involved. The participants in the study all work as communicators in small and medium-sized municipalities in Sweden. Their work implies external social media communication in some way in combination with communication management. The researchers and the practitioners have had a collegial relationship and had the am-

bition to make the most out of each meeting in order to develop research through practice and practice through research. The practitioners elaborated on their experience, whereas the researchers shared the latest research on the topic, and in an iterative manner, the discussions evolved through an exchange of practice-related and research-related insights. The integration of theory and practice through the simultaneous contribution to both is a central part of an ES research approach (King and Lyytinen, 2006; Van de Ven, 2007; Weber, 2004).

4.1 Data Sets and Analytical Approach

This paper is based on two data sets. The first data set includes the posts from five municipalities' Facebook pages. Fifty posts were scraped from each of the five selected municipalities' official Facebook pages in April 2017. This was found to be a sufficient number to achieve saturation and thereby cover all the different topics and approaches used by the municipalities (Bryman, 2016). The data collected for each post consists of a text message, the URL to the Facebook page post, and the number of likes, comments and shares. Altogether, 250 posts were collected and analyzed.

The second data set consists of discussions around experiences through i) three participatory workshops; ii) 21 individual semi-structured follow-up interviews with municipal communicators to follow up the workshops (between 40-90 minutes); and iii) numerous informal and formal meetings over the four-year period at the municipalities. Nine small and medium-sized municipalities and a total of 23 municipal communicators participated in three workshops. The three workshops started with a presentation and discussion of the research groups' latest findings based on previous interviews and workshops. A main topic in the following discussions was based on the contradictions the practitioners experienced between what they believe were proper actions as public servants (e.g., being accountable, transparent, formal), and what they experience as new opportunities with social media in interaction with citizens (e.g. promotion, informal conversations, being timely and immediate) (see also (blinded for review process)). The discussions also evolved around the algorithmic changes in Facebook as a platform, which had been implemented since the workshop last took place.

The overall analytical approach for this paper was through abductive engagement with the empirical and theoretical material (Alvesson and Sköldbberg, 2017). Here the abductive nature refers to the interplay between the empirical data, realized through real-world problems (inductively obtained) in combination with influences from theory (deductively inferred) (Gregory and Muntermann, 2011) by viewing "reality from the theoretical viewpoint or perspective" (Van de Ven, 2007, p. 104). The abductive nature has thereby involved shifting between inductive and deductive reasoning as a way to continuously revise, sharpen and re-formulate the research design (Gregory and Muntermann, 2011; Van de Ven, 2007).

Even though the overall approach was through abductive engagement, the analysis of the first data set included thematic analysis which was targeted towards what approaches were used in communication with citizens, how the communicators talk about successful interactions and by shedding light on less successful social media interaction. The analysis also highlighted how the communicators perceived Facebook's algorithms and Facebook as an external platform in relation to their work as communicators. In the analysis of the second data set, the thematic analysis was about coding and categorizing the data. To categorize the communication approaches, we searched the empirical material for different ways of approaching the audience: level of authority (formal or informal), relationship to the audience (friendly or distant) and with what aim (e.g. if something is requested from the audience or if the post is only informative). As social media mediates social interaction (Alaimo et al., 2015) and since posts that are formulated and designed to trigger socialization most probably will have an impact on audience engagement, we looked for communicative behaviors that supported such logics. The abductive approach also included using the literature on professional work with social media describing how algorithmic logic intertwines with missions of the municipality when social media is practiced (e.g. Norström and Hattinger, 2016; Norsröm, Islind and Vallo Hult, 2017; Norström et al., 2019; Norström, 2019) and literature on the impact of algorithms on work (e.g. Orlikowski and Scott, 2015) to inform the analysis.

5 Findings and Analysis

The work of the municipal communicators consists of managing the official social media accounts. The main target group for the communication through social media is the residents of the municipality, even if private and non-governmental organizations are sometimes also targeted. The communicators post at least one (often more) post to the municipality's official Facebook page every day and reply to several citizens' questions and comments. One municipality also uses Twitter and all of them use Instagram. Most municipalities have opened up their Facebook page for visitors to post directly to the page (which is a setting in Facebook that can be switched on or off). Still, the work with social media is only a part of the communicators' total work. In addition to managing the municipalities' social media accounts, the communicators in the study also manage the overall strategic communication work in the municipality, some manage the municipality's website and some serve as media experts for the politicians and other administrative staff in the municipality. However, in this paper we only analyze the work with social media, and it is that specific work that we refer to as algorithmic work. The following section includes both findings about, and analysis of, how communicators perform and reflect on their work with social media. We outline three areas of concern for the communicators in the study: i) enabling interaction; ii) creating meaningfulness; and iii) taming the algorithms.

5.1 Enabling Interaction

Reaching out with important societal news and reporting about municipal activities lies at the heart of the governmental mission which includes securing all citizens accessibility to municipal services while being accountable. However, purely informational posts (e.g. information about a meeting in the city hall or new opening hours of the library) will not spread in social media. The algorithms do not prioritize societal news which triggers little engagement. The algorithms are content neutral but they prioritize interaction, i.e., content and connections that have previously been engaged with. To adjust to Facebook's algorithms, the communicators in this study have therefore stretched the boundaries of what and how they normally communicate in other channels such as through the website and through email. One respondent elaborates on the logic behind the algorithms and suggests that the communication strategy on Facebook may not first and foremost be to spread everyday societal news but should instead be about getting people to interact with posts to "prepare" the algorithms to deliver important information when it is really needed, for instance in case of a crisis: *"Maybe what you post [on Facebook] is less important than actually having an established channel, eh, it is important to get the channel as widely used as possible and to get many followers, so that you at least have a path to walk on when you really need it [like in a crisis]."*

A way to create interaction is, according to the communicators, to use narrative expressions that evoke feelings. Such a promotional approach can be depicted through a picture alone, for example an early spring flower in bloom after a long winter. It can also be represented by a longer text that tells a story from within the municipality, e.g. about a pub evening at a local home care center or a regular day for a park worker. One communicator elaborates on a post that they found successful in terms of engagement from the audience: *"One of the most successful things I've posted, was when we bought a meatball machine, a machine that makes meatballs so that we can make homemade meatballs for all our organizations. Then she [the cook] simply filmed when this meatball machine was running and I posted it and wrote what it was and got great reach and we got so much positive response about the fact that we make homemade meatballs for the elderly, the preschool, the schools and all that. And we also conducted a small competition to name the meatball machine, so it's called Bertha."* The communicators discuss that topics related to social service, that shed light on routine everyday activities and that capture the municipality as a warm and nice place to be – those get reach. The algorithms favor these types of posts because they trigger likes. One communicator says: *"We had a retirement home in the municipality where they were making sausage before Christmas. And then she [the caregiver] had taken a picture which she gave to me and it has also got great reach and lots of hearts and people like to see things that are cozy and*

nice, that's what creates reach for us."

However, following the logic of the algorithms in order to increase reach is not only a successful strategy according to the respondents. On the contrary, they regard it as problematic in relation to the overall mission of the municipality. One communicator reflects: *"It's pretty much about culture. What space do we have in the municipality to arouse passion and play on people's feelings... when we simultaneously have a social obligation to protect children's wellbeing, which sometimes involves police interventions and other means of authority? And then at the same time we're supposed to sit here and talk about how compassionate we are and how much we care. I find it very difficult. What are we supposed to do... what's a reasonable code of conduct here?"* The struggle between bowing to what the algorithms favor and being true to the governmental mission is apparent.

5.2 Creating Meaningfulness

Another adjustment that the communicators discuss, is that if they make their posts shorter and with less informative depth, the algorithms favor those posts. They elaborate that to them, it is obvious that Facebook favors short pieces of native information (i.e., posts that do not contain links to websites) and they see the risk when too much of their time and work goes towards adjusting to the brevity and interaction speed that is favored by the algorithms. The communicators talk about the role of Facebook in relation to the role of the municipal website and explain that the website is used for long articles, while the Facebook page is mainly used for short messages which sometimes contain a link to longer articles on the website. They do however know that external links are favored less and discuss that as a problematic aspect. According to one communicator, the work with Facebook is always prioritized and that might be a problematic approach since the information on Facebook is shallower and lacks depth, which makes it difficult for citizens to participate and engage: *"The democratic mission is to provide information that people can immerse themselves in and understand and take a stand on, inform about things. That's where we lose because we put more and more focus on Facebook, because that's where we see that we get the interaction, there are fewer and fewer that go to the website. But the depth is missing [on Facebook]."* One communicator has a similar argument and states that to take advantage of Facebook they have to understand it as a separate channel with its unique prerequisites: *"That [a focus on Facebook] tends to shape communication towards an increased emphasis on short and shallow news rather than longer articles with different perspectives embedded in a context... In order to give that fast and direct feeling on Facebook, we have to get away from the thought that we have to make long articles and all that stuff. We need to be faster and more agile towards social media. We work much more with Facebook as a separate channel with its own prerequisites and that means we lose the depth, because we don't take the time to work with that. That is my experience at least."*

Yet another communicator asks how long a message on Facebook can be before the reader loses interest. A communicator replies that it all depends on how the messages are formulated: *"It depends completely on how you write, your way of writing"* and as they continue to reason about what types of posts are the ones that are important to people, another communicator fills in: *"Yes, your posts have to be touching and go straight to the heart."* Another communicator continues: *"Or that the person knows the person that you are writing about."* They continue to discuss the importance of balancing a professional attitude with a personal tone, and to not be afraid of applying a personal tone in a professional context: *"and dare to be more personal."* One communicator brings up the example of the police force in Sweden, which has active Facebook accounts all over the country and that often get a lot of interactions on their posts: *"For instance, the police force often has long posts about how they approach a scenario and blah blah blah, they can be super long posts, but they get shared a lot because they touch something."*

The communicator is analyzing and understanding that it is not about the length of the posts, but rather about the feeling that gets communicated: *"I believe that it is important to put your heart into it. But in general, when it is regular information, then I believe that it's like three sentences or something. Longer than that is too long, because it disappears so the whole message is not visible and when it's not visible*

there, then people become uninterested and then you lose them” [Authors’ comment: Facebook cuts the message after a few lines and the reader has to click on the post to continue reading]. Another communicator emphasizes that it is not simply publishing the information that is the important part of the work with Facebook, but rather to make the information engaging: “This is where we have homework to do. We sort of give the information that we want to give, but I think instead we need to think the other way around: how can I create interest around this? My goal is not only to get the information out so that I can get a ‘check’ on that and be done with that, it’s also about how I can reach into the heart of those who live here with this information.”

5.3 Taming the Algorithms

The secrecy and the governing influence of algorithms raises several questions regarding how the algorithms operate: *“What I think is hard is that I am in the hands of their [Facebook’s] algorithms and their valuation of what is relevant information... you are not in full control in a way and I... it’s like it feels good to reach out but it feels tough to be in the hands of a company in the way we are and in their algorithms and their earnings.”* There is a true will to understanding the algorithms: *“What I would like to be better at is a lot of follow-up as well as at statistics, like which are proper measurement points, what indicates that you are successful with social media... and even this with the algorithms, but they change all the time.”* There is also a frustration regarding the changes in the algorithms, which change without notice: *“Well, you don’t even get information that it’s changing, you just have to discover it all the time! I think it’s a challenge all the time... so it’s a platform we do not own so we have no chance to be the experts.”* Yet another communicator reflects on the difficulty of evaluating their own work and points towards a difficulty in systematically progressing and continuously developing when the algorithms of Facebook are constantly changing: *“Facebook changes every two months, right, so how can we as communicators possibly monitor and do follow-ups on our work?”*

Due to secrecy and constant changes in the algorithms, it is also difficult to remain in control of the communication and the communication strategy. One communicator reflects over the experienced tension between reaching out and having control: *“It’s a great tool [Facebook] if you can handle it and not everyone can. It’s like a two-headed monster. It’s terrifying in a way... There are municipalities that have really put their foot in their mouth, such as in a neighboring municipality where the residents of a retirement home didn’t get their New Year’s Eve dinner. It became a mess. It’s not funny to end up in such a shit storm. In those situations, you really have to hang on to your hat because otherwise you can easily lose control over your Facebook feed. And that’s what happened. They lost control.”* Another communicator makes a similar reflection: *“What I find difficult is that you are in the hands of their [Facebook] algorithms and their values of what is important information, you end up in people’s feeds next to sponsored posts and you do not know what it is about... and you end up in a context that you can’t control.”*

To briefly sum up the findings, the respondents report on how they change their way of communicating by being less informative and instead focus on approaches to the citizens that stimulate interaction. They experience themselves to be more shallow, brief and agile in their way of working and even if they realize the communicative potentials to reach out to people by means of social media, they also feel insecure about the distance to the platform owner and the lack of control of their communication. A constant change of algorithms makes it difficult for the communicators to evaluate their work and engage in strategic progression of performance. Work with social media has made the communicators start reflecting about the way they express themselves, how the audience can be engaged in topics, issues and events, but also what their role is as municipal communicators. The findings illustrate that work with social media involves considering social media platform algorithms in relation to the work of being professional. They show that professional work with social media is constituted by an evolving practice of entanglement of algorithmic and professional logics, which we discuss in the next section as algorithmic work.

6 Discussion

Using social media strategically as a part of work has become increasingly common, but the knowledge of how professional work with social media is enacted remains limited. The use of social media is influenced by platform algorithms. To be able to act professionally, an understanding of how these underlying algorithms operate, how professionals perceive and strategize them, and how algorithmic thinking affects work, has become the focus of this research. In this paper we have explored the strategies of municipal communicators and how they conduct work with social media, i.e., algorithmic work. Algorithmic work is part of a larger context that consists of a continuous iterative process in which algorithms are reconstructed by the platform owners at arm's length relationship to its users (Islind, 2018), and where both work of the communicators and life of the crowd (e.g. the citizens) are becoming increasingly intertwined with algorithmic changes (Hanna et al., 2011; Norström, 2019). From the findings we have opened up the black box of algorithmic work and we will now discuss three main conceptual processes that are encountered when algorithms face professional work: i) balancing openness and closeness of platform operations; ii) adjusting work operations and performative interactions as the algorithms change; and iii) strategizing on how to understand and utilize advantages of algorithmic logic for the organizational and professional mission. We argue that these three conceptual processes constitute algorithmic work.

6.1 Balancing Openness and Closeness of Platform Operations

Exactly how algorithms are constructed depends on the business concept of the platform owner (Zuboff, 2015). In the case of Facebook, algorithms have always had a strong focus on networking with family and friends (compared to for instance LinkedIn which has a more professional networking goal) (Zuckerberg, 2013). Consequently, using Facebook professionally is extra challenging, because posts have to be authentic and generate genuine engagement (compared to engagement baits as the opposite extreme). This informal and friendly approach to citizens is partly new to the municipal communicators, and it is difficult to balance in relation to the authoritative mission that a municipality has. Balancing activities that generate reach with the professional mission becomes a struggle.

Most social media platforms are neither designed for professional purposes (e.g. Facebook prioritize connections between family and friends rather than professional relationships) in general nor designed in accordance with government traditions and missions such as being authoritative, transparent and accountable in particular (Norström et al., 2019). The platforms are instead driven by a "sharing logic" with the purpose to make users share data by interacting online, and since data is the main business, the aim is to drive people to share their activities, thoughts, feelings and connections. This sharing logic is embedded in the social media platform algorithms that strictly govern the sorting and presenting of posts (Alaimo et al., 2015). As such, control of what is going to be shown to users is difficult for professional social media workers to predict. In our study, once opening up the black box of algorithmic work, the many strategies of acting professionally in an increasingly complex sociotechnical work environment became apparent. The communicators constantly strived to balance the hidden logic of algorithms with their daily work of opening up the municipality for visibility of information and for participation.

The invisibility of the algorithms, and the mystery that surrounds not knowing exactly what they do, is in line with Star's (1991) early arguments for the sociology of the invisible, where the author argues for the task of shedding light on the "erased and silent work," not only of humans, but also of devices and software that are a part of the culture (Roscoe, 2016). Being transparent is one of the core values of public government and it extends to the government's action online (Bertot, Estevez, and Janowski, 2016). When government operations are not clearly visible it is more difficult for communicators to "demand" things from the citizens and involve them in processes of decision-making and it is more difficult to uphold legitimacy. Algorithmic work is in that sense a process of constantly balancing on the verge of openness of activities and closeness of the operations underlying the openness. It is about making use of the openness that the platforms enable by creating visibility of municipal activities and enabling dialogue,

but simultaneously make sure that the price of supporting the platform owners' invisible operations is not too high.

6.2 Adjusting Work Operations and Performative Interactions as the Algorithms Change

The work that the communicators do is being orchestrated by the algorithms at play, and the communicators need to understand how to adapt to the algorithmic logic of the social media platforms. Algorithmic work is thereby tightly coupled to a bundle of different complex sociotechnical processes (cf. Bednar, 2000; Monteiro et al., 2013; Mumford, 2006), some of which are black-boxed or out of reach and control by the workers but as the results show, are being somewhat deciphered through their work.

With earlier communication technology types used, the distinction between informing and interacting has been a relevant distinction as the different activities have been done in different channels. With social media, this distinction is counterproductive. If information is supposed to reach out to people, it has to have been preceded by interaction. Facebook algorithms favor connections between users who are interacting or have been recently interacted with each other (Zuckerberg, 2013). Algorithmic work thereby includes planning ahead and adjusting content and tone to stimulate interaction, perhaps sometimes regardless of how important the topic being interacted about is. Just having interaction happening is vital for information to reach out.

To adjust to this interaction feature of algorithms, the communicators have understood that in order to adapt to Facebook algorithms, announcing, informing and requesting things from the citizens is not the right strategy. They have realized that it is the small everyday things that people engage with on Facebook and that issues that go straight to the heart of people will encourage likes. It is the news about a new machine that can make homemade meatballs for the municipality's children and elderly and a letter from a care recipient at an elderly care center that creates commitment and helps citizens continue to receive posts from the municipality in their private feed, as the algorithms are designed to boost authentic engagement. As we see, the communicators try to understand the specific algorithmic logic that defines and structures conditions for future socialization (Alaimo et al., 2015). From a perspective of algorithmic work, receiving likes from the audience is vital for posts to spread and for future posts from the municipality to reach out to people's feeds.

The communicators thus need everyday interaction happening on their Facebook page in order to reach out widely, which is sometimes extremely important, for instance in case of a crisis. Consequently, if a piece of information has been preceded by interaction activities, algorithms can be very supportive in distributing the piece of information. Since Facebook algorithms prioritize family and friends, posts will less likely spread directly from the municipality's Facebook page to the followers. From an organizational perspective, it is important to create content that can be shared by the followers themselves (e.g. the citizens) and other workers (e.g. colleagues) so the posts will start spreading between friends to friends. In that sense algorithmic work involves experimenting with algorithms by using different tones in the effort to understand the crowd and adjusting work performance accordingly.

6.3 Strategizing on how to Understand and Utilize Advantages of Algorithmic Logic for the Organizational and Professional Mission

How to phrase the postings on Facebook is complicated, however. A heavy emphasis on promotional material is seen through and disliked both by the algorithms and by citizens, which means that too easily "liked" posts also have to be used with restraint so as not to be interpreted as click bait by specific Facebook algorithms. Furthermore, too much promotion also risks eroding the legitimacy of the communicators and the municipality (Norström, 2019). Communicators express their worries about the dual mission of the municipality as being a cheerful "friend," and simultaneously deal with serious matters related to the exercise of public authority. Algorithmic work thereby both includes fine-tuning each post and also

includes slowly refining the role of social media activities, and the role of the profession, when used for work purposes.

In the analysis we saw very few topics that are critical of the municipality's activities or that are politically sensitive (such as shut down of local schools or issues regarding immigration). The communicators are careful not to generate negative discussions since they know that these will be favored by the algorithms and risk becoming viral. Since it is extremely difficult to have control over how algorithms spread content, a trustful relationship with the citizens is important to motivate them to defend the municipality in negative debates. The algorithms are in this way shaping the work of the communicators by influencing them to work for trustful bonds with the citizens, so that they are willing to team up with the municipality in case a negative debate goes viral (Norström, 2019).

Rich and informative stories are types of information that are difficult to get citizen reactions to according to the communicators in the study. If the text is too long Facebook will "make it" disappear below the frame of the post and the reader has to click on the post to continue reading. That extra effort makes the users lose interest, according to the communicators. To get people to make that extra effort is important in order to move away from shallow messages and make the municipal Facebook feed truly useful. Links on Facebook to the municipality's own website are also considered important when communicating complex and deep material that demands longer texts. Since Facebook algorithms typically reject links (i.e., non-native content), these types of posts risk not serving the intended purpose. Embedding a rich and serious approach into social media work probably takes time though and a lot of effort to build up a relationship with the citizens so that they feel that clicking for further reading is worth the extra effort. Communicators in the study refer to the Swedish police force for a successful example of a public institution that has succeeded with long narrative stories on Facebook, and are seen as role models in algorithmic work.

We argue that algorithmic work can be seen as a sociotechnical interplay of balancing deep quality content with easy, clickable access, and discussing with colleagues in order to find the "right" outlet depending on the type of message. It entails being flexible and understanding when switching between channels, techniques and platform logics. In this way, algorithmic work involves considering how algorithms can support or restrain a certain strategy and how work can be constantly refined to take advantage of changing algorithms in order to improve communication. Again, we see how algorithmic work is pushing the communicators to rethink their practice and find alternative strategies with alternative potential outcomes.

7 Conclusion

This paper contributes to the call for a deeper discussion of the relationship between algorithms and the effects of algorithms as practice (cf. Dourish, 2016; Passi and Jackson, 2017), through an in-depth understanding of the way algorithms impact work. The main contribution of this paper is the conceptualization of *algorithmic work*, what algorithmic work in general entails, and how algorithmic work with social media in particular is performed. In conclusion, algorithmic work is a sociotechnical relational arrangement between algorithms and professionals. This arrangement and performing algorithmic work constitute: i) balancing openness and closeness of platform operations; ii) adjusting the actual work operations and performative interactions as the algorithms change; and iii) strategizing on how to understand and utilize advantages of algorithmic logic for the organizational and professional mission. Future research can include looking deeper into how algorithmic work is enacted in other empirical cases and how understanding what algorithmic work entails can help to define work strategies, workaround creations and automated choice.

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