

Information literacy as a site for anticipation: temporal tactics for infrastructural meaning-making and algo-rhythm awareness

Temporalities
of information
literacies

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Abstract

Purpose – The article makes an empirical and conceptual contribution to understanding the temporalities of information literacies. The paper aims to identify different ways in which anticipation of certain outcomes shapes strategies and tactics for engagement with algorithmic information intermediaries. The paper suggests that, given the dominance of predictive algorithms in society, information literacies need to be understood as sites of anticipation.

Design/methodology/approach – The article explores the ways in which the invisible algorithms of information intermediaries are conceptualised, made sense of and challenged by young people in their everyday lives. This is couched in a conceptual discussion of the role of anticipation in understanding expressions of information literacies in algorithmic cultures. The empirical material drawn on consists of semi-structured, pair interviews with 61 17–19 year olds, carried out in Sweden and Denmark. The analysis is carried out by means of a qualitative thematic analysis in three steps and along two sensitising concepts – agency and temporality.

Findings – The results are presented through three themes, anticipating personalisation, divergences and interventions. These highlight how articulating an anticipatory stance works towards connecting individual responsibilities, collective responsibilities and corporate interests and thus potentially facilitating an understanding of information as co-constituted by the socio-material conditions that enable it. This has clear implications for the framing of information literacies in relation to algorithmic systems.

Originality/value – The notion of algo-rhythm awareness constitutes a novel contribution to the field. By centring the role of anticipation in the emergence of information literacies, the article advances understanding of the temporalities of information.

Keywords Social media, Temporality, Algorithms, Information literacy, Time, Anticipation, Prediction, Algorithm awareness, Media and information literacy

Paper type Research paper

Introduction

Information is increasingly folded into a platformised, automated information infrastructure employing algorithmic decision-making and leveraging different types of predictive analytics. Indeed, predictive analytics are central to how most contemporary information intermediaries work. They are programmed to calculate what users will experience as relevant content, and many work as recommender systems. In the context of this

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development, the multiple temporalities of information become ever more pertinent and so should the temporalities of information literacy. By temporalities of information, we mean the various ways in which time is experienced, articulated or arranged and how these interconnected orderings and experiences of time co-constitute the role and shape of information in society and everyday life. In this article, we focus on one specific dimension of temporality, that of *anticipation*. We argue that information literacies need to be understood as sites of anticipation. We further maintain that if information literacies are to be considered forms of critical engagement with information, then they need to include opportunities for understanding how people, their actions and imaginations are integral to the information infrastructure. Accordingly, this involves imagining and predicting future information. We conclude by proposing the notion of *algo-rhythm awareness* [1] to conceptualise the co-constitutive relationship between the temporality of algorithmic information systems and the temporality of everyday life.

The focus of information literacy research as well as of those professional organisations and public authorities advocating information literacy has been on the difficulties people might experience finding information, assessing the credibility of information and information sources and the implications of this for various societal issues or educational goals. That is to say, the main interest so far has been – understandably so – information that has already been retrieved and how to assess and evaluate it retrospectively. Considerably less attention has been given to enabling people’s understanding of why they are provided certain information in certain constellations in the first place and why other information remains obscure. We argue that attending to this question more explicitly is a prerequisite for understanding how infrastructural conditions are implicated in enabling (and disabling) information, specifically in relation to algorithmic systems.

Every day, people encounter and engage with enormous amounts of information from sources they may not even be aware existed and which are selected by commercial information intermediaries. Typically, these are multi-sided platforms and include social media, various recommender systems, streaming services and search engines. They sort, order and collate information based on indiscernible algorithmic rules and are trained on data sets that are largely unknown to those using them. Increasingly, the social world is *mediatised* and understood through such systems and through their databases and algorithms (Andersen, 2018, 2020). Clearly, the implications of this for information literacies and for how they can be conceptualised, expressed and enacted are profound (Haider and Sundin, 2019, 2020; Head *et al.*, 2020; Lloyd, 2019). While these implications are necessarily multifaceted, our interest here lies with a specific dimension of temporality, that of anticipation. This is an often overlooked, yet – we argue – extremely important aspect of how people encounter information and information intermediaries and, more importantly, how the various temporal tactics employed are implicated in the creation of meaning from those.

We develop our argument by engaging in a conceptual discussion of the role of anticipation in understanding expressions of information literacies in algorithmic cultures and by exploring some of the ways in which the invisible algorithms of information intermediaries that govern information in society are conceptualised, made sense of and challenged by young people in their everyday lives. The empirical material that we use for this purpose, and which we will present in more detail below, consists of pair interviews with 61 17–19 year olds, which were carried out in Sweden and Denmark. To specifically capture the work of anticipation that engagements with information in algorithmic systems – such as web search engines, various recommender and streaming services or social media – entail, we enlist three interconnected conceptual devices: *algorithmic imaginaries* (Bucher, 2017), *infrastructural meaning-making* and *frictions of relevance* (Haider and Sundin, 2019). The former two help us to isolate and examine accounts of situations where certain ideas of

infrastructural materialities are enlisted to create meaning from information and the latter to attend to situations where what is expected of an information intermediary does not correspond to what is encountered.

The information literacy dilemma

Before moving on, we need to declare our position regarding information literacy, as it presents us with a dilemma. On the one hand, our understanding is normative in the sense that we start from the knowledge that society's information infrastructure, by and large, reproduces and even amplifies structural injustices (e.g. Benjamin, 2019; Noble, 2018). For this reason alone contributing to enabling people to act within but also to resist these structures should be a responsibility of research. The conception of information literacy, as it is employed in most policy and professional contexts, has come to signify that typically with a strong connection to the ideals of participation and democracy. On the other hand, we are committed to the notion that research must make visible how normative assumptions are constructed, how they are imbued with values and vested with interests, which, despite good intentions, might even further the very injustices they ostensibly intend to address (e.g. Pilerot and Lindberg, 2011; Whitworth, 2014). Talking of information literacies in the plural offers a way to deal with this tension (Johansson and Limberg, 2017). It further offers a means to emphasise that information literacies are situational, epistemically bounded and part of social practices (e.g. Limberg *et al.*, 2012; Lloyd, 2019; McKenzie, 2003; Tuominen *et al.*, 2005). We subscribe to this notion of a plurality of information literacies and a diversity of positions from which they are formed. However, research on information literacies is also implicated in promoting information literacy education (Tewell, 2015). These are political projects, which necessarily subscribe to normative goals and shared values. This, in turn, necessitates the privileging of certain expressions of information literacies over others. From the vantage point that articulating this dilemma offers, we assert that we position information literacy as an object of study at the same time as we hope to contribute to developing it into a more useful device for articulating and enacting control over algorithmic information intermediaries. In the remainder of this article, we try to be as precise as possible in our use of the plural or singular form of information literacy. Nevertheless, in some cases it will be possible to put forward arguments as to why the other form would have been preferable. We are aware of this.

Anticipation and temporality

As Adams *et al.* (2009) write, "The present is governed, at almost every scale, as if the future is what matters most". The authors make this statement in outlining how *regimes of anticipation* and their affective dimensions are involved in situating subjects as individuals and in relation to the collective. Anticipation is one of the most dominant traits of modern and late-modern society, whose time regime is fundamentally oriented towards a specific type of perpetual progress (Rosa, 2015; Urry, 2016) predicated on technological advancement and economic growth. Predictive analytics as the prevailing form of algorithmic involvement in society has to be considered against the background of this specific time regime, which is concerned with the short term and premised on the continuous recalculation of certain types of possible futures. The temporalities of information bounded by this time regime are complex arrangements of technologies, social and economic conditions, political projects and individual experiences, which shape everyday life and our expectations of it.

Information literacy today inherently implies the creation of meaning from information shaped in relation to and by algorithmic systems that employ different forms of predictive analytics. While they are experienced as personalised, they are embedded in society; they are

informed by collective values and have far-reaching implications for the organisation of society. However, as we explore in this article, information literacy has also come to entail possibilities for anticipating the shape of prediction in relation to specific forms of governance, and this often means the platform-specific algorithmic governance of commercial information intermediaries.

Our understanding of anticipation is grounded in the notion that “[t]he future is neither fully determined nor empty and open” (Urry, 2016, p. 12) and that conceptualisations of algorithmic systems have performative effects (Bucher, 2018; Lomborg and Kapsch, 2020). People’s engagements with information intermediaries are partly shaped by their previous experiences of how these systems responded, including how they adapted to or resisted certain actions (Nagy and Neff, 2015). This can lead to what has come to be called *algorithm awareness* (Gran et al., 2021) and which we suggest constitutes an increasingly important facet of information literacy. It is evident that people’s experiences and their interpretations of those experiences will contribute to how they anticipate future interactions with information intermediaries to play out. Yet, considering that the invisible rules governing contemporary information intermediaries are adaptive, mutable and dynamic, anticipation necessarily involves negotiating multiple levels of uncertainties. Thus, in addition to foreseeing expected outcomes, anticipation here also needs to foresee the likely shape of predictions themselves. Yet, how can this play out more precisely? How might anticipation of certain outcomes shape strategies and tactics for engagement with algorithmic information intermediaries? How are these articulated and reflected on? These questions guide us as we explore this topic further, but we will first lay out our conceptual tools. This is followed by a presentation of materials and methods.

Noticing algorithms: algorithmic imaginaries, infrastructural meaning-making and frictions of relevance

People’s understanding of algorithms has implications for their use of algorithmic systems, which the concept of *algorithmic imaginaries*, as proposed and developed by Bucher (2017, 2018) emphasises. It captures “the way in which people imagine, perceive and experience algorithms and what these imaginations make possible” (Bucher, 2017, p. 31) and helps create an understanding of “how different ways of thinking about what algorithms are and do may affect how these systems are used” (Bucher, 2017, p. 32). This relates to a broader issue regarding how such imaginaries enable or limit the creation of meaning from the content encountered on algorithmic systems. This concern is addressed in the notion of *infrastructural meaning-making*, as it locates algorithms and algorithmic information intermediaries in the wider context of the infrastructural arrangements in which they are involved (Haider and Sundin, 2019).

Infrastructural meaning-making pertains to the need for information literacy to include awareness of the infrastructural conditions that shape information and opportunities for this awareness to inform critical assessments of information. The various infrastructural arrangements we have for keeping up to date; for finding out about something; for suggesting music, series or movies; for recommending services, products, events or partners and even learning about political action we may wish to engage in are all increasingly dependent on algorithms that rank, prioritise and, to a considerable degree, individualise information. Often this happens according to a logic developed for advertising. However, people rarely question or explicitly reflect on what these algorithmic decisions do to us (Gran et al., 2021; Lomborg and Kapsch, 2020) or how they are a part of everyday life and society (Andersen, 2020), including their temporal ordering. Importantly, the notion of infrastructural meaning-making derives from an understanding of infrastructures as socio-material. It foregrounds the ways in which cultures and socio-economic, commercial, material and political conditions are as

much part of the shaping of infrastructures as the various practices they enable or restrict. This understanding of infrastructures, as something that happens in and through practices, necessarily includes temporal dimensions as foundational elements.

In aiming to be as frictionless as possible in order to produce and extract more data for various forms of gain or commercial exploitation, algorithmic information intermediaries need to melt into the background and go unnoticed. This, as [Bucher \(2020\)](#) shows, has clear temporal implications as they “are not merely operating in or producing distinct forms of realtimeness but hinge on a set of temporal relations that work to produce a particular temporal landscape characterised by a time that is right”. Algorithmic systems often employ predictive decision-making, attempting, for instance, to foresee what type of information to present in response to a search, what type of adverts to display or which product, film, music or human contact to recommend depending on a profile or previous interactions with the system amongst other cues. This includes decisions on when to present what. Ultimately, the aim of presenting these recommendations is user retention, i.e. keeping people in the system or on the platform generating ever more data. They can be thought of as “traps”, as [Seaver \(2019\)](#) describes recommender systems, where developers lay out snares for users in order to retain them. Yet, and this is where our interest lies, users anticipate those traps and the various paths leading into them, at least, sometimes. Notably, they make decisions and create meaning based on this anticipation, thus engaging in infrastructural meaning-making.

Paying attention to the workings of algorithmic information intermediaries is difficult, as they increasingly melt into the background and are integrated into the routines of everyday life. Whilst many users lack the technical vocabulary to describe the processes at work in these systems, they have other means for putting their experiences and interpretations into words. Not least, there are occasions when these intermediaries become visible or tangible. Most noticeably, this is the case when glitches occur ([Benjamin, 2019](#)), such as when what these intermediaries deliver is perceived to be wrong, unexpected or otherwise disturbing ([Lomborg and Kapsch, 2020](#)). These *algorithmic mismatches*, as [Bucher \(2018, p. 103\)](#) calls them, lead to frictions. These frictions can be productive in which they lay bare the workings of the automated decisions employed and thus enable a discussion about them in the first place. We have conceptualised them as *frictions of relevance* ([Haider and Sundin, 2019](#)), where system relevance, individual relevance and societal interests collide, thus exposing their unstable relation and the different interests that enable them. Frictions of relevance pertain to issues with wider societal and political implications, when, for instance, overtly racist or sexist (or both) search results are given prominence in search engines ([Noble, 2018](#)) or when social media makes obvious misinformation hyper-visible, but the de-bunking of false claims never reaches the same level of exposure. Yet, frictions of relevance are also experienced individually and can relate to personal issues. Evidently, these levels are variously interlinked and heavily interdependent. With this in mind, what we want to focus on here are mainly personal experiences of such frictions, specifically with a view towards how these contribute to the development of an anticipatory stance with regard to human–algorithm relations in information intermediaries.

Materials and methods

Since algorithms can be neither seen nor touched and are in many cases purposefully designed to be as undetectable as possible, studying life with algorithms presents inherent difficulties. In addition, most of the dominant algorithms are subject to secrecy in any case and, as we know, they are constantly changing. Even if algorithms are not secret or obscure, they work in tandem with others that are as well as with people who develop them, people who use them and with the data used to train them and the people and systems who created the data and so forth. This leaves us with several issues. What is it that we are trying to

observe, and how can we as researchers accomplish that? Moreover, how can other people show us or tell us about their various thoughts and interactions with phenomena that we cannot even delimit properly so we can ask direct questions?

We carried out 32 pair interviews (with the exception of three individual interviews and one interview with three participants) to investigate the understanding and experience of algorithms and algorithmic systems amongst late adolescents. In total, we interviewed 61 participants between 17 and 19 years of age. We recruited participants through ten upper-secondary schools in southern Sweden (9) and Denmark (1). The schools were located in seven different cities with populations ranging from 30,000 to over 1 million and included both theoretical and vocational education programmes. The participants were enrolled in a wide range of different study programmes, including, for example, vocational programmes for hairdressers or child care workers, but they were also enrolled in various university preparatory programmes with different specialisations. We sought contact with our participants indirectly by first contacting teachers or school librarians. Participation was strictly voluntary and in no way influenced the participants' grades. However, each participant received a cinema ticket after replying to a follow-up email sent a couple of weeks after the interview. In many of the interviews, but not all, it was evident that the participants had a prior interest in and some knowledge of the topic. This was a desired outcome of our qualitative selection strategy and was deemed to be beneficial given the project's interest in the creation of meaning.

The interviews were held in pairs with two participants who knew each other and signed up together. This strategy has several advantages (e.g. [Morgan et al., 2013](#); [Polak and Green, 2016](#)): It gave us a more comprehensive picture of the age group's understanding of the topic, as it created a more relaxed situation where interview participants filled in each other's gaps. We were also interested in our participants' perceptions of the knowledge and expectations of their peers, and a joint interview has the potential to stimulate conversation in a more dynamic way. The interviews had a conversational style and were flexibly structured around a semi-structured interview guide. Even though the participants had been recruited through the schools and that all interviews were carried out at their schools, the starting point for the interviews was not school activities but everyday life. All interviews were conducted and audio-recorded by one of the authors and transcribed verbatim by a research assistant. The quotations from the interviews presented in the article are translated to English by one of the authors.

The qualitative analysis was carried out in three steps following a grounded theory approach: coding, theme building and integration of the analysis ([Charmaz and Belgrave, 2012](#)). In most cases, the follow-up email questions failed to provide new information, so the analysis was primarily done on the interview transcripts. When identifying the themes, we looked for repetitions, metaphors and analogies and similarities and differences but also for what was missing ([Ryan and Bernard, 2003](#)). Coding and theme building were done by one of the authors, while both authors were involved in the integration of the analysis. Similarly, the discussion of the sensitising concepts involved both authors. The concepts used to focus the analysis for this specific article were agency and temporality. The analysis of the transcripts was supported by the qualitative analysis programme NVIVO. We adhered to the ethical guidelines as outlined by the Swedish Research Council and also submitted the research project for consideration to the Swedish Authority for Research Ethics, which determined, however, that the project does not require formal ethical approval.

Performative imaginaries

We maintain that information literacies need to comprise an understanding of how people imagine information intermediaries work and are controlled and how they reflect on their

interactions with these intermediaries. In a situation where most mediated information is encountered in and through algorithmic systems, this necessarily entails a sense of the implications that the ways of anticipating continuously changing algorithmic systems have for people's possibilities to know and act. The various components of information intermediaries and other digital applications, including their algorithms, function together with the conceptualisations that people have of them and their expectations of certain effects. The following sections explore some of the ways in which people imagine that algorithmic information intermediaries act and how they reflect on their own actions in relation to these imaginations. These are, as we attempt to show, anticipatory in different ways and also in differently empowered ways. In the interviews, we were careful not to use the term algorithm too early in the conversation. Instead, we talked about the effects of algorithms and used brand names of widely used algorithm-based systems, such as specific search engines, social media or streaming services. Towards the end of each interview, however, we asked our participants directly about their associations with the word *algorithm*. Almost all interview participants associated the word with mathematics in school, rather than the workings of search engines, social media or other digital applications. Despite this, our interview participants talked about how they experience the effects of algorithmic decisions; yet in most cases, they never used the term.

The following presentation is organised along three empirically grounded themes: *anticipating personalisation*, *divergences* and *interventions*. Each theme examines one aspect of what it means to engage with information through algorithmic systems in everyday life, and each theme highlights different kinds of anticipatory engagement, ranging from awareness and reactive interaction to proactive intervention. Together they help to cast light on the temporal tactics involved in infrastructural meaning-making.

Anticipating personalisation

In the interviews, participants were asked to reflect on experiences of algorithmic curation. The stories touched upon a wide variety of issues, including computer cookies, advertisements, the importance of following and having followers, the meaning of likes, filter bubbles and how personal data and search histories move between social media and search engines. The following exchange is an example of this:

Participant 1: So, advertisements and things like that, they are obvious to me if I have been looking at say dresses, then I notice that I will get dress advertisements both on my mobile and the computer no matter what I have searched for. And I know that has an effect, and I think it's kind of scary.

Participant 2: Yes, when it comes up when you look at a particular dress, for example, and then it comes up on Instagram. That's a little uncomfortable.

Participant 1: But, you know, that's how it works. With cookies that . . .

Participant 2: But I notice that there is this filter bubble, and that everything is tailored to me.

The participants expressed awareness of the algorithmic curation of their feeds and search results, often concerning how they experience their actions to shape other, future information encounters, even across platforms. This is primarily expressed in relation to various everyday life experiences, as demonstrated by the participant's exchange above, and it is often the personalisation and targeted adverts that people notice. The concept of the filter bubble, in particular, was mentioned repeatedly because often it had been talked about in school.

In many cases, participants described their experience of the workings of algorithms in fairly positive terms. They expect search engines, streaming services and social media

applications to adapt the feed to their own interests and were often content with what they encountered. One participant put it as follows:

... but it is also true that you do not go and search for something else. So, it is not the case that if I sort of see that my feed is maybe very targeted, kind of politically as well, then I do not really go and Google what the political opponents think and feel about this thing, I just leave it alone and take in that information, but I do not take in the information that I do not see, quite simply

This person demonstrates an awareness of the human user's role and agency in the workings of search engines and social media feeds and of how this role might support a desired confirmation bias (Haider and Sundin, 2019; Tripodi, 2018). What is more, the response includes an idea about alternatives, i.e. how things could be shaped differently to lead to a different future outcome.

Being aware of the possibility of undesired or outright problematic effects of algorithmic decisions does not necessarily lead to someone acting to avoid these (see also Bucher, 2017, 2018; Head *et al.*, 2020; Klawitter and Hargittai, 2018; Lomborg and Kapsch, 2020). One of our participants, while articulating a clear understanding of their own involvement in but also exposure to the algorithmic arrangements of social media, reasons as follows:

IP1: So, it's not like I've managed to get a grip on that problem, really. And it's really bad, but, well. I do not know if you subconsciously like what you see because it is your own interests and that is what you are interested in. And then you kind of do not want to see other stuff. So, you see what I mean, well. So, maybe that's why.

F: So what do you think affects, or who is controlling, what you see?

IP1: Myself. Because I am still the one steering this boat, in a way. And social media is the wind pushing the boat. (giggles) That propels it forward, well, what a good analogy. (laughs) Yes.

The ability to provide users with information that is perceived to be *relevant* and gets them to return or, even better, to stay is the currency with which platform services compete. Yet, platforms increasingly also define what relevance means, what it looks like and feels like. In most cases, our participants trust the platforms' performance and the information they provide, without any need to question their respective feeds or results.

Participant 1: It's not something I've thought about.

Participant 2: No, things do pop up that I have not seen before. So, I do not feel I have much of a need to check again. It feels like, I'm sort of interested in what's coming up already.

Anticipation of a certain type of information occurs in relation to how a specific platform service is perceived, what community it connects to and what type of information it enables or is imagined to enable. This goes beyond the fact that each service is branded differently and works according to different rules; Instagram, TikTok, Facebook, Google Search, YouTube, Reddit, etc. all differ from each other in specific ways. What is interesting for us is that these services and their various affordances are interpreted by means of an anticipatory stance shaped by ideas of what information to expect and thus how to value and assess it (see also Gerrard, 2018). This also comprises an understanding of *when* a certain service is suitable. Thus, the temporality introduced comprises a range of different dimensions pertaining to the repetitive chronology of daily routines to generational relations, and even notions of maturity.

One participant described the start of a typical day as follows: "You open Snapchat, there might be 20 snaps when you wake up. So, you open them all. And maybe go to Instagram and like some pictures and maybe some clips at YouTube as well. That's about it most days. I'm never on Facebook. I do not even have Facebook". Many identified Facebook as a "grown up thing": "Adults and kind of older people usually use Facebook" or "Facebook has pretty much become a thing for older people now. It has been taken over by parents and stuff like that".

Facebook is for the parent generation and for more formal or structured information. Most participants used it only for events, to follow a sports or social club or to stay in touch with relatives. While the general attitude towards Facebook reflected this sentiment, there were exceptions, and some of our interview participants were, in fact, regular Facebook users. Yet, even for those interviewees, it was connected to a specific type of information that they expected to be provided with by accessing the platform. In the exchange below, Facebook's curation of news is described as preferable to the editorially controlled presentation of news in legacy media.

Researcher: Isn't it true that news show up on social media?

Participant 1: Yes, well, on Facebook in particular, I look at quite a bit of news.

Participant 2: Facebook puts up quite a bit of news.

Participant 1: Yes, then there are quite a few interesting things that come up, which you do not usually find, if you had just gone to Aftonbladet or Kvällsposten or Expressen [Note: 3 Swedish tabloids with different political leanings]. Then these interesting things do not come up.

Researcher: What sort of things come up?

Participant 1: Yes, like, if there has been a murder, if something has happened, maybe not so interesting, but things that you do not hear about, that are being silenced, things like rape. It is more like government, parliament, politics and stuff that comes up. Things that are not very interesting to us.

Participant 2: No.

To describe how Facebook provides them with a different form of news, the interview participant employs the notion of "silencing". This is a trope that is commonly used to accuse legacy media and official authorities of willfully suppressing certain news. Here Facebook is seen as a way to circumvent legacy media in order to obtain news, which is considered more relevant. Obviously, from the point of view of Facebook, this is exactly the outcome they would want to achieve. Providing a curated feed, which is perceived to deliver more relevant content than other media does, keeps the consumer on the platform. The person anticipates this relevance. There is no awareness expressed regarding the way Facebook's algorithms or data-driven business model work. These are left uncommented. Yet, the alternative to Facebook, which are here legacy print media, including tabloids, is commented on as having a particular agenda. This, in turn, makes the social media platform as it is expected to produce fewer frictions – appear more attractive, ostensibly more neutral and relevant in this person's everyday life.

Divergences

Stories of encounters with content that diverges from what is expected or what is desired abound in the interviews. These lead to *frictions of relevance* that open up ways to engage with the infrastructure. In many cases, our participants provide reasons to explain such instances, but in some cases, they are left puzzled:

So, I really have no idea why I get some suggestions. Where I really have not viewed anything similar to what is in the video, but I get it as a suggestion. It's the same thing on Facebook, I get ads for things I have never really looked for.

These interview participants consider the possibilities for controlling their feeds as very limited at best. In contrast, the interview partner strikes a different chord and distinguishes between different social media services and expresses a sense of control as follows:

Facebook is a little harder to understand. I click and I do not like so many things on Facebook, but it's really based on what my friends are looking at. It's things like this quiz "how well do you know me" and, very bad jokes like from my older relatives as well. But then there's Instagram, I think it's very clear that you get to see what you, what I put up as well.

This is a fairly accurate depiction of how specific social media brands at the time determined relevance in relation to one's network of connections. Considering that most brands are marketing platforms, it is not surprising that social media can be exploitative in how they mirror and amplify normative ideals of societal expectations, including beauty standards, moral positions and emotional stability. Trying to counter the curated feed and pre-empt the appearance of this content necessarily includes anticipation. For instance, for people with eating disorders, a steady stream of photos of ideal bodies, foods, recipes or dieting recommendations can make for very challenging encounters:

Yes, well, I'm pretty good at it because it's such a big part of what I do, that I just do not want to see it. Because I think, if I see too much of it, I just think it's tough to see stuff like that, because I would say that maybe I have mild eating disorders because I've competed a lot and stuff like that. I feel like it gets really hard when things come up where you're supposed to feel guilty almost, because maybe I ate something and it says something like "this is something you absolutely must not eat if you are going to lose weight", things like that.

Diverging expectations and ensuing frictions of relevance can also arise when people share accounts and through the way content is presented that is predicted to be relevant based on data pertaining to an individual's activities or even someone else's activities. One person describes this in relation to the music streaming service Spotify.

Yes. They have a list that changes every week, but it's like . . . since I share with my sister, her songs end up on there too. "What kind of shit is this?" I say, who listens to this? So, then you are not really happy with it, but maybe it's because I share with her, otherwise it might be better. But . . .

When asked how they handle such situations, the interview participant replies, "then I just listen to what I have, or I can search for a playlist. Or go to the radio mode, and then type in a song, and then songs from the same genre will come up and similar artists, so it's a bit like that". The interviewee's actions vary, ranging from acceptance of the situation to active intervention to shape the service, an intervention based on anticipating what data the algorithm needs to be presented with in order to respond by playing music that suits their taste at a specific time. This active intervention in the system's algorithmic predictions is based on an anticipatory stance that calls for conscious interaction with the algorithms or with whatever understanding of those one has. The next section attends to those conscious interventions as the most apparent manifestation of anticipation, which, however, has to be related to those other more subtle anticipatory stances that are involved in these interactions.

Interventions

Since algorithms are only meaningful in relation to the data they process, contemporary information intermediaries need to be used in order to be useful. Indeed, each interaction with or use of information intermediaries leaves traces, i.e. they produce data that are then used to shape possible future uses. Still, people have varying levels of control over their roles in the different services – this is mostly by design, but it is also because people have different ways of engaging with these services. And whilst most people have everyday theories about their roles, theories that tend to have varying degrees of accuracy, they all shape how the services are used and the traces they leave behind for the algorithms to deal with. Reactions to changes in the workings of algorithms are often based on a misunderstanding of how they actually function, and as [DeVito et al. \(2017\)](#) suggest, many might be informed by folk theories

and rumours (see also [Eslami et al., 2016](#)). Even for those with an adequate grasp of how algorithmic information systems operate, it is difficult to actually exert control over the systems they engage with (e.g. [Klawitter and Hargittai, 2018](#); [Burbach et al., 2019](#)). In this section, we are concerned with the conscious decisions people make – and the projections these involve – in order to influence their own or others’ information encounters in algorithmic systems.

In most social media platforms, what you are presented with primarily depend on who you follow, though there is a great deal of variation in the way this happens, and it has changed considerably since social media’s early days. This is something that is well known amongst our participants and consciously used to actively shape one’s feeds. For instance, one participant explains, “Yes, so the easiest thing to do on Instagram is to unfollow people”. However, other platforms demand more finely calibrated methods. The person continues as follows:

But if, for example, because sometimes on YouTube only the same things come up as recommended, and that is pretty boring. So, then I usually go and, either watch a new video or an old video from before, but one that is a completely different genre. If I . . . then watch two, three of these in a row, it usually changes what is recommended. So that is a way I try to change that algorithm.

YouTube’s recommender system is known for being very responsive, albeit unpredictable, to user interaction and this participant knows how to manipulate this. In some cases, gaming the algorithms might even be a necessary tactic for safeguarding one’s emotional and physical well-being, also in relation to other platforms. One of our participants recounts “Because I, so I have manipulated my Instagram quite a bit. I started to like things that were good for me to see, a little bit, I was trying to recover from an eating disorder a little bit, so I started to like things that were good for me to see, like animals”. This is illustrative of an experiential understanding of how people and algorithmic systems intersect. Recommendations are predicated on various types of acting within the system that go beyond actively seeking out certain content or following tags ([Gerrard, 2018](#)) and which necessitate anticipation on different levels. Another participant explains how they adapt their search strategies depending on when in the month – closer or further away from payday – they were looking at clothes online. They anticipate their searches to generate the display of adverts in their social media feeds, and depending on their financial situation at the time, they want to control how expensive the brands they are being exposed to are.

This way of strategic searching is occasionally described by our participants in terms of *gaming the algorithm*. For instance, “you can game Google’s algorithms so that some pages are at the top and things like that, and it remembers what you like and so on”. This demands knowledge and experience of how the search engine works, and this knowledge entails awareness of one’s own role in it. A participant explains, “For example, if I’m going to have a discussion with a friend, about something. Then I Google what I want to Google, for example, coffee causes cancer. Then I Google ‘coffee causes cancer’ and I get a lot of articles”. Then he googles “coffee is good for your health”, and then he also gets a lot of articles”. The choice of keywords happens not only in relation to what can be called an information need, but also with a view towards how the likely result can be put to use in a specific social situation. This conscious use of the search engine as an instrument for confirmation bias is an advanced strategy for engaging with algorithms and infrastructural meaning-making, which entails a pronounced anticipatory stance ([Haider and Sundin, 2019](#); [Sundin et al., 2017](#); [Tripodi, 2018](#)).

The business model that is informing social media is based not only on enabling exposure and visibility for advertisements, but also for the content private or commercial users create. Yet, the promise of visibility is inevitably accompanied by a “threat of invisibility” ([Bucher, 2012](#)). In our interviews, we come across numerous examples where our participants describe how they go about making their own social media updates visible to others. This mostly

concerns Instagram and Snapchat and to a lesser degree Facebook, YouTube, Twitter and Reddit. People have an understanding of what they think attracts views and how to achieve engagement. This includes the notion that *when* is as important as *what*. People and algorithms are seen to work in tandem. A participant explains, “People who are in revealing clothing and such usually get a lot of likes. And then faces usually get quite a few likes, and nature usually does not get many at all”. Another interviewee who is very active on Instagram describes how they would delete a post that has too few likes and resubmit it at another time of the day. The person explains, “One of my friends said to me, ‘I see that you posted the same picture three times today.’ It’s very embarrassing. But it’s true”. Here, algorithm awareness also entails what we propose to call *algo-rhythm awareness*. Timing, i.e. acting in accordance with the rhythms of the service and its algorithms, is an integral part of how it is used. This is expressed in various temporal tactics. It involves anticipating the “right time” (Bucher, 2020) for the algorithm to amplify a post in the feeds of followers. Fellow users are envisioned by means of theories about how the temporal regime facilitated by the service’s algorithms operates and what conditions for actions this regime creates. The rhythmicity of information practices is structured around the temporal regimes algorithmic information systems afford (see also Tana *et al.*, 2019).

Conclusion: towards algo-rhythm awareness

Awareness of algorithmic decision-making is fundamental to contemporary information literacies, which is understood as critical engagements with information. Yet, we argue that there is a need to go beyond awareness in order to connect individual responsibilities, collective responsibilities and corporate interests and to facilitate an understanding of information as co-constituted with the socio-material conditions that enable it. The conceptualisation of information literacies as a site for anticipatory engagements offers an opportunity to make these conditions visible and to articulate human agency. The notion of infrastructural meaning-making helps articulate how this can play out, not least in regard to the temporal regimes upon which algorithmic decision-making is premised.

Infrastructural meaning-making includes strategies for anticipating likely predictions and acting to pre-empt or channel those. Bearing in mind the specific socio-political and economic conditions they are part of, frictions of relevance can support the creation of meaning from information encountered in and through algorithmic information intermediaries. Thus, we argue here that these frictions have the potential to enable individual agency to defy algorithmic power and can pave the way for “algorithmic resistance” (Velkova and Kaun, 2021), though they, of course, do not have to serve this purpose. Anticipation “as a way of actively orienting oneself temporally” (Adams *et al.*, 2009) presents opportunities for the formation of temporal tactics, which may entail articulations and enactments of algorithm awareness through infrastructural meaning-making. It is, however, also a way to maintain agency *vis-à-vis* algorithmic governance. Anticipating and pre-empting outcomes of predictive decision-making potentially – but clearly not necessarily – opens up avenues for micro-resistance and change-oriented intervention. It is a prerequisite for the formation of interfaces for critical interventions within the specific conditions of an information infrastructure that is shaped according to the corporate interests of multi-sided platforms and is heavily invested in data extraction.

Thus, beyond awareness of the ways in which algorithms govern contemporary information intermediaries, anticipation potentially facilitates ways for imagining different futures, including those that transcend the specific instance or system in question. Central to this is an understanding of how the temporalities of platforms and of everyday life are intertwined – algo-rhythm awareness. In particular, as we show, understanding the role of anticipation within the temporal tactics that sustain engagements with information in algorithmic systems contributes to enable critical information literacies for the platformised

information landscape of late capitalism. This helps emphasising the collective efforts that go into the creation of meaning not just of a piece of information, but of infrastructural arrangements and the information they make possible and exclude. With this in mind, information literacies can be fruitfully fathomed as sites where anticipatory engagements are enabled and where, ideally, the individualising tendencies that predictive decision-making and recommender systems often propel are met with resistance.

Note

1. The authors' use of the term algo-rhythm is inspired by Manu Luksch's short film *Algo-rhythm* (2019) and Childish Gambino's song *Algorithm* (2018).

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