

# ‘Transparency is Meant for Control’ and Vice Versa

Learning from Co-designing and Evaluating Algorithmic News Recommenders

ELIAS STORMS, Department of Sociology, University of Antwerp, Belgium

OSCAR ALVARADO, Department of Computer Science, KU Leuven, Belgium

LUCIANA MONTEIRO-KREBS, Mintlab, Faculty of Social Sciences, KU Leuven, Belgium and Faculty of Librarianship and Communication, UFRGS, Brazil

Algorithmic systems that recommend content often lack transparency about how they come to their suggestions. One area in which recommender systems are increasingly prevalent is online news distribution. In this paper, we explore how a lack of transparency of (news) recommenders can be tackled by involving users in the design of interface elements. In the context of automated decision-making, legislative frameworks such as the GDPR in Europe introduce a specific conception of transparency, granting ‘data subjects’ specific rights and imposing obligations on service providers. An important related question is how people using personalized recommender systems relate to the issue of transparency, not as legal data subjects but as users. This paper builds upon a two-phase study on how users conceive of transparency and related issues in the context of algorithmic news recommenders. We organized co-design workshops to elicit participants’ ‘algorithmic imaginaries’ and invited them to ideate interface elements for increased transparency. This revealed the importance of combining legible transparency features with features that increase user control. We then conducted a qualitative evaluation of mock-up prototypes to investigate users’ preferences and concerns when dealing with design features to increase transparency and control. Our investigation illustrates how users’ expectations and impressions of news recommenders are closely related to their news reading practices. On a broader level, we show how transparency and control are conceptually intertwined. Transparency without control leaves users frustrated. Conversely, without a basic level of transparency into how a system works, users remain unsure of the impact of controls.

CCS Concepts: • **Human-centered computing** → *User interface design; Participatory design*; • **Social and professional topics** → *Privacy policies*.

Additional Key Words and Phrases: Algorithms; News Recommenders; Transparency; Co-design

## ACM Reference Format:

Elias Storms, Oscar Alvarado, and Luciana Monteiro-Krebs. 2022. ‘Transparency is Meant for Control’ and Vice Versa: Learning from Co-designing and Evaluating Algorithmic News Recommenders. *Proc. ACM Hum.-Comput. Interact.* 6, CSCW2, Article 405 (November 2022), 24 pages. <https://doi.org/10.1145/3555130>

## 1 INTRODUCTION

Automated computer systems increasingly mediate our everyday activities [52]. Algorithmic systems influence people’s behavior [35] and impact governance dynamics [27] in many different social domains. In the context of news, distribution increasingly relies on algorithmic recommender

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Authors’ addresses: [Elias Storms](mailto:elias.storms@uantwerpen.be), [elias.storms@uantwerpen.be](mailto:elias.storms@uantwerpen.be), Department of Sociology, University of Antwerp, Antwerp, Belgium; [Oscar Alvarado](mailto:oscar.alvaradorodriguez@ucr.ac.cr), [oscar.alvaradorodriguez@ucr.ac.cr](mailto:oscar.alvaradorodriguez@ucr.ac.cr), Department of Computer Science, KU Leuven, Leuven, Belgium; [Luciana Monteiro-Krebs](mailto:luciana.monteiro@ufrgs.br), [luciana.monteiro@ufrgs.br](mailto:luciana.monteiro@ufrgs.br), Mintlab, Faculty of Social Sciences, KU Leuven, Leuven, Belgium and Faculty of Librarianship and Communication, UFRGS, Porto Alegre, Brazil.

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2573-0142/2022/11-ART405 \$15.00

<https://doi.org/10.1145/3555130>

systems, designed to predict the preferences of readers and to offer a personalized experience, whether embedded in social media or on news websites themselves [32].

Despite the increased use of recommender systems, research has highlighted potential issues with algorithmic ranking and decision-making more generally. Examples of such issues include biases in filtering and personalization processes [8], a lack of transparency [14], limited access to plural and diverse points of view [12, 37], and an extensive list of ethical concerns such as opacity, discrimination, and challenges to the autonomy of users [31]. In addition, the automated disclosure of personal data implemented in most social media platforms presents a direct threat to user privacy [51].

To address some of these issues, legislators in different countries and regions attempted to legally impose transparency of automated decision-making systems. When personal data is involved, for example, recommender systems fall under the scope of the European Union General Data Protection Regulation (GDPR) [19], which is considered “the most important change in data privacy regulation in 20 years” [41]. This body of laws imposes transparency obligations on ‘controllers’ (i.e., social media platforms and news providers) and grants ‘data subjects’ (i.e., users of such services) a series of prerogatives to request information or control the use of their data. In this context, privacy policies and transparency features become legal centerpieces and objects of research. Unfortunately, previous research has exposed how privacy policies are often ineffective, unreadable, incomprehensible, require high levels of education, and are often ignored, among many other issues [20, 30, 44, 45]. Moreover, despite the vast diversity of control strategies to interact with those privacy policies [1], they seem disconnected from the legal requirements that justify their existence [6].

An important related question is how people using recommender systems relate to the challenge of transparency, not as legal ‘data subjects’ but as users. This paper investigates users’ expectations and imaginaries concerning recommender systems and explores how user input can help design those systems. Such a participatory approach is relevant for the design of services that better accommodate users’ needs, and helps providers of recommender services to better meet data subjects’ rights under data protection law such as the GDPR.

Our paper aims to explore how designers can translate privacy and transparency requirements imposed by legal frameworks into interaction design and interface proposals via co-design. In other words, we investigate how ‘data subjects’ can be involved as ‘users’ during the design process. We contend this shift from ‘users’ to ‘data subjects’ is relevant, as it changes focus from ‘legal rights’ to actual ‘daily use’. We argue that involving users in the design process can thus help designers and service providers to meet the legal requirements imposed by frameworks such as the GDPR. To make this case, we report on an interdisciplinary research project during which we organized two co-design workshops and a prototype evaluation to increase transparency. We suggest how user involvement in the design of algorithmic recommender systems can take shape, and we share insights and suggestions for the design of such systems: we report on the intertwining of transparency and control, the struggles between control and convenience, and how news recommender systems and impressions of transparency are situated within users’ daily lives and personal views. Additionally, we reflect on the dangers of perceived control that some design solutions could provide in this context.

## 2 BACKGROUND & RELATED WORK

Recommender systems that rank and suggest content to users (whether on news websites or social media platforms) are not just technical systems but are embedded in complex socio-technical contexts and governed by legal frameworks. The study and design of recommender systems in news consumption benefits from a multidisciplinary approach. Such a multidisciplinary perspective

allows us to take stock of practical design considerations that enable those who build recommender systems to meet the various social, legal, and user requirements. This paper takes inspiration from Human-Computer Interaction, the Social Sciences, and Legal Studies on personalized recommender systems. Two domains of practice and academic inquiry are of particular interest to our investigation. First, the legal framework of the GDPR imposes particular transparency obligations system operators need to take into account. We sketch these by briefly discussing the GDPR’s conceptualization of transparency and data subject rights. Second, social scientific inquiries into how users perceive the algorithmic systems emphasize how ‘algorithmic imaginaries’ and ‘folk theories’ influence users’ behavior. In the next section, we explore these two topics in preparation for our co-design approach.

## 2.1 Data protection law & data subject rights

Around the world, various legal frameworks, either currently implemented or under development, attempt to regulate privacy and personal data collection in everyday technologies. One of them is the General Data Protection Regulation (GDPR), introduced by the European Union (EU) in 2018, considered “the most important change in data privacy regulation in 20 years” [41]. This legal framework strengthens the position of ‘data subjects’ in terms of the rights they hold, including their access to information on automated decision making. To understand the implications of the GDPR, we need to take a closer look at the specific obligations and rights it provides with regards to transparency, privacy, and control.

Three motivations inform our choice to involve the GDPR. First, the GDPR is the legal framework in our regional research context, the EU. Second, while it is a regional legal framework, the GDPR does not only apply to data controllers located in the EU but to everyone offering goods and services to data subjects located in the region (Art. 3 GDPR), making it relevant for many major digital service providers around the world. Third, the core principles of the GDPR return in similar legislative frameworks in other parts of the world. For example, the GDPR became a reference point for regulations in countries like Turkey, Mauritius, Chile, Japan, Brazil, South Korea, South Africa, Argentina, and Kenya. These aspects turn the GDPR into a relevant and essential point of reference for designers, practitioners, researchers, and service providers located both within and outside the EU [40].

The GDPR applies to the “processing” of “personal data.” It defines *personal data* as “any information relating to an identified or identifiable natural person.” Personal data thus includes names, email addresses, interests, and preferences, but also physical, physiological, genetic, or mental attributes [38]. The GDPR defines the notion of *processing* as “any operation which is performed on personal data,” including but not limited to the collection, storage, structuring, use, combination, transmission, alteration, and even deletion. Finally, responsible for these operations, according to the GDPR, are ‘controllers and processors’ either based in the EU or serving or monitoring data subjects located in the EU.

The GDPR thus sharply delineates the notions of a ‘data subject’ whose ‘personal data’ is collected and further processed and the ‘controllers and processors’ responsible for these activities. Renaud and Shepherd provide a summary of what controllers and processors are legally obliged to provide to their users. They have to: (1) specify the data that the digital service is collecting about users, (2) justify precisely why they need to collect such data, (3) explain how the digital system will process that data, (4) explain how long the digital service will retain that data, (5) detail whom the user can contact to have that data removed, and (6) communicate privacy information “in a concise, easy to understand and clear language” [41].

The GDPR thus enshrines transparency as a core principle: service providers should be transparent towards data subjects about which data they collect and what they do with it. Usually,

controllers comply with these requirements by drafting a privacy policy and a data policy that users must agree with when using or signing up for the provided service. As data controllers provide these policies upfront, scholars and practitioners refer to these provisions as *ex-ante* transparency measures.

In addition to these *ex-ante* transparency measures, the GDPR grants data subjects the right to obtain specific information: (1) confirmation from the controller that they are indeed processing personal data, (2) access to the data undergoing processing, and (3) information such as the purposes of the processing, the recipients to whom the controller has transferred this personal data, and the retention period. Data subjects have to make explicit requests to receive this information, turning such ‘right of access’ and complementary data subject rights into *ex-post* transparency measures.

Finally, the GDPR grants data subjects complementary rights, such as ‘the right to rectification’, allowing them to rectify or modify the data that controllers keep on them, and ‘the right to erasure’ (also called the ‘right to be forgotten’) allowing them to ultimately erase the data their personal data.

In sum, the GDPR imposes a new attentiveness to transparency by creating specific rights for data subjects. The *ex-ante*, *ex-post*, and all of the latter legal principles create specific legal and design challenges for the providers of digital services such as algorithmic recommender systems: how can these rights and legal obligations be accommodated? Consequently, the designers of such systems need to reflect on how they can bring their services and applications in line with these legal requirements.

The legal framework itself gives part of the answer to this design challenge. In some areas, the GDPR encourages the involvement of users to ensure notices, policies, and interfaces are intelligible and transparent. For example, controllers are encouraged to involve users via panels and tests [see 39, p. 7]. Similarly, in some cases, controllers should “seek the views of data subjects” as part of a data protection impact assessment [see also 33]. In the context of news recommenders, this emphasis on data subjects’ views means the involvement of end-users in the design process of these services. Our study follows these suggestions included in the GDPR, by following a participatory approach and considering previous design work as presented in the next section.

## 2.2 The GDPR’s impact on design

Via the data subjects’ rights and the corresponding obligations of the controllers (i.e., service providers), the GDPR influences the design of privacy notices, systems and their interfaces in various contexts. Many of the GDPR requirements to inform users *ex-ante* are present in privacy notices. However, academic research on privacy notices has exposed how they are often ineffective, incomprehensible, or ignored by users [20, 30, 45]. In addition, privacy notices are characterized by conflating requirements. They lack genuine choice for the users, they involve a high burden yet provide little utility, and they are decoupled from the digital services provided [44]. Despite various forms and interactive approaches [1] to privacy policies, they seem disconnected from the legal principles that justify them, characteristics that make them ineffective for users [6].

Furthermore, service providers tend to stretch the GDPR’s obligations, implementing “antipatterns” [48] or resorting to “dark patterns” for their consent notices [36]. Investigations into ‘cookie banners’ point towards suspected GDPR violations [29] and dark patterns in their design [24].

Previous studies have explored potential solutions to the challenge of privacy and consent. Examples are inquiries into the potential of visualizations of privacy-related features [7] or suggestions on how designers can effectively ask for proper consent on privacy choices using various alternatives of icons and links. In a similar vein, researchers have developed and tested elaborate interfaces enabling users to provide specific and explicit consent to the privacy statements of online services [15, 16]. Others propose middle-ware solutions to empower users against possible privacy

invasions in the context of the Internet of Things [49]. In this paper, we contribute to this area of research by taking a different approach. In line with participatory approaches to design, we aim to involve users’ perspectives and experiences in the design process. To do so, we also take inspiration from the social sciences and HCI, as discussed below.

### 2.3 Exploring users’ perspectives & experiences

Automated systems that rank and recommend content are becoming an object of study within the social sciences. Studies from these disciplines often pay particular attention to lay people’s understanding and perception of algorithmic ranking systems and how such impressions subsequently shape their interactions with these services.

Taking a phenomenological approach, for example, Bucher argues that algorithms “can be accessed via experience and how they make people feel” [10]. In the context of social media, she developed the notion of *algorithmic imaginary* to refer to “the way people imagine, perceive and experience algorithms” [10, p. 31]. The concept, she suggests, highlights the “productive and affective power that these imaginaries have” [10, p. 41] on users’ interactions with algorithmic systems. In her study Bucher shares different contexts and situations in which experiences with Facebook prompt users to reflect on how the platform works, thus spurring their ‘algorithmic imagination’. Bucher identifies how users’ experiences and observations cause them to reflect, for example, on the algorithms tracking power, how it turns Facebook into a ‘popularity game’, or the impact of faulty predictions. Such imaginations are not only a result of experience but also impact how users use of system, making these imaginaries productive.

In the domain of HCI researchers have deployed the concept of *folk theories* to refer to the “intuitive, informal theories that individuals develop to explain the outcomes, effects, or consequences of technological systems” [23]. For Twitter [13] and Facebook [17], researchers use the folk theories concept to highlight how users understand and react to the algorithmic curation of their news feeds and how such understandings influence their interactions with these platforms. For instance, previous research on Facebook and Twitter identified four folk theories [23] based on how people think these platforms work: (1) the rational assistant, related to the idea that the platform is fair and works for the interests of the user; (2) the transparent platform, the idea that the system is transparent, easy to understand and influence, showing diversity without influence from the company; (3) the unwanted observer, as the platform working in the interest of the company rather than the user; and (4) the corporate black box, the idea that Facebook’s platform is hard to understand, opaque and laborious to influence. While folk theories (1) and (2) invoke positive feelings, users perceive (3) and (4) as adverse.

In this strand of literature, Eslami and colleagues [18] argue that a way to be more open to users about the presence of algorithmic ranking is via ‘seamful’ design (as opposed to a ‘seamless’ approach). The user interface of social media news feeds, for example, would then make the presence of algorithmic curation visible rather than hidden, giving users the possibility of better understanding how an algorithm constructs their feeds. A different approach is to shift focus to user controls over the algorithmic recommendation rather than emphasizing transparency directly. Harambam et al. [26, p. 69] show that potential users value intelligible user profiles coupled with options to manipulate the news recommendation algorithm, “especially when these control mechanisms can be operated to achieve personal goals.”

These studies share a ‘phenomenological sensitivity’: they put the perspectives and experiences of users at the basis of their analysis and investigate how they perceive and experience interactions with these algorithmic systems situated within a particular context. In this paper, we take a similar approach, departing from the ‘algorithmic imaginaries’ of users while involving them in the ideation process through co-design activities to develop new interface elements that increase transparency.



### 3 RESEARCH DESIGN AND METHODOLOGY

Algorithmic recommender systems are not only technical systems but are always embedded in a particular social domain and context and for particular purposes [46, 52]. In this study, we focus specifically on recommender systems in the context of news consumption. As outlined in the introduction, recommenders are increasingly prevalent in the distribution and consumption of news stories. In addition, the societal importance of news brings questions relating to the transparency of news recommenders a to the fore. Where applicable, however, we turn our findings into insights that are generalizable beyond the topic of news recommenders.

As outlined in the background section, the design of personalized, algorithmic recommenders needs to accommodate two types of requirements. On the one hand, there are the legal requirements imposed by the GDPR and comparable legal frameworks revolving around data subjects' rights and *ex-ante* & *ex-post* transparency measures. On the other hand, interface design should consider users' conceptions and expectations. To address this second challenge, we try to involve users in ideation and evaluation processes.

The goal of this paper is twofold: (1) we aim to explore ways in which interface design features can increase the transparency of algorithmic recommender systems by involving users directly in the design process, and (2) through this ideation, prototyping, and evaluation process, we aim to generate insight into how potential users conceive of transparency features in the interface and how such design elements relate to their experiences and habits. In this sense, we use the design and evaluation process as a means to generate knowledge and insights, which in turn can be used when addressing further design challenges [21].

We divided the study into two phases which we present in more detail below. In the first step, we organized co-design workshops to (1) elicit users' 'imaginaries' on algorithmic recommender systems and (2) invite them to ideate interface elements for increased transparency. In the second phase, we turned (some of) these ideas into a mock-up prototype, while paying attention to the requirements of the GDPR. We then organized a qualitative evaluation with a new set of participants. Through this process, we generate insight into how people conceive transparency and related issues in the context of algorithmic recommender systems. As each phase entails different methods, we provide more details in the relevant sections below.

### 4 CO-DESIGNING TRANSPARENCY FEATURES BASED ON USER IMAGINARIES

Algorithmic recommender systems rely on user data and profiling. When designing such systems, data controllers must take data subjects' legal rights into account. Nevertheless, an important related question is how people using recommender systems themselves relate to the challenge of transparency, not as 'data subjects' but as users.

This section reports on two two-phase co-design workshops we organized to (1) investigate user expectations and (2) develop new design ideas in collaboration with potential users themselves. Through this process, we aim to shed light on participants' ideas about transparency and related issues.

#### 4.1 Goal and methodology of the co-design approach

Participatory approaches for interaction design research consider users as partners and involve them as co-creators within the design process [42]. Such involvement often takes the form of co-design workshops during which users come together under the guidance of a moderator to reflect on specific design solutions to overcome a given challenge. During these workshops, researchers and practitioners involve participants as "experts of [their own] experience" [43, p. 12]. From the literature discussed above, however, we know that conceptions about how such systems work (their

‘folk theories’ and ‘algorithmic imaginaries’) guide users’ interactions with algorithmic systems. Before inviting participants to develop design ideas, we wanted to explore their imaginaries of data use in the algorithmic curation processes. In addition, given the complex nature of the topic, we took great care to subtly ‘sensitize’ participants to the presence of algorithmic selection and ranking [4]. We therefore split our co-design workshops into two parts and included a preparatory diary study. The entire participatory process thus consisted of three phases (discussed in more detail below): (1) a diary study meant as sensitizing activity, (2) a workshop aimed at uncovering algorithmic imaginaries, and (3) a workshop with co-design exercises to develop new design ideas.

*Recruitment & overview of participants.* Given the topic of news curation and recommendation, we set out to recruit users of a service that, on top of being popular with a broad audience, integrates algorithmic ranking at its core. As Facebook is one of the most popular social media platforms in Belgium, we decided to recruit users of this service. Facebook presents users with a single feed of posts selected from a large pool of candidates, which means it takes little effort to raise participants’ awareness of the presence of automated ranking systems. As social media are common platforms via which people consume news [34], Facebook is also involved in news distribution, which is central to our co-design challenge.

We recruited participants through an online call disseminated via the website of our research group and social media platforms, viz. Facebook and Twitter. The digital flyer was shared on local Facebook pages, such as second-hand buying and selling groups and various ‘ask anything’ pages. We specified three prerequisites in the call, namely (1) being a social media user, (2) receiving news through social media, and (3) being open to reflecting social media use.

As recommended for this kind of study [4], the recruitment call purposely avoided the terms ‘algorithms’ or ‘recommender systems’ to avoid biasing in potential participants. Instead, the call focused on reading news via social media. The flyer also mentioned that selected candidates would receive a 40 euros voucher for an online store as an incentive. All applicants had to fill out a brief enrollment form that served as a screener and allowed us to collect necessary personal and demographic information. The study was conducted in a university city with an international population, allowing us to recruit participants with a variety of backgrounds. Initially, 16 candidates registered as participants. However, as the date of the workshops drew closer, some indicated they were no longer in the capacity to attend. We attempted to recruit more participants to compensate for this drawback, but this yielded limited results due to the short notice. At the end of the recruitment period, eleven candidates participated. All participants received a 40 euros voucher from an online store in retribution for their time. Table 1 presents an overview of the participants’ characteristics.

*Sensitizing activities.* The co-design approach comes with some challenges, especially when tackling topics such as the design of recommender systems. Following recent methodological literature [4], there are two main obstacles. First, users often have limited awareness of the presence of algorithmic selection and ranking and are often unaware of the presence of algorithmic ranking systems. Social media users in particular seem to have limited awareness of the fact that algorithmic systems curate their news feeds [18, 25]. Researchers refer to this lack of knowledge as limited ‘algorithm awareness’ [25]. Second, and equally important, different people understand the term ‘algorithm’ differently. To deal with these challenges, we follow the suggestion of including ‘sensitizing activities’ in the participatory design approach [4]. Sensitizing activities are a way to make participants aware of and sensitive to specific phenomena without directly influencing their experiences.

To this end, we provided participants with a preparatory diary exercise intended to gently increase their awareness of the presence of algorithms in their social media feeds. During the week leading up to the first workshop, we asked participants to keep track of the news they encountered in their Facebook news feed. For the first five news items they encountered they had to fill out a

#	Gender	Age	Background
1	f	56-65	IT
2	f	36-45	Finance
3	f	36-45	Social sector
4	m	18-12	IT
5	f	26-35	Cultural sector
6	f	18-25	Graduate student
7	m	26-35	Civil engineering
8	m	26-35	Civil engineering
9	m	36-45	Computer programming
10	f	18-25	Social sciences student
11	f	18-25	Graduate student

Table 1. Overview of workshop participants

brief questionnaire asking about the type of message, the time a user posted it, and where in their News Feed it appeared. Then, during the first workshop, we started with a collective brainstorming exercise during which participants discussed these experiences. These sensitizing activities ensured participants were aware of the algorithmic curation of their social media feeds and shared a basic understanding of it without direct instruction from the researchers. It is essential to note that we conducted the workshops to inform the subsequent design process. Their purpose was not to generate knowledge with universal validity (which would be difficult given the small and self-selected sample of participants) but rather to provide insight into what users are currently thinking and doing and how additional features could take into account both their concerns and wishes.

*Workshop #1: User imaginaries.* The first workshop explored participants' imaginaries about which personal data is collected and processed when Facebook composes a news feed. Almost all participants knew that items in their news feeds did not appear in chronological order but that a computer system reordered them. The workshop coordinators briefly mentioned that Facebook generates a 'relevancy score' for each item based on official communication by the social media platform.<sup>1</sup> In small subgroups, we then asked our participants to come up with factors they thought Facebook would take into account when calculating the 'relevancy score' and write them on sticky notes. We used collaborative affinity mapping [28] to, together with participants, form 'clusters' of factors the social media platform might take into account. Starting from a single concept, participants took turns suggesting sticky notes to add to a shared whiteboard. As participants added notes, connections and contrasts naturally emerged, forming clusters of similar notions. Importantly, participants were encouraged to explain the elements mentioned on their sticky notes and highlight the relationships with already-existing notes. The resulting interaction and discussion between participants provided vital research material. It turned the mapping into a real collaborative effort, while comments of and exchanges between participants provided insight into how they conceptualized the functioning of the social media algorithmic ranking system.

*Workshop #2: Co-designing for explainability.* In the second workshop, organized two weeks later, the same participants joined in co-designing activities we developed specifically for this research project. The idea of the workshop was to turn to participants' expectations of and wishes for explainability features that would better explain how and why certain items appear in their news

<sup>1</sup>Workshop coordinators showed participants two stills of a video shared by Facebook about the news feed ranking. Original video at <https://about.fb.com/news/2018/05/inside-feed-news-feed-ranking/>, last accessed on 3 June 2021.



feed. In preparation of the second workshop, we asked participants to look at Facebook’s information on them via their ‘Ads preferences’ page. We provided participants with instructions on how to access this dashboard within the platform, which shows the interests Facebook thinks users have.

After a brief recapitulation of the first workshop, we gave participants a co-designing exercise. Divided into small groups, they received two sets of cards<sup>2</sup>. The first stack consisted of 16 ‘goal cards’ based on the results of the previous workshop and contained transparency goals for the recommender system. The goals revolved around the user’s profile (e.g., show data sources used for profiling), an individual item in the news feed (e.g., show ranking weights), other users’ interactions with an item (e.g., show the impact of comments and likes on ranking), or means for control (e.g., prioritize a topic or filter post types). The second stack contained 13 cards with ‘interaction design elements’ such as ‘information box’, ‘sort’, ‘notification’ or ‘dials’, meant to spark their imagination and creativity. After dot-voting on the most critical goals, we asked participants to develop design ideas and interface elements that could help achieve those goals. They were also encouraged to sketch their designs, and to present and discuss their creations with other participants.

*Analysis.* In order to streamline the analysis of the results, both workshops were voice-recorded. When analyzing these recordings and our notes, we paid particular attention to participants’ motivations: what mattered most was the reasoning behind their choices, their priorities, dreams, wishes, and imaginations. The first workshop ended with a collective affinity mapping exercise, resulting in clusters. The discussions during this exercise were analyzed to reveal significant themes.

For the second workshop, we applied ‘thematic analysis’, going “back and forth as needed through the phases” of the workshop [9]. We first transcribed the audio recording of the final discussion and presentation of participants’ design ideas. The following steps in our analysis consisted of initial open coding of the transcriptions and the descriptions of their designs and then grouping the coded sections into themes. We then reviewed the design ideas by theme and generalized their characteristics.

## 4.2 Imaginaries of data use for news feed ranking

Collaborative affinity mapping during the first workshop produced a structured overview of participants’ imaginaries about the type of data used by Facebook to rank items. As discussed above in the background section, the imaginaries refer to how people *think* algorithmic systems use their data (and how this impacts their behavior), rather than how they work technically [10]. In the following paragraphs, we discuss participants’ imaginaries in more detail.

*Big Brother and the ‘abuse of data’.* The first cluster of imagined factors relies on what participants spontaneously called a ‘Big Brother’-like collection and use of data by Facebook. They suspected unfair and opaque data collection to be used by the system to improve its predictive model. Participants alluded to using location data and search and browsing history in the ranking process, qualifying this as ‘abusive use’ of data. Other examples of data use that were deemed abusive by some were the type of device, a user’s internet speed, and the content and metadata of private communications. Two participants even suspected data was collected by eavesdropping via the microphone or spying through the camera of their devices. While workshop moderators emphasized that there was no evidence that Facebook eavesdrops on its users, this shows participants had a wild imagination about which data is collected and processed while showing an eagerness to better learn about how and what data news providers collect.

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<sup>2</sup>These cards are attached as appendix to the project report of ATAP, Task 3.1, available at <https://www.law.kuleuven.be/citip/en/research/atap/reports>.

*'Derived data'*. A second cluster relates to data a social media platform might infer from users' behavior on the platform itself. Examples include creating profiles to categorize users based on previous interactions, the consolidation of such profiles with information retrieved from other services when using single sign-on solutions, or monitoring the time spent on the platform. Participants grouped all of these under the label 'derived data'.

It is important to note that participants showed different levels of concern over the types of data news providers use. Most participants considered 'derived' information as legitimately obtained compared to the 'abusive data'. Where precisely one should draw the line between the two, however, was a topic of disagreement. Some saw little harm in a system using, for example, their shopping history, while others expressed concern about such practices. One participant stated that "while sharing a post is a public act, clicking on a link should remain private" (P3). This result brings us to the next category: data that is explicitly shared rather than inferred.

*'Explicitly provided data'*. The third cluster, participants suggested concerns information actively and explicitly provided by users. Examples of such information include age, gender, residence, and relationship status, all provided when registering or using the service. Participants distinguished this cluster on the basis that some information is shared consciously. While 'abusive' and 'derived data' are shared unconsciously, the information in this cluster is 'explicitly provided'. Still, the fact that some information is deliberately shared does not imply that all users are comfortable with their data being used in the recommendation or ranking process. One participant mentioned that she would not want any system to serve content based on her gender, even if she had revealed it to a platform.

### 4.3 Lessons from co-design: combining transparency and control

The results of the first workshop show the distinctions participants make in how data are used in algorithmic recommender ranking on social media. Even as participants draw the lines between these categories differently and show different levels of concern over the use of their data, it is essential to note that all were interested in more control over the collection and use of such data. This decision did not only apply to data use they considered illegitimate, but also to the 'explicitly provided' data: participants wanted to be more involved in *how* news providers use such data to provide recommendations. This became clear from the second workshop, where we asked participants about the transparency features they would like to see. We discuss these insights here.

*Transparency & legibility*. Nearly all participants were eager to know why the interface displayed items in a particular order. They wanted to see, for example, which factors influence automated curation. Participants wanted to know which data the system used to build their profile and how these were obtained or derived. In the words of one of the participants, they wanted to "see the logic behind it, why certain parallels are drawn".

During discussions later in the workshop, some participants emphasized that this information should be transparent, accessible and insightful. As one participant phrased it, adding "fine print" is not enough. The information shared should also be understandable. In other words: transparency should imply legibility.

This concern resonates with issues raised in academic literature. For example, Mike Ananny and Kate Crawford note that, among other issues, a focus on transparency "can privilege seeing over understanding." [5, p. 680]

*No transparency without control*. Our participants considered transparency and control as intertwined. This point was implicitly present in many design proposals and resurfaced in the closing discussion. At its most basic level, many participants felt they should be able to intervene if the

system makes faulty inferences about them. Participants also expressed the need for fine-grained control over the functioning of the recommender system itself to influence *how* it comes to its decisions.

Transparency should also involve increased control on a more conceptual level. As one participant noted, "if it is 'just for information and you wouldn't be able to change anything, that would be frustrating to me." Another participant put it even more straightforward: "[Transparency] is meant for control." In other words, participants wished for transparency and insight that they could put to use. Transparency is pointless without adequate means of control. Designers should therefore consider both concepts as two sides of the same coin.

*Profiling concerns.* During both workshops, participants expressed interest in understanding the resulting profile the system made of them. One reason is that they were particularly afraid of being pigeonholed in too narrow a category, resulting in them receiving news based on a narrow conception of their interests. This was related to participants' care for diversity in the news: they wanted to keep discovering new and unexpected content, especially if 'the system' were to assign them to specific categories. Some participants suggested that designers could achieve diversity by adding a 'surprise me'-button to show variety or via elaborate filters that would allow users to indicate preferences explicitly.

Profiling concerns were broader than a fear of being pigeonholed, however. Almost all participants were eager to know what the system thought of them, i.e. which categories the system assigned them to and how it came to these conclusions. They wanted to know which data the system used to construct their profile and from where these data came. One subgroup of participants envisioned a detailed dashboard that would allow users to retrieve and manipulate such information. Other groups proposed variations of a 'why this?'-button. In one version, these included the ranking weights of items in the news feed, detailing how the shown news item resembles the users' profile. We turn these design ideas into a mock-up prototype in the following section.

## 5 LEARNING FROM QUALITATIVE PROTOTYPE EVALUATION

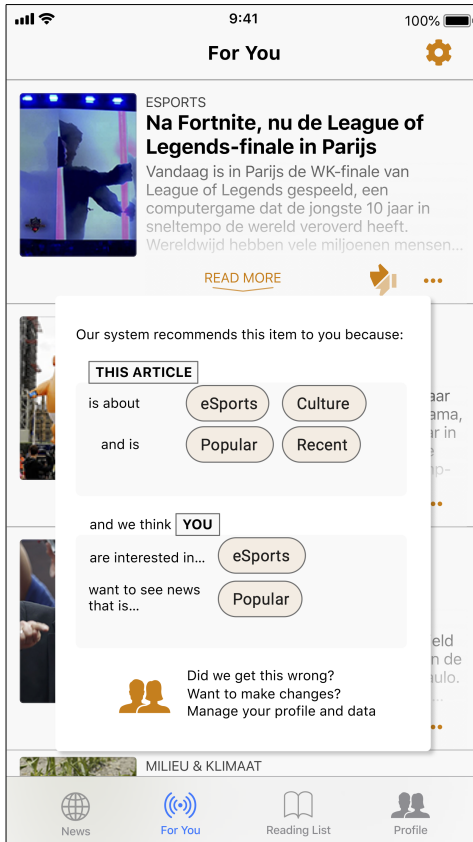
In the second phase of our research project, we translated the design ideas and sketches of the co-design workshops into different interface features and a mock-up prototype. As participants in the co-design workshops emphasized the importance of both transparency *and* control, we broadened our initial scope and included participants' suggestions for increased control in our prototype.

### 5.1 Design Rationale: Transparency and control connected to a privacy hub

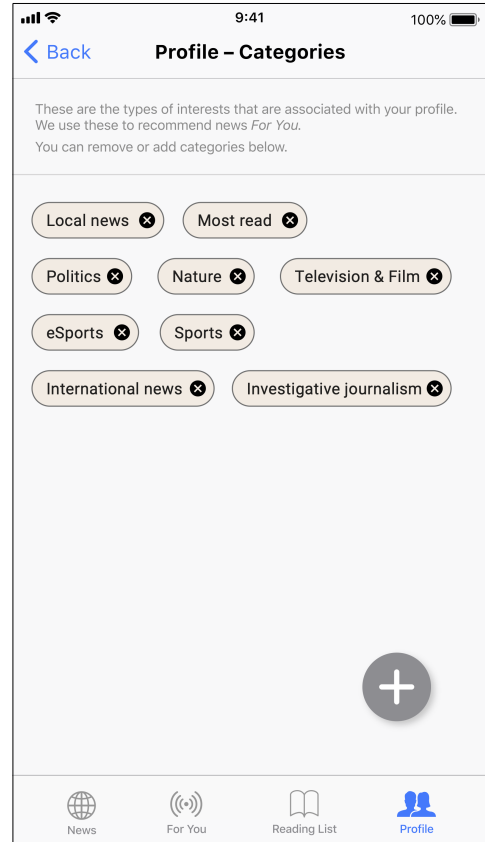
Considering previous research' emphasis on the ineffective and troublesome nature of current privacy notices [20, 30, 45], we build upon the results of the co-design workshop and design suggestions from previous research [11, 41, 44] to create what we called 'a privacy hub'. We first summarized participants' ideas and motivations into a set of design features and then further synthesized these features, until we arrived at a list of four sets of features that we included in our prototype and subsequently evaluated.

We used Adobe XD to design a digital mockup with basic interactivity to provide the feeling of a real application (see figures 1a, 1b, 2a, 2b, and 3). We designed the prototype to resemble a personalized news service that we called *News For You*. We included a splash screen and a 'personalized news feed' listing news articles corresponding to readers' interests to make it realistic. The enumeration below presents an overview of the features.

*1. A 'Why this'-explanation.* During the co-design workshops, participants shared an eagerness to learn why a particular item receives its specific ranking in the feed. To meet this interest, we added



(a) 'Why this'-overlay



(b) Control panel for user categories

Fig. 1. Overlay and dashboard for 'Why this'-based explanation

a button next to each element that pops up an overlay that explains why the article is selected. When the user clicks the button, it shows the categories associated with the article and highlights which of these characteristics correspond to the user's profile. The 'why this' button attempts to increase transparency regarding which factors influence automated curation. To accommodate participants' requests for complementary controls, we connected the 'why this' overlay to the profile dashboard where users can modify the categories associated with their profile. We show this feature in figure 1a and 1b.

**2. Ranking weights & sliders.** During the first workshop in the co-design process, participants suggested that showing the weights calculated to sort the news feed could shed light on the ranking process. We included a button to display the ranking weights of items in the feed to accommodate this request. When a user clicks on a ranking weight, an additional overlay provides graphical information on the factors influencing the score, as shown in figure 2a. A direct link to the profile dashboard allows users to adjust their interests.

In the co-design workshop, participants suggested using sliders or dials to manipulate the weight given to different factors in the algorithmic ranking. We therefore drafted a panel from which a user

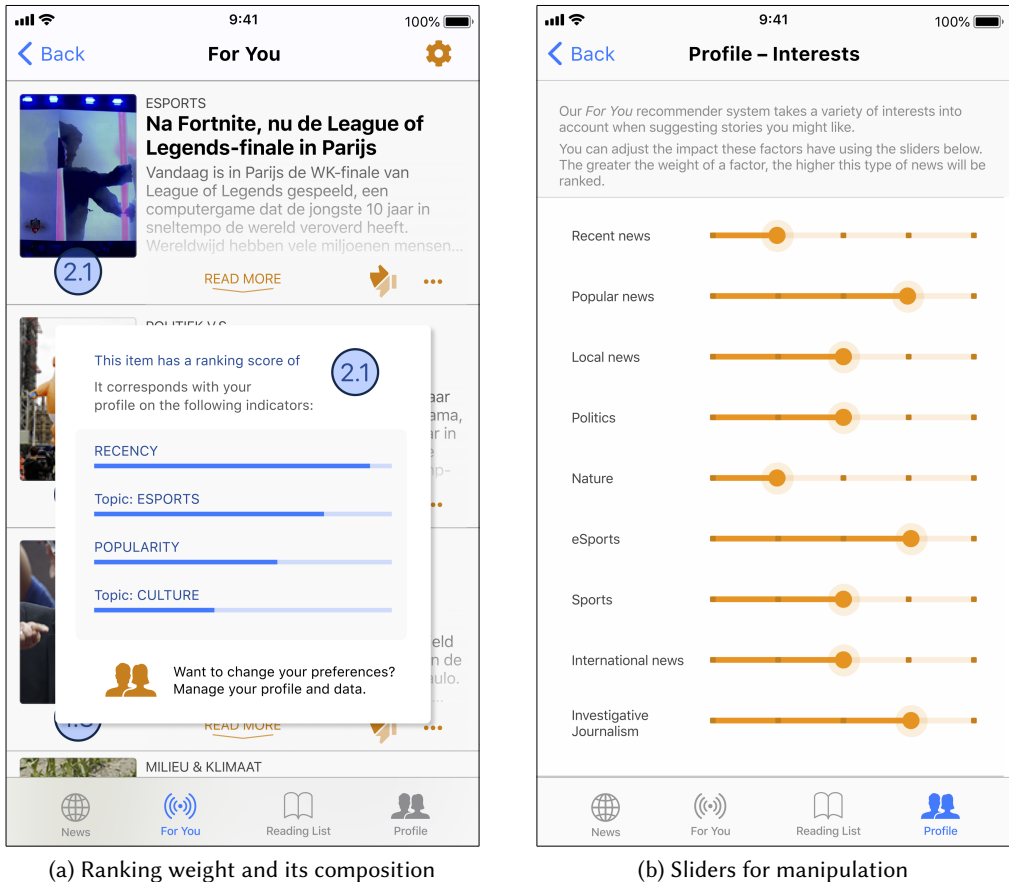


Fig. 2. Overlay and control panel for score-based explanation

could manipulate the importance of different categories and characteristics associated with their profile and news items, such as 'recency', 'popularity', or specific topics (see figure 2b). Each of these characteristics has a slider so the user can manipulate them individually to alter their impact on the final ranking weight. These sliders would allow for more nuanced control in comparison to binary options.

**3. Voting with thumbs.** As a variation on the previous feature and following a suggestion from the co-design workshops, we included a different mechanism to manipulate preferences. This feature displays thumbs up or down icons for users to indicate whether they would like more or less similar news items. We do not intend the thumbs up/down as a way to indicate whether a user agrees with the news item, nor to assess the popularity of a news article, but as a feedback mechanism to the algorithmic ranking system.

As with the previous feature, the overlay includes a link to the more elaborate 'interest sliders' shown in figure 2b. This feature aims for simplicity and ease of use while simultaneously providing more sophisticated control when requested. Note that the emphasis here is on control rather than

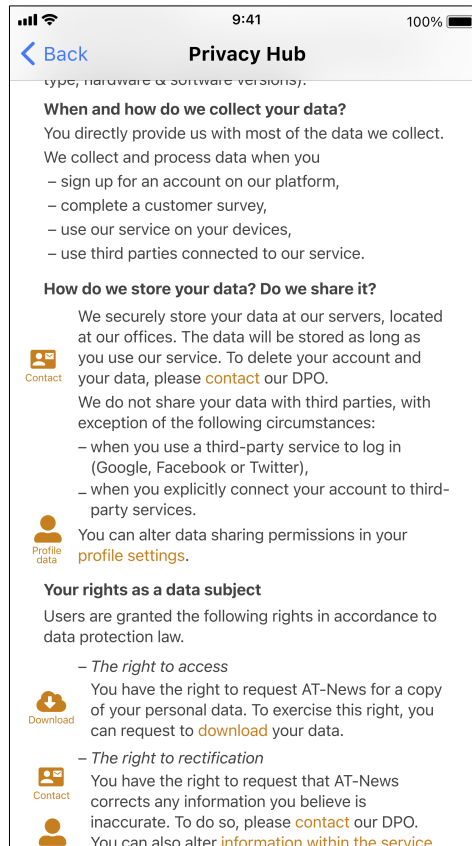


Fig. 3. Privacy Hub

transparency, as the feature does not provide additional information as to why items are currently ranked the way they are.

**4. Interactive Privacy Hub.** To imitate the legally required privacy notice for any application that collects personal data, we included a 'privacy hub' in our prototype. Our participants did not suggest this final feature during the co-design workshops. We included it to make our prototype more in line with the legal obligations of the GDPR. The 'privacy hub' contains a legal notice informing users of the data our prototype collects (or rather, would collect), how it processes this data, and with what purpose. In addition, it explicitly mentions users' rights as data subjects as provided by the GDPR. We deliberately wrote this privacy notice in accessible and understandable language. Actionable buttons and direct links to the in-app control panels, as shown in figure 3, transform the passive notice into a 'hub'. In doing so, the hub combines *ex-post* and *ex-ante* transparency measures. This feature aims to connect existing features and settings to legally required information, thus further facilitating user control in the spirit of data protection law.

## 5.2 Approach to evaluation

**User walk-through & semi-structured interview.** In order to investigate users' assessments of our prototype, we took a qualitative and in-depth approach. This method allowed us to quickly gather



Table 2. Participants for prototype evaluation

#	Gndr	Age	Background	#	Gndr	Age	Background
1	F	26-35	Public sector	13	M	18-25	Social sciences student
2	F	36-45	Policy advisor	14	M	18-25	Social sciences student
3	F	18-25	Graphical design student	15	F	18-25	Social sciences student
4	F	18-25	Social sciences student	16	F	18-25	Social sciences student
5	F	26-35	UX design	17	F	18-25	Social sciences student
6	M	26-35	Retail	18	M	36-45	Civil servant
7	F	36-45	Health care	19	F	18-25	Social sciences student
8	F	26-35	Hotel and catering	20	F	18-25	Social sciences student
9	M	26-35	Social sciences student	21	F	18-25	Social sciences student
10	M	18-25	Social sciences student	22	F	18-25	Social sciences student
11	F	18-25	Social sciences student	23	F	18-25	Social sciences student
12	F	18-25	Social sciences student	24	F	36-45	Public sector

a variety of impressions and reflections on the design features and assess whether potential users would be interested in using them. To this end, we designed a user walk-through exercise, where we provided participants with simple tasks to perform using the clickable prototype [47, p. 561]. For this exercise, we invited participants to our offices to navigate the prototype on a laptop.<sup>3</sup> We asked participants to describe what they saw and what they thought the buttons meant during the walk-through. In addition, we invited participants to comment on the usefulness and clarity of the features. The walk-through was supplemented with semi-structured interviews investigating participants’ news reading habits, their recent experiences with recommender systems, and their interest in explanations of how such systems work.

*Recruitment & overview of participants.* For the evaluation, we recruited participants who read news online or were familiar with similar applications. The recruitment text mentioned the topic of ‘digital personalized news’ and the challenge of how such a service could be better attuned to reader preferences. We circulated our call for participants on social media and the online educational platform for students in the Social Sciences at our university. Table 2 provides more details on the final participants. Potential limitations of this selection are discussed in section 6.

*Analysis of prototype evaluation.* The walk-throughs and subsequent interviews were audio-recorded. Together with written notes they formed the basis for our analysis. First, we summarized participants’ reactions to and comments on the individual prototype features. We subsequently conducted a thematic analysis of the results of the semi-structured interview in order to evaluate how their assessment connected to their current experiences with reading news, social media feeds, and recommender systems.

Our primary intent with the development and evaluation of our prototype was to use it as a means to generate knowledge that researchers and practitioners can use in later designs [cf. 21]. We aim to provide insight into users’ perceptions of transparency in recommender systems. In other words, we are interested in what the confrontation between participant and prototype shows, rather than in the evaluation of the prototype itself. Our analysis thus focused not on the features per se but on deliberations and reflections of participants.

<sup>3</sup>Even though we designed the mock-up to look like a smartphone application, we decided to let participants use a laptop as the bigger screen made it easier to point at and discuss interface elements.

### 5.3 Insights for news recommenders: reflecting on transparency and control

*Control requires transparency.* During the workshop, participants explained that unless transparency of the algorithmic ranking process is combined with user controls, the increased clarity will lead to frustration. During the prototype evaluation, participants turned this connection on its head: for controls to be helpful, a certain level of insight and transparency is required. In the words of one participant: “When I start turning those dials myself, I really need to know how it works.” (P6) Effective use of controls requires knowledge of the system itself. Before users can decide whether they want to see more or less ‘similar articles’, for example, they need to know how the system categorizes the article in order to understand what ‘similar’ means. In other words, users in our study need to have insight into the system’s evaluation in order to assess the effects of the different controls.

For this reason, participants criticized the ‘thumb up’ and ‘thumb down’ buttons for being opaque, even though we originally included them for easy manipulation of user preferences. While some participants praised the feature’s simplicity and accessibility, most were critical of the thumbs because of the difficulty of gauging how significant the impact of clicking them would be. One participant, for example, said she dislikes “trivial” political news and would not want to see such articles, yet she was very much interested in “real” political topics. She pointed out that her reasons for demoting an item might differ from the system’s assigned categories: “I don’t know how [the thumbs] are defined. What do they imply?” (P5) This underscores that effective controls require insight into how the system works.

*Transparency without insight.* Despite the eagerness of participants in the co-design workshops to see the ranking weights of different items in their news feeds (as prototyped in figure 2a), the evaluation pointed out that these weights are of little use without additional context. Participants said it was difficult to make sense of these scores. Showing the ranking weights directly thus seems to generate confusion rather than clarity.

Our main takeaway here is that features that aim to reveal some of the inner mechanics of algorithmic systems, thus showing the ‘seams’ of the design [17], need to make what they show intelligible to make it helpful to users. Without such intelligibility, the result seems to be transparency without insight, or “seeing without understanding” [5, p. 680].

*A balance between convenience and control.* During the evaluation, a central recurring theme was the balance between convenience and control. Participants that were positive about the granularity of control provided by the ‘interest sliders’ (see figure 2b) also reflected on the effort it would take to use those controls. Perhaps the effort would be too high, some suggested. This reflection is related to a central concern expressed by participants who were suspicious of an automated system recommending news: controls are required to have a sense of power over what is suggested, but using them extensively might involve a lot of time and effort, thus making the service even less attractive. In the words of one critical participant: “On the one hand I don’t want to spend time to track and evaluate which information is served to me, but on the other hand, when [a system] is making choices for me, I’d like to [have control over] it.” (P6) Here a conundrum appears: using control requires effort and thus diminishes the convenience provided by the service, yet elaborate controls seem crucial to convince users critical of automated and personalized news recommenders actually to use such systems.

Here we should emphasize diversity among participants, both regarding how much control they want and how much effort they are willing to spend to use them. Some participants expected the recommender to ‘do its thing’ without any control or configuration on their behalf. Participants who appreciated the voting buttons, while a minority, expected ‘the system’ to learn about their

preferences, thus automatically configuring the sliders for them. Some expressed the desire that the service would learn their interests by itself, based on the articles they read, without undertaking any action themselves. Evaluation of the control panel with sliders (shown in figure 2b) emphasized that participants differed in their willingness to put in the effort to use the provided controls. While half of the participants were eager to fine-tune their preferences on a more granular level, the system seemed “too much work” (P8, P22) to others. They thought the task of configuring the sliders to be daunting.

*Gaining insight through control panels.* Some participants found a different use for the sliders and were interested in using them to gain insight. As the sliders allow users to modify their profile, these controls would also shed light on how they are being profiled in the first place. One participant who thought the sliders looked too complicated was interested in using the feature to know “what does the algorithm actually think of me?” (P8) In this sense, features meant for control can also enhance transparency, as they provide a way for users to inspect their algorithmically constructed profiles. From the evaluation of this feature, we see how controls that confront users with their profile can also serve as a means to gain insight into the recommender system. The extent to which this is actually feasible remains a big question (see 6.2).

*Trust as networked characteristic.* During the interviews it became clear that ‘trust’ in a news recommender cannot be meaningfully separated from trust in the media organizations and newsrooms. In other words, participants’ trust in news recommendations should be seen as a ‘networked’ characteristic [see also 26, p. 73]. Some participants made this clear by explicitly connecting the topic of trust in the system to trust in newspapers and editorial boards. While almost everyone assumed that the system would be technically functional and accurate, many participants indicated that their trust in the recommender system depended on the newspaper(s) involved. In other words, participants were skeptical towards editorial (i.e., human) and algorithmic (i.e., automated) selection alike [22]. In this sense, the issue of trust in recommenders can be considered ‘networked’: inseparable from and dependent on the broader organizational systems in which the recommender system is embedded.

*Diversity and serendipity when reading news.* Not only trust in the system is situated within a broader context, but also the wishes of participants seem situated in daily news reading practices. The connections between preference for a particular set of controls and reading habits became clear from the interest participants showed in the sliders (see figure 2b). They specifically appreciated the nuanced control this dashboard seemed to provide. One participant stated that this feature appealed to her “because I like to have a diverse palette of news rather than focused on one topic. [...] It [seems] gratifying to use because you can use it interactively, and you have a sense of control” (P11). Providing controls that enable users to state a mixture of interests thus seems particularly important.

In addition, the interviews underscored how new and diversified content is crucial for peoples’ news reading experience. During the walk-through, some participants worried that the system would ‘pigeonhole’ them in a particular category (similar to what some participants of the co-design workshop feared). This is particularly problematic for news reading, as participants emphasized the importance of surprise and curiosity in their news reading experience. For instance, one participant wondered whether using a news recommender would lead to “wearing a specific set of glasses. Only these topics... What with the others?” (P6) Another participant shared the same concern: she feared her own choices might lead to “tunnel vision” and noted that while she has a preference for a specific set of topics, she “also want[s] to know things that [she] might not immediately pick [herself].” (P23) In other words, she wanted to receive news outside of her usual scope. This finding

is connected to a motivation many participants shared: they read the news to learn and see new things. In the words of one participant: “I read the news online to see things that lie beyond my own world. [...] When I take the effort to open this app, I want to broaden my worldview.” (P19)

This result is a challenge we have not explored in our prototype but which warrants further attention in future research: how to ensure discovery outside of one’s usual scope of interests. One respondent mentioned a possible feature that would suggest categories the reader could be interested in and would like to read. She also emphasized that the system should merely make suggestions: “...there should also be the possibility of saying: ‘no, this is not for me’” (P2). Another participant suggested a sort of “roulette feature” that would make more wild guesses regarding recommendations (P6).

*Preferring control over transparency.* When interacting with the prototype, most participants seemed more interested in manipulating the recommender system rather than in knowing why or how it came to certain conclusions, suggesting they value control more than transparency. For many participants, control was more important than insight. The ‘why’ question only pops up when the service does not work as expected.

However, there is a particular danger to the emphasis on control over transparency: a possible ‘placebo effect’ [cf. 50]. The following interaction illustrates this. When we asked a participant whether she understood why certain items were suggested to her, she replied: “Because you can configure everything yourself, you know where [the suggestions] come from, and not from random likes and whatnot.” (P16) Precisely *because* the participant saw interface elements that suggest control, she felt that she would know *why* certain items were recommended. However, previous research suggest that when controls are present, users will take responsibility when suggestions are not as they expect them to be, even if the controls do not work [50]. This finding suggests that such placebo effects of controls could decrease users’ interest in transparency. We discuss this challenge in more detail in the discussion and conclusions of this paper.

*The ‘privacy hub’ as a way to complement the ex ante privacy notice.* The final task in the walk-through asked participants to read through the ‘privacy hub’ (as shown in figure 3). Almost all participants stated they do not usually read privacy notices when using online services. One participant mentioned that he was not interested in privacy notices because there was no room for negotiation: “You simply have to click agree [or] you can’t use the service.” (P14) His skepticism extended to our privacy hub, which he described as “small print”.

Many other participants commended the possibility of navigating directly from the privacy hub to the application’s different settings dashboards, decreasing the effort it would take to change how data is used. As shared by one participant: “The fact that there is the [possibility for] control with an actual button makes it much more human and tangible to me.” (P6) However, when we told participants that the same control panels were also accessible via the in-app settings, almost all preferred making changes there rather than via the privacy hub.

The fact that our privacy notice, usually considered an *ex-ante* transparency measure, included links to directly exercise one’s *ex-post* rights did make the data-subject rights more accessible. One participant, for instance, praised the fact that the privacy hub does not only mention the possibility for the user to download data (as imposed by the GDPR) but provides a direct link to use this prerogative.

We conclude that our idea of the privacy hub does not suddenly turn the privacy notice into sought-after literature. The chance that users will turn to this page when they are looking to manipulate their settings seems slim, as they seem to prefer to access the control settings directly. However, responses from participants suggest that icons and direct links to control settings do make the privacy notice more understandable and valuable. Future research could explore the

potential of interactive privacy notices, combining both *ex-ante* and *ex-post* measures in a single design.

## 6 DISCUSSION AND CONCLUSIONS

The two-phase study discussed in this paper illustrates how a close involvement of users can inform the design of news recommender systems by (1) investigating their ‘algorithmic imaginaries’, (2) including them in ideation via co-design activities, and (3) learning from qualitative user evaluations. This section wants to share general insights relevant to both practitioners and researchers. While some of these insights are specific to the theme of news recommendation, most have broader relevance. We end this section with a discussion of the dangers of perceived control.

### 6.1 Takeaways for the design of algorithmic recommender systems

*The intertwining of transparency and control.* A common theme that returned in all parts of our study is the close relationship between the concepts of transparency and control. We learn from the co-design workshops that users are eager to know how recommenders construct user profiles and score different items. However, providing such transparency without the option to make changes would lead to frustration, according to participants, which implies that transparency probably necessitates some form of control over the system. During our prototype evaluation this insight was complemented with new connection between these two concepts: effective use of controls presupposes a basic understanding of how the system works and the effects of the controls. In other words: control requires transparency. When designers implement controls, users want to understand how these impact the recommendations they receive.

At the same time, designers are advised to be careful when setting expectations of the level of control users have. The prototype evaluation suggests that betrayed expectations of control can discourage people from using the service. When users notice that provided features have little impact on the recommendations, they can quickly become dissatisfied and turn away from the service altogether (assuming users can detect defects, cf. *infra*). It is crucial, then, that designers carefully consider the impression and expectations the implemented features generate.

*Control vs. convenience.* Our prototype evaluations underscore that striking a balance between control and convenience is essential yet challenging due to users’ varied priorities. Different users seem to have different preferences and make different assessments of the same feature, depending on the way they (would like to) consume news. This is related to findings from previous research pointing out that user do not always need explanations, that not all users need a detailed explanation, and that explanations should be provided only “on-demand”, keeping them brief and using layperson terms [11]. Some users were eager to spend much time exploring different options and fine-tuning their settings, while to others such complexity feels like ‘work’. This became apparent from the evaluation of the privacy hub: to some users, the interactive notice provided limited additional value precisely because they had little interest in control over how their data was used and how recommendations were made. To others, however, the hub made the traditional privacy notice more insightful and actionable.

We believe design solutions such as the privacy hub should be seen in this light: as an additional feature that provides users with insightful and actionable options when they want them, thus increasing the value and legibility of privacy notices. By combining the notice with direct controls, a privacy hub might have a higher possibility of being read or explored, leaving the users with the chance to get to know their data subject rights more interactively. Further research is needed to find if and how a privacy hub could achieve such potential.

More broadly, and beyond the topic of the privacy hub, one answer to the conundrum of convenience vs. control is to provide users with a choice between two options when they start using the service: more control via elaborate but complex interface features, or more automation with less direct user control.

*News recommender systems are situated.* Personalized recommenders and ranking systems are always ‘situated’: users’ interactions with recommender systems occur in a particular context and are informed by their perceptions and assessments of the system. That is to say, an automated system never exists ‘by itself’, but for the user it always operates in relation to the type of things it ranks or recommends. Our evaluation underscores this insight in two separate ways. First, participants’ expectations and concerns with algorithmic recommendations were connected to their news reading habits and experiences. Crucial in the design of news recommender services, then, is attention to people’s motivations for reading news (from following specific thematic interests to broadening one’s worldview) or to their preferred ways of discovering reading material (taking note, for example, on the importance of serendipity or encountering unexpected topics).

Second, our investigation shows that trust in algorithmic recommendations is always related to trust in the news organization. Managing trust at different organizational levels seems therefore integral to generating trust in the recommender system, from trust in journalistic content and the newsroom to trust in the publisher and the company as a whole.

These conclusions are in line with existing research. When evaluating privacy and human behavior, scholars have emphasized how perceptions of recommender systems and their level of privacy are dependent on the context within which they are used. This influences how people use control mechanisms. [2]. Consequently, it is crucial to study the particularities of news reading practices when proposing design solutions that address issues of control, transparency, and privacy, also when complying with legal frameworks such as the GDPR. Again, the direct involvement of users via co-design is one way to achieve this.

These insights emphasize that when considering the effectiveness of design solutions, it is essential to take users’ opinions of service providers and data controllers into account. This insight is in line with previous research highlighting how users’ perceptions and impressions of an organization affect how they experience and perceive recommender systems [3].

## 6.2 The dangers of perceived control

A potential issue of particular importance is related to what Vaccaro and colleagues [50] have called ‘placebo effects’ of controls. They write that adding features that increase the *perceived* level of control can increase user satisfaction regardless of whether they work or not. Previous work has also highlighted how behavior and attitudes towards privacy can be easily influenced in favor of digital services via interaction and control mechanisms [2].

During the evaluation of our prototype, participants made statements that suggest placebo effects are particularly prominent in our prototype. In particular complex features such as the ‘interest sliders’ can provide a false sense of control, regardless of their effectiveness. Nevertheless, participants seemed confident that they would be able to notice when the system does not take their preferences into account. We suspect, however, that they might overestimate their capacity to note discrepancies between the control’s settings and the system’s behavior, which is particularly difficult when controls are complex and thus hard to evaluate.

Finally, our evaluation suggests that when users are convinced they have control over the system, they are less interested in learning how it works. In other words, as users perceive high levels of control, they see less need for transparency. This response could be particularly misleading when placebo effects are involved, i.e., when the actual level of control is much smaller than the user



assumes. A false sense of control could thus reduce the perceived need for transparency without improving the users’ insight into or control over the recommender system.

## 7 LIMITATIONS

Despite our best efforts, the research design has some limitations. Even though we organized the co-design workshops twice, the number of participants remains limited. While we took the effort to recruit local participants and international residents in Belgium by organizing one workshop in Dutch and one in English, socio-economic, gender, and cultural diversity could have been broadened with a higher number of participants. For these reasons, as with all co-design workshops, the resulting design ideas are situation-dependent and cannot be easily generalized to users in general.

While we attempted to ensure diversity in participants’ characteristics for the prototype evaluation, we were unable to achieve a representative distribution of age, gender, and educational & professional background. In this part of our study, young female participants and students of the social sciences are over-represented.

Finally, the co-design workshops departed from participants’ experience with Facebook. While Facebook is widely used and thus familiar to participants, it also has a controversial reputation which might influence their attitudes and ideas. Consequently, the imaginaries and concerns of participants might be specific to this platform. However, the aim of this contribution is broader, as we hope to have shown how the involvement of users via both co-design and qualitative prototype evaluations provides added value to the design of algorithmic systems.

## ACKNOWLEDGMENTS

The authors would like to thank Laurens Naudts and Pierre Dewitte (CiTiP, KU Leuven) for sharing their valuable insights on the GDPR. This article builds on the ATAP research project, Algorithmic Transparency and Accountability in Practice, that David Geerts (Mintlab, KU Leuven), Peggy Valcke (CiTiP, KU Leuven) and Katrien Verbert (Augment, KU Leuven) have coordinated. The present work was carried out with the support of the Coordination for the Improvement of Higher Education Personnel (CAPES) - Brazil - Financing Code 001.

## REFERENCES

- [1] Alessandro Acquisti, Idris Adjerid, Rebecca Balebako, Laura Brandimarte, Lorrie Faith Cranor, Saranga Komanduri, Pedro Giovanni Leon, Norman Sadeh, Florian Schaub, Manya Sleeper, Yang Wang, and Shomir Wilson. 2017. Nudges for Privacy and Security: Understanding and Assisting Users’ Choices Online. *ACM Comput. Surv.* 50, 3, Article 44 (aug 2017), 41 pages. <https://doi.org/10.1145/3054926>
- [2] Alessandro Acquisti, Laura Brandimarte, and George Loewenstein. 2015. Privacy and human behavior in the age of information. *Science* 347, 6221 (2015), 509–514. <https://doi.org/10.1126/science.aaa1465>
- [3] Oscar Alvarado, Vero Vanden Abeele, David Geerts, and Katrien Verbert. 2019. “I Really Don’t Know What ‘Thumbs Up’ Means”: Algorithmic Experience in Movie Recommender Algorithms. In *Human-Computer Interaction – INTERACT 2019. INTERACT 2019. Lecture Notes in Computer Science, vol 11748. Springer, Cham*, Lamas D., Loizides F., Nacke L., Petrie H., Winckler M., and Zaphiris P. (Eds.), Springer, Cham, 521–541. [https://doi.org/10.1007/978-3-030-29387-1\\_30](https://doi.org/10.1007/978-3-030-29387-1_30)
- [4] Oscar Alvarado, Elias Storms, David Geerts, and Katrien Verbert. 2020. *Foregrounding Algorithms: Preparing Users for Co-Design with Sensitizing Activities*. Association for Computing Machinery, New York, NY, USA. <https://doi.org/10.1145/3419249.3421237>
- [5] Mike Ananny and Kate Crawford. 2016. Seeing without knowing: Limitations of the transparency ideal and its application to algorithmic accountability. *New Media & Society* (2016), 146144481667664. <https://doi.org/10.1177/1461444816676645>
- [6] Pauline Anthonysamy, Phil Greenwood, and Awais Rashid. 2013. Social Networking Privacy: Understanding the Disconnect from Policy to Controls. *Computer* 46, 6 (June 2013), 60–67. <https://doi.org/10.1109/MC.2012.326>
- [7] Kaustav Bhattacharjee, Min Chen, and Aritra Dasgupta. 2020. Privacy-Preserving Data Visualization: Reflections on the State of the Art and Research Opportunities. *Computer Graphics Forum* 39, 3 (2020), 675–692. <https://doi.org/10.1111/cgf.14444>

- 1111/cgf.14032 arXiv:<https://onlinelibrary.wiley.com/doi/pdf/10.1111/cgf.14032>
- [8] Engin Bozdog. 2013. Bias in Algorithmic Filtering and Personalization. *Ethics and Inf. Technol.* 15, 3 (Sept. 2013), 209–227. <https://doi.org/10.1007/s10676-013-9321-6>
  - [9] Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 2 (jan 2006), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
  - [10] Taina Bucher. 2017. The algorithmic imaginary: exploring the ordinary affects of Facebook algorithms. *Information, Communication & Society* 20, April (2017), 30–44. <https://doi.org/10.1080/1369118X.2016.1154086>
  - [11] Andrea Bunt, Matthew Lount, and Catherine Lauzon. 2012. Are Explanations Always Important? A Study of Deployed, Low-Cost Intelligent Interactive Systems. In *Proceedings of the 2012 ACM International Conference on Intelligent User Interfaces* (Lisbon, Portugal) (IUI '12). Association for Computing Machinery, New York, NY, USA, 169–178. <https://doi.org/10.1145/2166966.2166996>
  - [12] Ana S. Cardenal, Carlos Aguilar-Paredes, Carol Galais, and Mario Pérez-Montoro. 2019. Digital Technologies and Selective Exposure: How Choice and Filter Bubbles Shape News Media Exposure. *The International Journal of Press/Politics* 24, 3 (July 2019), 1–22. <https://doi.org/10.1177/1940161219862988>
  - [13] Michael A. DeVito, Darren Gergle, and Jeremy Birnholtz. 2017. Algorithms ruin everything: RIPTwitter, Folk Theories, and Resistance to Algorithmic Change in Social Media. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17* (2017), 3163–3174. <https://doi.org/10.1145/3025453.3025659>
  - [14] Nicholas Diakopoulos and Michael Koliska. 2016. Algorithmic Transparency in the News Media. *Digital Journalism* 5, 7 (2016), 809–828. <https://doi.org/10.1080/21670811.2016.1208053>
  - [15] Olha Drozd and Sabrina Kirrane. 2019. I Agree: Customize Your Personal Data Processing with the CoRe User Interface. In *Trust, Privacy and Security in Digital Business*, Stefanos Gritzalis, Edgar R. Weippl, Sokratis K. Katsikas, Gabriele Anderst-Kotsis, A Min Tjoa, and Ismail Khalil (Eds.). Springer International Publishing, Cham, 17–32.
  - [16] Olha Drozd and Sabrina Kirrane. 2020. Privacy CURE: Consent Comprehension Made Easy. In *ICT Systems Security and Privacy Protection*, Marko Hölbl, Kai Rannenberg, and Tatjana Welzer (Eds.). Springer International Publishing, Cham, 124–139.
  - [17] Motahhare Eslami, Karrie Karahalios, Christian Sandvig, Kristen Vaccaro, Aimee Rickman, Kevin Hamilton, and Alex Kirlik. 2016. First I “like” it, then I hide it: Folk Theories of Social Feeds. *Conference on Human Factors in Computing Systems* (2016), 2371–2382. <https://doi.org/10.1145/2858036.2858494>
  - [18] Motahhare Eslami, Aimee Rickman, Kristen Vaccaro, Amirhossein Aleyasen, Andy Vuong, Karrie Karahalios, Kevin Hamilton, and Christian Sandvig. 2015. “I always assumed that I wasn’t really that close to [her]”. In *Proceedings of the 2015 CHI Conference on Human Factors in Computing Systems - CHI '15*. Seoul, 153–162. <https://doi.org/10.1145/2702123.2702556>
  - [19] European Union. 2016. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016. OJ L 119, 04.05.2016, p. 1–88. *Official Journal of the European Union* 59, L 119 (may 2016), 1–88.
  - [20] Benjamin Fabian, Tatiana Ermakova, and Tino Lentz. 2017. Large-Scale Readability Analysis of Privacy Policies. In *Proceedings of the International Conference on Web Intelligence* (Leipzig, Germany) (WI '17). Association for Computing Machinery, New York, NY, USA, 18–25. <https://doi.org/10.1145/3106426.3106427>
  - [21] Daniel Fallman. 2007. Why Research-Oriented Design Isn’t Design-Oriented Research: On the Tensions Between Design and Research in an Implicit Design Discipline. *Knowledge, Technology & Policy* 20, 3 (2007), 193–200. <https://doi.org/10.1007/s12130-007-9022-8>
  - [22] Richard Fletcher and Rasmus Kleis Nielsen. 2018. Generalised Scepticism: How people navigate news on social media. *Information, Communication & Society* 22, 12 (2018), 1751–1769. <https://doi.org/10.1080/1369118x.2018.1450887>
  - [23] Megan French and Jeff Hancock. 2017. What’s the Folk Theory? Reasoning About Cyber-Social Systems. *SSRN Electronic Journal* (feb 2017). <https://doi.org/10.2139/ssrn.2910571>
  - [24] Colin M. Gray, Cristiana Santos, Nataliia Bielova, Michael Toth, and Damian Clifford. 2021. *Dark Patterns and the Legal Requirements of Consent Banners: An Interaction Criticism Perspective*. Association for Computing Machinery, New York, NY, USA. <https://doi.org/10.1145/3411764.3445779>
  - [25] Kevin Hamilton, Karrie Karahalios, Christian Sandvig, and Motahhare Eslami. 2014. A path to understanding the effects of algorithm awareness. In *Proceedings of the extended abstracts of ACM conference on Human factors in computing systems - CHI EA '14*. 631–642. <https://doi.org/10.1145/2559206.2578883>
  - [26] Jaron Harambam, Dimitrios Bountouridis, Mykola Makhortkyh, and Joris van Hoboken. 2019. Designing for the better by taking users into account: a qualitative evaluation of user control mechanisms in (news) recommender systems. In *Proceedings of the 13th ACM Conference on Recommender Systems - RecSys '19*. ACM Press, Copenhagen, Denmark, 69–77. <https://doi.org/10.1145/3298689.3347014>
  - [27] Natascha Just and Michael Latzer. 2017. Governance by algorithms: reality construction by algorithmic selection on the Internet. *Media, Culture and Society* 39, 2 (2017), 238–258. <https://doi.org/10.1177/0163443716643157>

- [28] Andrés Lucero. 2015. Using Affinity Diagrams to Evaluate Interactive Prototypes. In *Human-Computer Interaction - INTERACT 2015*. 231–248. [https://doi.org/10.1007/978-3-319-22668-2\\_19](https://doi.org/10.1007/978-3-319-22668-2_19)
- [29] Célestin Matte, Nataliia Bielova, and Cristiana Santos. 2020. Do Cookie Banners Respect my Choice? : Measuring Legal Compliance of Banners from IAB Europe’s Transparency and Consent Framework. In *2020 IEEE Symposium on Security and Privacy (SP)*. 791–809. <https://doi.org/10.1109/SP40000.2020.00076>
- [30] Aleecia M. McDonald, Robert W. Reeder, Patrick Gage Kelley, and Lorrie Faith Cranor. 2009. A Comparative Study of Online Privacy Policies and Formats. In *Privacy Enhancing Technologies*, Ian Goldberg and Mikhail J. Atallah (Eds.). Springer Berlin Heidelberg, Berlin, Heidelberg, 37–55.
- [31] Brent Daniel Mittelstadt, Patrick Allo, Mariarosaria Taddeo, Sandra Wachter, and Luciano Floridi. 2016. The ethics of algorithms: Mapping the debate. *Big Data & Society* 3, 2 (dec 2016), 1–21. <https://doi.org/10.1177/2053951716679679>
- [32] Philip M. Napoli. 2014. Automated media: An institutional theory perspective on algorithmic media production and consumption. *Communication Theory* 24, 3 (2014), 340–360. <https://doi.org/10.1111/comm.12039>
- [33] Laurens Naudts, Pierre Dewitte, and Jef Ausloos. Forthcoming 2022. Meaningful Transparency through Data Rights: A Multidimensional Analysis. In *Research Handbook on EU Data Protection*, Eleni Kosta and Leenes Ronald (Eds.). Edward Elgar Publishing.
- [34] Nic Newman, Richard Fletcher, David Levy, and Rasmus Kleis Nielsen. 2015. *The Reuters Institute digital news report 2016*. Reuters Institute for the Study of Journalism.
- [35] Daniel Neyland and Norma Möllers. 2017. Algorithmic IF ... THEN rules and the conditions and consequences of power. *Information Communication and Society* 20, 1 (2017), 45–62. <https://doi.org/10.1080/1369118X.2016.1156141>
- [36] Midas Nouwens, Iliaria Liccardi, Michael Veale, David Karger, and Lalana Kagal. 2020. Dark Patterns after the GDPR: Scraping Consent Pop-Ups and Demonstrating Their Influence. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) (*CHI '20*). Association for Computing Machinery, New York, NY, USA, 1–13. <https://doi.org/10.1145/3313831.3376321>
- [37] Eli Pariser. 2012. *The Filter Bubble*. Penguin Books Limited.
- [38] Article 29 Data Protection Working Party. 2007. Opinion 4/2007 on the concept of personal data. (June 2007). [https://ec.europa.eu/justice/article-29/documentation/opinion-recommendation/files/2007/wp136\\_en.pdf](https://ec.europa.eu/justice/article-29/documentation/opinion-recommendation/files/2007/wp136_en.pdf)
- [39] Article 29 Data Protection Working Party. 2018. Guidelines on Transparency under Regulation 2016/679. (Apr 2018). [https://ec.europa.eu/newsroom/article29/document.cfm?action=display&doc\\_id=51025](https://ec.europa.eu/newsroom/article29/document.cfm?action=display&doc_id=51025)
- [40] Presidência da República do Brasil. 2018. Regulation (BRAZIL) 2018/13.709 of the Presidency of the Republic of Brazil in 14 August 2018. OJ L 13, 14.08.2018, p. 59–64. *Diário Oficial da União* 157 (august 2018), 59–64. [http://www.planalto.gov.br/ccivil\\_03/\\_ato2015-2018/2018/lei/l13709.htm](http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/l13709.htm)
- [41] Karen Renaud and Lynsay A. Shepherd. 2018. How to Make Privacy Policies both GDPR-Compliant and Usable. In *2018 International Conference On Cyber Situational Awareness, Data Analytics And Assessment (Cyber SA)*. 1–8. <https://doi.org/10.1109/CyberSA.2018.8551442>
- [42] Elizabeth Sanders and Pieter Jan Stappers. 2012. *Convivial Design Toolbox: Generative Research for the Front End of Design*. BIS, Amsterdam.
- [43] Elizabeth B.-N. Sanders and Pieter Jan Stappers. 2008. Co-Creation and the New Landscapes of Design. *CoDesign* 4, 1 (2008), 5–18.
- [44] Florian Schaub, Rebecca Balebako, and Lorrie Faith Cranor. 2017. Designing Effective Privacy Notices and Controls. *IEEE Internet Computing* (2017), 1–1. <https://doi.org/10.1109/MIC.2017.265102930>
- [45] Florian Schaub, Rebecca Balebako, Adam L. Durity, and Lorrie Faith Cranor. 2015. A Design Space for Effective Privacy Notices. In *Eleventh Symposium On Usable Privacy and Security (SOUPS 2015)*. USENIX Association, Ottawa, 1–17. <https://www.usenix.org/conference/soups2015/proceedings/presentation/schaub>
- [46] Nick Seaver. 2017. Algorithms as culture: Some tactics for the ethnography of algorithmic systems. *Big Data & Society* 4, 2 (2017), 1–12. <https://doi.org/10.1177/2053951717738104>
- [47] H. Sharp, Y. Rogers, and J. Preece. 2019. *Interaction Design: Beyond human-computer interaction* (2 ed.). Wiley, Indianapolis.
- [48] Supreeth Shastri, Melissa Wasserman, and Vijay Chidambaram. 2021. GDPR Anti-Patterns. *Commun. ACM* 64, 2 (Jan. 2021), 59–65. <https://doi.org/10.1145/3378061>
- [49] Patrícia R. Sousa, Rolando Martins, and Luís Antunes. 2020. Empowering Users Through a Privacy Middleware Watchdog. In *Trust, Privacy and Security in Digital Business*, Stefanos Gritzalis, Edgar R. Weippl, Gabriele Kotsis, A. Min Tjoa, and Ismail Khalil (Eds.). Springer International Publishing, Cham, 156–170.
- [50] Kristen Vaccaro, Dylan Huang, Motahhare Eslami, Christian Sandvig, Kevin Hamilton, and Karrie Karahalios. 2018. The Illusion of Control. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*. <https://doi.org/10.1145/3173574.3173590>
- [51] Sami Vihavainen, Airi Lampinen, Antti Oulasvirta, Suvi Silberberg, and Asko Lehmuskallio. 2014. The Clash between Privacy and Automation in Social Media. *IEEE Pervasive Computing* 13, 1 (Jan 2014), 56–63. <https://doi.org/10.1109/>

[MPRV.2013.25](#)

- [52] Michele Willson. 2017. Algorithms (and the) everyday. *Information Communication and Society* 20, 1 (2017), 137–150. <https://doi.org/10.1080/1369118X.2016.1200645>

Received July 2021; revised November 2021; accepted April 2022