

Problematising Transparency Through LARP And Deliberation

KRUAKAE POTHONG, London School of Economics and Political Science, UK

RUTH CATLOW, Furtherfield, UK

LARISSA PSCHETZ, University of Edinburgh, UK

SARAH MEIKLEJOHN, University College London, UK

Information technology is increasingly designed to increase information transparency as a way to increase trust. However, it can be hard to comprehend and anticipate the social implications of information visibility, people's competing expectations of transparency versus privacy, and the role of enabling technologies. We devised Live Action Role Play (LARP) as a means for people to explore the potential and consequences of transparency, within a social context of daily transactions related to food, fashion, and finance. Through the process of deliberation, we enabled participants to critically assess their co-created LARP experience and articulate their transparency expectations for design considerations. We report on insights into their expectations and perceived limitations of information technology in delivering transparency, including social measures required to realise the full potential of technology, as well as transparency, while minimising unintended consequences.

CCS Concepts: • Human-centered computing → *Interaction design, process and method*.

ACM Reference Format:

Kruakae Pothong, Ruth Catlow, Larissa Pschetz, and Sarah Meiklejohn. 2021. Problematising Transparency Through LARP And Deliberation. In *DIS2021: ACM Designing Interactive Systems Conference, June 28–July 02, 2021*. ACM, New York, NY, USA, 20 pages. <https://doi.org/10.1145/1122445.1122456>

1 INTRODUCTION

Technologies emerge and evolve in relation to complex social arrangements [41, p.129-130]. An increased call for transparency in the development of new technologies is one such example. Societal issues surrounding the trust people have in their social, political, and economic interactions have led to an increased desire for *transparency* of the actions and decisions made in human interactions. Transparency, however, is a loaded term, and its implementation and practices are contentious across various application contexts [21, 56]. Even so, numerous technology solutions have been developed in response to the growing calls for transparency in human transactions, ranging from open data initiatives [36] to distributed ledger technologies (DLTs) such as blockchains, which are considered to promote transparency via a shared, verifiable, and irreversible set of records [6, 19, 53].

Given the increasingly pervasive use of information technologies, the opacity of these technologies' operation, and the resulting increase in visibility of daily human interactions and their consequences, we argue that people's critical assessment and expectations of technology-enabled transparency is required. To achieve that, we propose an approach, combining Live Action Role Play (LARP) with deliberation to gain deeper insights into the functional, emotional, and rational dimensions of the human experience with respect to the effects of transparency.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org.

© 2021 Association for Computing Machinery.

Manuscript submitted to ACM

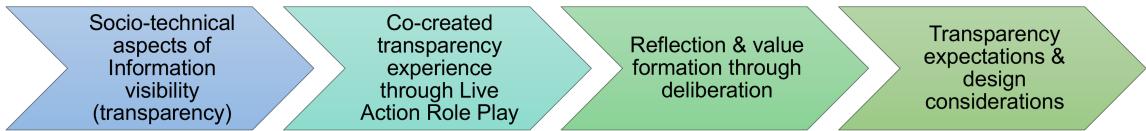


Fig. 1. Research design: Problem area, methodology, and findings.

We contribute this approach as an alternative for designers and HCI researchers to engage the public in problematising information technology, demonstrating the application of this LARP-based approach, and providing the resulting insights into the limits of transparency within social contexts and their implications for design. As an immersive, emergent, social game [66], Live Action Role Play (LARP) offers a safe space for designers and developers to explore how human factors could play out in the development of transparency-enabling applications and systems. Our LARP-based approach provides rich experiential knowledge for deliberation, which in turn explains human preferences within these contexts.

2 PROBLEMATISING TRANSPARENCY

2.1 Transparency-enabling technologies

Regardless of the context, transparency implies a state in which information is made visible [72]. In open data movements, it refers to the willingness of companies, institutions, and governments to make their information available to all [29]. In information technology domains, transparency can refer to an explanation of user interfaces [28, 31, 37], intelligent systems [11, 20, 39, 67], or the application of AI [75].

Information-based technologies have been deployed to deliver transparency. Examples of these initiatives include the use of text mining techniques to improve the clarity of publicly available information about government spending [2] and the deployment of open data to promote transparency and accountability in local governments' spending [34]. DLTs have been applied in financial services [1], the sharing economy [26], and supply chains [62, 63] to build trust.

However, both transparency and transparency-enabling technologies have limits. Transparency, as a means for individuals to exercise their rights to manage the visibility of information pertaining to themselves, as prescribed in Article 5(1)(a) of the General Data Protection Regulation (GDPR), is problematic [17, 18, 40]. Such autonomy over information pertaining to individuals depends on individuals' information and technology literacy rather than information about the data being processed. Worse, transparency about data collection and processing can be presented in ways that are incompatible with the diverse range of technology literacy of data subjects or the way they consume information [13, 57]. Using technologies such as DLTs to deliver transparency in human transactions can also pose challenges to individuals' ability to manage their information visibility [1, 56] and even limit regional autonomy [58].

These limitations of transparency and transparency-enabling technologies, including competing principles and interests underpinning them, invite further investigation into the acceptable and responsible trade-offs concerning transparency practices. Therefore, we developed a method for examining the attitudes, understanding, and expectations of users, both businesses and individuals, towards transparency. We applied this method to generate insights into users' expectations of transparency in order to support the design and development of information technology, as well as governance of technology applications. Here we broadly focus on the transparency of human and institutional transactions, rather than on algorithmic transparency of intelligent systems and AI.

2.2 LARP

Engaging people in assessing transparency practices is difficult for two main reasons. On the conceptual level, transparency is a slippery term that involves various factors and human and technological actors. On the operational level, transparency enabled by technologies is contextual and incomplete, with often oversimplified explanations. Given these challenges, it can be difficult for individual and business users to comprehend and articulate what is at stake in the design and appropriation of transparency or information visibility.

We address these challenges by devising a design-based approach, using Live Action Role Play (LARP) and deliberation. We use LARP as a method to facilitate the co-creation of human experience, through improvisation, with transparency in various social contexts. We use deliberation as a process of reflective exchange to support participants to work through their co-created experience, formulate and articulate their preferences for transparency outcomes in social interactions.

Live Action Role Play (LARP) is an “acted, immersive, social game” [66, p.108], which combines acting (performative arts), gaming, social interaction, and immersion. This combination distinguishes LARP from other immersive drama techniques employed in operational research [7, 8] and other mainstream theatre or performance art because the acting element is not performed for an external audience [70, p.4]. Rather, the acting in LARP is aimed at the players who do the acting themselves in order to co-create an experience. This intention of LARP resonates with some practices in applied drama or theatre, which operate on the idea that theatre has “the potential to address something beyond the form itself” [54, p.4].

The *principles of embodiment* [25] in LARP require participants (players) to live their character and interact with other characters within a given scenario—historical, fantastical, futuristic—as if they were living in that specified space and time. These principles are akin to the “role-taking” in educational drama, especially for experiential purposes; role-taking helps players (students) develop experiential knowledge of being in “someone else’s shoes” [27, p.1077]. In LARP, embodiment opens up space for participants to inhabit and develop their characters and build relationships and alternative realities together with their fellow players. In this way, the game element, or challenge, in LARP is emergent and generative of new states of play and narratives, rather than a progressive discovery of pre-authored or latent narrative sequences [24, 33]. These generative and emergent properties make LARP a good tool for world-building and exploring alternative realities and share the affordances of fiction to support critical and reflective practices in technology design and research [5, 44]. Through these processes, Simkins contends that the development of practices can be observed [66]. By stepping into the shoes of their randomly given character, LARP enables participants to see their own preferences in a social context. We argue that with the support of deliberation, explanations for these preferred practices can emerge from the narratives of the LARP.

LARP varies in style (e.g., political, staged art, theatre), structure (e.g. combat, sandbox, rule-based), themes (e.g. adventure, war, historical, future) and objectives (e.g. entertainment, education, inspiring social-change) [25, 69]. In this research, we use Nordic LARP, which is a LARP tradition that focuses on critical (intellectual) engagement in “conflicts and intrigues” between players rather than conflicts manifesting through physical and tactile interaction (e.g. combat) in mainstream North American and UK-based LARP traditions [25, p.99]. Apart from the format, we use Nordic LARP as it allows participants to:

- *escape* into a different context, leaving behind their daily life, routine, and environments;
- be *exposed* to specific topics, themes, and contentious situations by LARP organisers, also called game hosts, in order to push an agenda;

- react or respond to the messages *imposed* by game hosts through the playful and generative nature of the game, which serve as a “social alibi for pushing the boundaries of what is tolerated”; and
- subsequently *explore* alternative realities, practices, social relations, and structures without the stigma or consequences of failure that we have in real life [69, p.25-28].

As such, we use LARP as a critical exploratory tool for the collaborative construction of transparency practices to inform technology design and development. In our approach, we *expose* participants to and *impose* diverse themes around transparency practices and allow them to explore alternatives to these arrangements.

The aim is to provide a playground to safely experiment with transparency practices, as well as the associated functional and emotional dimensions of human experience, despite the challenges of transparency discussed above. The functional element is achieved through escape, exposure, and imposition, which makes participants feel as if they were in particular situations, facing certain dilemmas and embodying certain attributes. The emotional element involves feelings that the characters develop when exposed to particular situations and dilemmas. Together with the resulting co-constructed alternatives of transparency practices and the meanings participants assigned to these practices, these functional and emotional dimensions of human experience provide rich resources for deliberation. These materials, therefore, serve as units of analysis from which configurations and types of social interactions can be derived [74].

2.3 Deliberation

Deliberation is a talk-based process to derive mutually acceptable solutions to problems through open, reflective, and respectful exchange [16, 45]. In this research, deliberation serves as a method for encouraging participants to discuss different values and priorities and collectively develop mutually acceptable transparency practices, having considered the perspectives of various stakeholders in the information society. This process constitutes the rational dimension of human experience with technology.

Applying the deliberative methods for public engagement developed by Coleman and Götze [9], we provide participants with an open, equal, and reflective platform for developing collective judgements on transparency practices. The development of collective judgement follows a four-step process: experience sharing, problem definition, solution brainstorming, and resolutions. This process has been successfully applied to design research [59] and deployed in social and policy research concerning digital rights for young people [10, 57].

In our approach, the shared experience involved the functional and emotional elements of participants’ experience with transparency within a social context of an information-dependent society, co-created through LARP. Based on this shared experience, participants develop their problem definition and collectively brainstorm approaches to tackle the problems they collectively defined in post-LARP deliberation. In this process of reflective exchange (deliberation), the moderator played a critical role in prompting participants to refer back to their playful exploration of transparency in LARP and identify what participants found problematic and why, then encouraging participants to exchange ideas on how their self-defined problems should be addressed. The emphasis of this deliberative process, as well as the analysis of the resulting data, is placed on preference formation and empathetic reasoning, rather than preference assertion and position-taking. Collectively, participants derive a rational dimension of human experience, thus providing an explanation for both preferred and frowned-upon configurations as well as types of social interactions.

2.4 Related work

Various technologies, ranging from Internet portals [48], social media [4], open data [34], and application programming interfaces (API) [42] have been applied to deliver transparency in both technology and human operations. Increasingly, DLTs and blockchain applications have gained attention from researchers, designers, and developers in the human-computer interaction (HCI) community. Much of this literature focuses on users, user behaviour, and blockchain technology as an infrastructure [22, 30, 35, 38, 64, 65]. Parallel to the core interests in users and human-computer interaction are growing efforts to understand the effects of DLTs on everyday life and people's perceptions of these emerging value transactions through user engagement in design-based research [43, 49, 50, 55, 60].

We contribute our approach to engage users in the design, development, and critique of transparency-enabling technologies, as well as insights into people's expectations of transparency. Designers and HCI researchers' engagement with LARP has focused either on the role of artefacts or technologies in augmenting the LARP experience [32, 73] or the role of LARP in supporting the design of and research in co-located experience [14, 46]. However, our LARP focuses on participants' narratives as a way to explore and construct transparency alternatives within a social context. These narratives feed into our deliberative process, designed to engage participants in critical reflection on the consequences of various transparency alternatives and articulate their transparency expectations in human transactions, constituting design considerations for transparency-enabling technologies. Our LARP approach expands on the use of fiction [5, 44] to elicit users' insights in support of the design and research of future technologies. The way we use LARP can be considered a variation to playification as an approach to foster "open-ended" playful user-engagement rather than "goal-oriented" gaming [47, p.377], reflective fiction for design futures [5, 44].

3 THE FICTIONAL FOCUS GROUP: OUR LARP DESIGN AND RESEARCH PROCESS

We implemented our approach, combining LARP and deliberation, in two workshops held online for the safety of the researchers and participants during the COVID-19 pandemic. Given the emphasis of Nordic LARP on intellectual engagement in "conflicts and intrigues" [25, p.99] rather than on physical and tactile interaction, the limited range of sensory engagement of the online platform did not compromise participants' live acting, which is carried out mainly through narratives. We ran two workshops to accommodate the diversity of participants' interpretations of the characters and dilemmas that shaped their improvisation. We recruited 20 participants through advertisements across social media platforms (Facebook, LinkedIn, and Twitter), special interest groups, and mailing lists. Of these recruits, 11 attended the first, and 9 attended the second workshop. All participants were informed about the nature of the workshops and provided consent to use their information for our research study, which was approved by the ethics committee at our institution.

Once recruited, participants were asked to complete an online pre-workshop survey to collect information about their demographic data, technology confidence, attitudes toward data, consumer ethics, and purchasing habits around food, clothing, and financial services. We sent each participant the details of a randomly assigned character and a dilemma that their character was facing. Characters and dilemmas were split across three sectors: food, fashion, and finance. We asked each participant to complete a dilemma diary, detailing their character's decision and the factors shaping it. The dilemma diary provided an opportunity for participants to identify with their characters and practice walking in their shoes. This also helped to level the playing field between players with prior LARP experience and those new to LARP. Each workshop took approximately three hours. After the workshops, participants were invited to

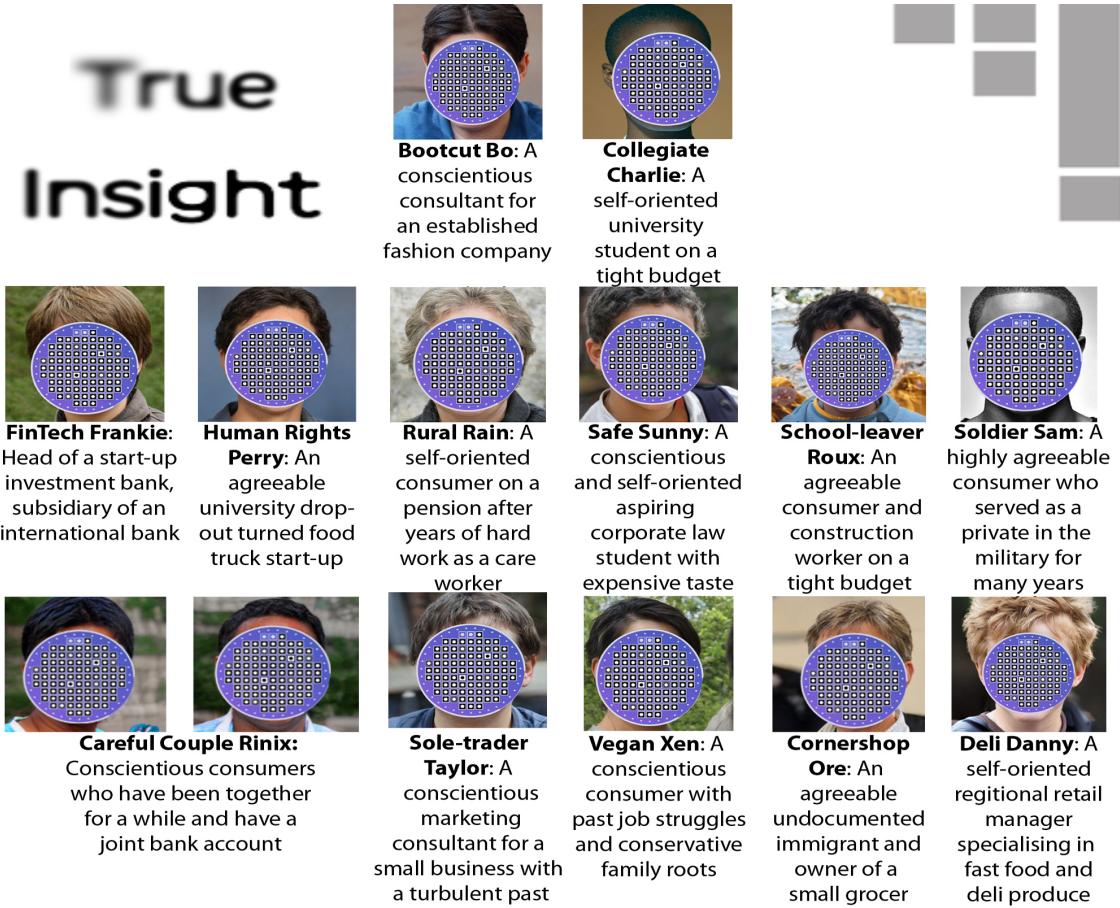


Fig. 2. A list of characters, their roles, and character traits.

complete another survey. We also conducted vox-pop interviews with participants who showed interest in providing us feedback on their LARP experience.

Both workshops were audio- and video-recorded, and thematic analysis was applied to the transcription of the workshop recordings. We interpreted the repertoire of the stories, told by participants in their characters, to derive justification for participants' preferences and design considerations. We applied descriptive statistics to the pre-and post-workshop survey data to observe changes in participants' attitudes and self-reported behaviours concerning information. The complete toolkit of our LARP (i.e., our survey questions, characters, and character dilemmas) can be found in the supplementary material.

3.1 Characters

Characters were developed based on the five-factor model of personality [51] and responses to the pre-workshop survey questions concerning the factors that shape purchasing decisions and information sharing preferences. We interpreted participants' pre-workshop survey responses to provide numerical representations of the characters' personality traits,

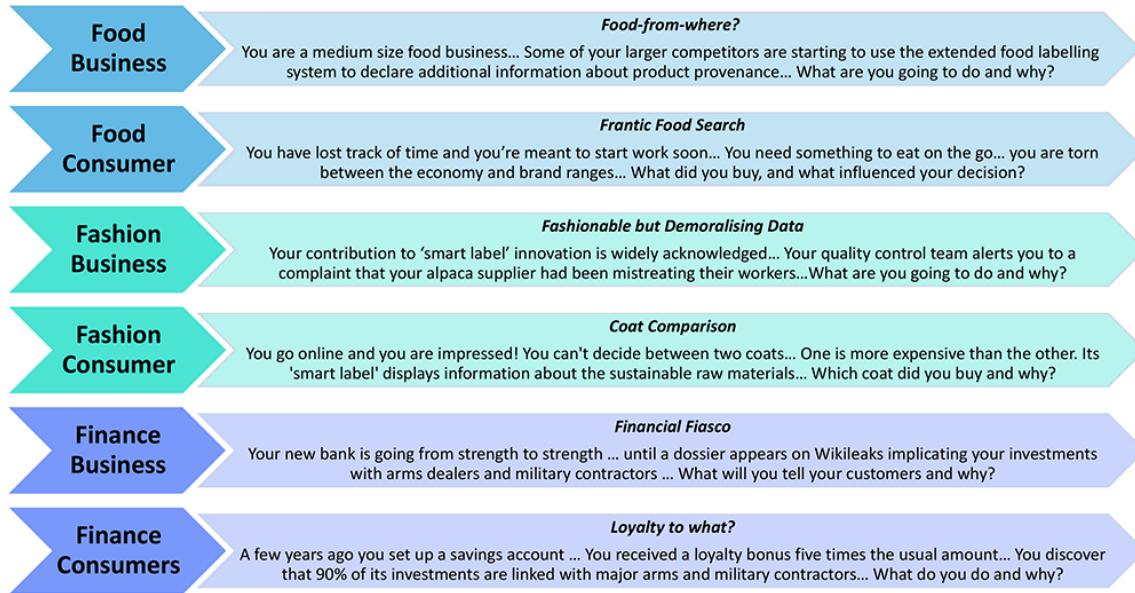


Fig. 3. Summary of business and consumer dilemmas used.

in terms of their conscientiousness, agreeableness, and self-orientation. Other key features of our characters include gender-neutral names and pronouns, and complex life challenges. These features were designed to ensure that our participants would encounter life experiences that are different from their own and that anyone, irrespective of their actual demographic backgrounds, could relate to and play these characters. These characters, and all the characters we developed, serve to represent diverse worldviews, personal circumstances, interests, and priorities [9].

3.2 Dilemmas

Dilemmas were tailored to the roles of either consumers or businesses because of the transactional nature of transparency in DLTs. Our dilemmas were created based on the attributes and potentials of DLTs recorded in academic literature [61] and news media [3, 68], particularly relating to their usage and consequences in the food, fashion, and financial sectors. These dilemmas situate participants in their daily interactions with a highly information-dependent society and provoke critiques of the underlying arrangements. The dilemmas for both consumers and businesses centred on the tension between ethical choices, motivations or incentives, and the practicality of making informed decisions. The differences between consumers and businesses relate to their roles and priorities, which at times compete (see Figure 3). We argue that the ethical, social, and personal contexts in which we situate our dilemmas required participants to consider broader implications of transparency in their relationships with others, beyond those with whom they have direct transactional relationships, especially after the revelation of the future consequences of their choices. The familiar daily exchanges of food, fashion, and finance were specifically chosen to enable participants to draw on their own experience to develop and play their characters in response to the dilemma, thus minimising any potential reliance on prior LARP experience.



Fig. 4. Future scenarios summarised in news reports of the year 2030.

3.3 The Year 2030: Future scenarios to explore transparency consequences

To prompt participants to think about the consequences of their choice, the second half of the LARP sent them 10 years into the future, to a time of increased transparency. Through a series of news reports designed to acquaint them with the year 2030, shown in Figure 4, participants learned that food packaging automatically displayed environmental and social impacts, while augmented reality allowed people to stay in the safety of hazmat overalls and face masks but still appear in the highest fashion. They also learned that new transparent financial regulation made everyone's credit ratings and financial status visible at all times. These changes *exposed* participants to the ubiquitous computing processes that make information about our daily engagement with society visible to others. This was also a message we *imposed* on transparency practices within this fictitious focus group to push participants' boundaries of tolerable practices. The use of exposition and imposition in our LARP also served to stretch participants' imaginations about the positive and negative consequences of information visibility, which were revealed in the story of their characters' lives in this new age of total visibility.

4 LARPING AND DELIBERATING TRANSPARENCY

When participants joined our online workshop, we introduced them to the game and demonstrated how to get into and play their characters. We introduced the main rule of the game, which was to interact with other participants as their characters until we signalled that it was time to come out of their characters. We then performed a ritual to signify their entry to the Live Action Role Play (LARP). Our LARP took the form of a focus group, run by a fictional research company called True Insights, to study shifting attitudes and practices around transparency in a highly information-dependent society. The ritual to enter the LARP involved the ringing of a gong, prompting participants to change their screen name to the name of the character assigned to them and shaking their own hands, as an act of transition into their characters. Once in the LARP, participants were greeted and briefed on the research activities by two game coordinators and the research team, playing the roles of True Insights employees and moderators of the focus group.

The fictional focus group serves as a realm to which participants can *escape* from their daily routine and environment. It also serves as a platform for participants to *explore* aspects of transparency in various contexts of use—food, fashion, and finance—that they are *exposed* to as consumers or businesses. Through dilemmas, we created encounters between consumers and businesses as our way to *impose* messages about the competing interests of consumers and businesses, as well as the tensions between transparency and other tenets, such as privacy, agency, and accountability.

Our pre-workshop survey results showed a mix of demographic backgrounds and levels of technology confidence. Eight of our participants were male and twelve were female. Two of our participants were in the 18-25 age range, six were over 45, and the rest were between 26 and 45. Our participants came from diverse professional backgrounds, such

as students, artists, journalists, and academics. The majority of our participants were tech-literate, with only three out of twenty participants reporting themselves as “tech-awkward”. Six participants reported being tech-sceptic. The survey results showed that all our participants are cautious with their information sharing: nobody reported randomly giving away their data. The results also suggested that participants’ usage of information for purchasing decision is complex and contextual, with price being the main determining factor for 19 out of 20 participants, followed by ingredients.

4.1 Act I: Present-day consumer and business dilemmas

Once briefed on the research activities, participants, wearing their characters, were sent to breakout rooms for small-group discussion about the sector-specific dilemma that they faced. In these moderated discussions, participants were asked to share their experience about the dilemma and explain their decisions regarding the online dilemma diary that they had completed. Participants were then asked to collectively identify what they found most problematic about their experiences and report back to the participants in other groups.

Competing priorities, trust, and accountability. From the experience sharing and the characters’ justifications of their decisions, tensions relating to the purpose of information usage by businesses and consumers began to arise. These tensions concentrated around areas of competing priorities, information presentation, and consumers’ scepticism about the validity of the information provided by businesses. In both workshops, discussions moved from the issue of competing priorities to the question of trust in information and accountability.

Food. Business and consumer characters across both workshops reported finding competing priorities problematic, which then surfaced the issue of trust in information provided. In the first workshop, Human Rights Perry, an agreeable and conscientious business character, vented that consumers didn’t seem to care about the information he provided about the ingredients and the supply chain behind the falafel he sold. A conscientious and self-oriented consumer, Deli Danny, explained: *“I care about the ethics [...] but [...] my priority is for nutritional value. I think that generally there’s a big distrust from the general public regarding labels that certify a certain type of ethics.”* She further qualified that she believed in nutritional value more than information about how the product is sourced because “*nutrition is scientific*” and that she could “*weigh the grams*” herself. Similar problems also emerged in the second workshop: *“I’m a student, so the price is very important to me. I don’t have a lot of money, but I also don’t want to support businesses that go against my principles”,* said Collegiate Charlie, a conscientious and self-oriented consumer character.

The business characters that saw themselves as small businesses reported that their budget and the cost-effectiveness of their investment limited the information about their products that could be provided. In the first workshop, Human Rights Perry stated: *“obviously you need to make a profit, and that can sometimes be difficult, so you have to get good suppliers who you can trust [...] and then you have to work with them to get a price.”* In the second workshop, however, Human Rights Perry interpreted her business to be medium-sized, catering to an affluent market segment, so felt she could shift her costs of information provision to consumers.

Fashion. Conversations in the fashion group followed a similar pattern to that observed in the food group. The conversation started with business characters justifying their priorities for either workers’ welfare or environmental impact, followed by feedback from consumer characters regarding the rationale for their purchasing decision. In the first workshop, a conscientious consumer character, Vegan Xen, remarked that consumers “*shouldn’t have to choose between worker rights and animal rights.*” The conversation progressed to discussions about the consequences of making worker welfare information available, as it was partially based on their health records. *“The second company had some kind of system in place for taking workers’ health data and then firing them based off of it. So, it’s supposedly anonymous,*

but actually people are being laid off”, said School-leaver Roux, an agreeable consumer character. Bootcut Bo, a highly conscientious business character, replied that *“for us, the concern is to try and figure out the best way for the consumer to understand all aspects of the production process, and our focus is directly on the welfare of the animals and the workers. I’m not sure there is a direct truth in how HR deals with the data that’s been gathered.”* Bootcut Bo also added: *“What I can say is that we’ve made choices so that any data gathered is not passed on to any other third parties.”*

Finance. Conversations in the finance group also revolved around the issues of competing priorities, information presentation and trust. However, the context in the financial sector invoked greater discussions concerning trust, both in the information given and in the source of information, as well as accountability. These discussions reflect the real-world social status of a financial institution and the real-world consumer expectations of this institution. The competing priorities discussed in the finance group reflected the competition between a business’ interest in its reputation and a consumer’s interest in the business performing their expected due diligence. These competing priorities are most clearly observed in the business’ treatment of the alleged connection between the bank and arms trades as a “*PR fiasco*”, according to Fintech Frankie, a highly self-oriented business character. This approach provoked a mix of reactions from consumer characters. A highly conscientious consumer, Careful Couple Rinix, and a rather self-oriented consumer, Rural Rain, were disappointed and stated that they were “*shocked*” by the information they discovered, with Rural Rain saying that she expected the bank to perform “*due diligence*.” On the other hand, another highly conscientious and self-oriented consumer character, Safe Sunny, treated the incident as a non-issue and decided to keep his lucrative savings account with the bank. He justified that his benchmark for ethical transparency practice was whether the business breached any laws, and, in this case, there was no proof of that having happened.

4.2 Act II: Future consequences of today’s decisions

Having shared the problems identified in their sector-specific discussions with other participants, all participants time-travelled to the year 2030, in which their consumer and business decisions were made visible to everyone.

Participants were then asked to ponder the consequences of these legislative and technology developments on the lives of their characters during a break and then share their experience in their sector-specific groups when they returned from their break. The experience sharing at this stage quickly progressed to re-identification of the problems that participants, in character, reported in Act I but in a very personal way. From this round of experience sharing, we observed a shift in participants’ narrative—how they talked about information visibility—from a dry rational choice perspective to a personal and subjective perspective. This new perspective in storytelling, in turn, brought out new dimensions of the problems concerning trust and its connection with accountability previously identified in Act I. From this new perspective on storytelling, participants also identified new problems: lack of boundaries and fairness. Both the new dimensions of the problems identified in Act I and the new problems highlighted the relational and spatial aspects of context that shape participants’ value judgement of data and data practices.

Blurred boundaries and heightened social anxiety. The sharing of characters’ life stories and how they experienced ubiquitous transparency in the year 2030 concentrated around the unintended consequences of transparency for the privacy and well-being of the characters.

Food. In food, both the business and consumer characters reported negative consequences of ubiquitous information visibility. In the first workshop, Human Rights Perry reported having to close down his falafel shop and retrain as a lawyer because the costs of making information about his product and supply chain visible could not sufficiently be covered by his sales. He chose to specialise in transparency law and found that *“it’s hard to keep anything private [...]”*

People who you work with know everything about your personal life. People in your personal life know about your work life. And then that lack of boundaries has been a challenge for many of us who would like to be able to present different aspects of our personalities." Other business characters in the second workshop also experienced similar blurred boundaries. Human Rights Perry found her work-life unexpectedly bled into her personal life: "*the market segment that I'm catering to is strictly limited [...] to the elite who are able to pay extra [...], but it means that I'm identified as part of that elite and I've got to send my children to private schools.*" Corner Shop Ore, an agreeable business character, shared that information visibility related to his grocery business "*caught up*" with him too. It leaked his status as an undocumented immigrant, which led to him having to fight for his right to remain in the country.

Consumer characters also reported being affected by how their shopping records were passed on to third parties without their prior consent. A highly agreeable consumer character in the second workshop, Soldier Sam, raised a social and relational impact of the visibility of her "*unemployment*" and the resulting "*credit score*", stating: "*I feel [...] like everybody's super judgemental about our situations and of our data.*"

Fashion While there was a rather heavy emphasis on the negative unintended consequences of transparency in fashion, characters saw both sides of the same coin. Vegan Xen reported "*feeling free*" given greater opportunities to "*express*" himself through the deployment of augmented reality in the fashion industry. However, he also reported feeling "*constantly judged on his earnings and his history of having a very unstable working life because it's literally written across my face that I don't have much money and that I struggled with financial matters for a long time.*" Similarly, School-leaver Roux said: "*I think transparency is good because now I employ other people, and [...] I think that a level of transparency financially is actually quite good. I think it helps workers to feel like they're being compensated fairly [...] On the other hand, I don't love my financial information being aired out everywhere.*"

Finance Unlike the fashion group, the characters in the finance group echoed more negativity than optimism. That said, Rural Rain noted that increased transparency in the financial sector had some positive impact on consumer behaviour, making people more "*responsible*" with their personal finances. She observed that "*people are not able to just pass on nest eggs to their children in the same way. And now, of course people who want to have insurance for care needs can take that out when they're younger, so in a way, it sorts of changed the market to make that much more equitable.*" However, she was also quick to note the "*corruption*" in the "*governance*" of the financial system, which she deemed a political and institutionalised problem that she didn't think "*technology could impact in the same way.*" She further qualified her comment that "*transparency isn't fairness, that fairness and ethics are still active questions that this technology hasn't solved.*" Another consumer, Careful Couple Rinix, reported feeling disempowered: "*I don't think it's necessarily getting better with more information. The amount of information about financial institutions is just so much.*"

In the second workshop, participants focused on the effects of ubiquitous information visibility on their personal life and social relations. Careful Couple Rinix reported that the increased visibility of her partner's financial history caused them to "*grow apart.*" Rural Rain also reported an overzealous information practice among her fellow local community members who caught wind of a handyman whom she contracted to fix her broken shower and "*called [her] out*" for the handyman's poor dietary habits, which had been made publicly available.

The discussions excerpted above demonstrated that the future scenario transformed information visibility from an abstract principle and rational choice to a relatable daily experience. With this experience, participants were empowered to explore the latent effects of information visibility embedded in its relational and spatial contexts. The exploration of these latent effects then surfaced the issue of blurred boundaries between public and private information, resulting in dwindling privacy and increased social anxiety, or sensitivity toward being judged.

Transparency paradox. The exploitation of information visibility was identified as a problem that escalated from the issue of blurred boundaries between public and private information. This aspect of transparency was discussed only in the finance group, possibly due to the different context of information use and the implications for business as well as consumer characters. As observed in Act I's real-world reflection, consumer characters have different expectations of their business counterparts in this sector, mimicking real-world requirements and regulations for financial institutions.

This discussion on the abuse of information visibility stemmed from the reflection of FinTech Frankie: “*I guess what these past 10 years have taught me is that what we think we know through the ledger is really not what we know [...] What we are experiencing is that the transparency is being used entirely as another front for what has become completely uncontrollable as an industry.*” Safe Sunny, who in 2030 got a job as a corporate lawyer, concurred: “*Yes [...] it’s possible for [business] to be totally transparent but actually not give a particularly accurate picture of what’s going on in terms of [their] investments [...] If anything, I think the consumer ends up with less knowledge, less insight than they had before.*”

5 OFF-LARP DELIBERATION: A REFLECTION AND SOLUTION BRAINSTORMING

After participants finished the main group discussion in Act II, the game coordinators asked them to perform a ritual to mark their exit from the LARP. This ritual involved changing their screen name from their character's name back to their original one. Having exited the LARP and their characters, participants were invited to join an off-LARP deliberation to reflect on the transparency problems that their characters identified in the game and collectively brainstorm solutions to these problems. To prompt deliberation in this session, the moderator summarised the problems that the characters had identified and asked whether the participants could relate to any such problems in their daily lives.

5.1 Problematising transparency

The parallel participants drew between their in-character experience and the experience in their daily lives led them to exchange views on the limits of transparency in their daily engagement with information-based technologies. This discussion concentrated on the ability of transparency to promote individual agency, the relationship between transparency and trust, the abuse of transparency, and the assumed relationship between information and knowledge.

In the first workshop, a participant critiqued the assumption about the role of transparency in improving individuals' agency and their ability to affect positive change through their choices. She said: “*I think that transparency in and of itself is not enough [...] there needs to be some sort of layer on top of transparency.*” In terms of transparency and trust, another participant observed: “*I think part of the problems we have these days with companies is they have burned all their capital, all their goodwill, so we are incredibly suspicious of them [...] And transparency on its own won’t solve that because all it does is it pushes the trust back one level.*”

Another participant added: “*I think [the information glut is] kind of a useful dissembling tool to provide more and more information to hide the truth behind other things.*” This comment highlights transparency abuse, or information spin, as a problem. Another participant noted that she found the assumed correlation between information and knowledge to be problematic. She said: “*I think there’s a problem between data information and knowledge [...] because of the computer, the rise of computation in computers and data crunching and machine learning. There is this idea that somehow the more data points you have, the more knowledge you have, and they’re not necessarily related.*”

5.2 Solution brainstorming

Having articulated what they thought were the limits of transparency, participants were prompted to brainstorm solutions for the transparency problems they identified. Here, various solutions were shared and weighed out.

- a. Tech solutions and information literacy.** To promote individual agency and build trust, a participant suggested: “*what we need is a broader framework where businesses are known to behave ethically, and therefore you can trust the things they tell you without necessarily having to validate every step of the way.*” The same participant also proposed the concepts of “*data stewardship, personal data stores, and data trust*” as technical solutions to give individual users greater control over their personal data, which other participants also agreed were important. In proposing these concepts, however, this participant also gave the caveat that technical solutions would not work on their own and that their intended outcome “*relies on people being sufficiently aware of the systems within which their data is embedded to actually care, and to care before the consequences become apparent.*”
- b. Business strategy.** To implement accountability, a participant shared with the group an approach that he used in his work. He said: “*For some time, we've been thinking about this in terms of how can we help businesses to be more responsible and to make that demonstrable and assuage some of the fears that people have because they've been bombarded with the glossy CSR reporting for so many years.*” He also added that the answer to achieving transparency and accountability was to be realistic about what businesses could actually do to address the issues they chose to engage with. In this way, information about business activities, for example, in corporate social responsibility (CSR) work, was not just spin to serve a PR purpose.
- c. Regulation.** One participant highlighted a problematic relationship between transparency and trust: “*If you remember all the whitewashing stuff from, you know, Nike commissioning factory inspections, and nobody believed the factory inspections because they don't trust the people who are paid by Nike to inspect the factories. So again, how do you set a framework within which you can reasonably trust the people who are telling you things?*” Another participant responded: “*I think what would help if there are more government regulations because I think the whole thing, the example of the food labels in the future being the same as tobacco labels, I think that would be a step forward.*” This participant also acknowledged that one of the limits of regulations could also be “*trust*” in the government. Even so, he felt that “*you can do something about your government in a way that you can't do something about the businesses that provide you things.*” This comment implies that this participant has more faith in his ability to effect change through a political process than through his engagement with businesses as a consumer. Similarly, another participant suggested using “*antitrust*” law, explaining that: “*Classic antitrust law holds that the owner of the content and the owner of the pipes over which that content moves should not be the same business because it gives the owner of the pipes has too much leverage over how the competitors operate*”.

5.3 Post-workshop survey and vox-pop interviews

We administered a post-workshop survey and carried out several vox-pop interviews immediately after the off-LARP deliberative session. Having participated in the workshop, 10 out of 20 participants reported some increase in their sense of efficacy, i.e., their perceived ability to effect positive change in businesses’ information practices. As compared to the pre-workshop survey, these participants changed from having “no say at all” on the information practices of businesses to having “very little say”, or from having “very little say” to having “some say”. Seven of the participants also reported an increased sense of agency, changing their answer from “not knowing whether it is humanly practical” for them to “have a say on the type and amount of data companies have on [them]” in the pre-workshop survey to realising that they “can have a say and would like to be involved in the design and development processes of the information systems and policies so that [their] data management principles are respected by design”.

In our more in-depth vox-pop interviews, the participant who played Rural Rain in the second workshop stated: “*I find it really illuminating that I was playing an older person aged 75 [. . .] I just thought that was such a brilliant*

way to work with transparency, by really imaginatively stretching it. Like we have some really interesting examples in other countries where pay is transparent, and it does cause those actually really uncomfortable conversations.” Another participant, who played Vegan Xen in the first workshop, reported having realised that a character and also a person in real life “*have got certain elements to social capital*” that would place this person above someone else in a social setting and that would “*not be a comfortable thing to be faced with*”. This participant also reported that LARP and deliberation “*forced*” him to “*think about data in ways that [he hasn’t] done*” in that the method “*engaged*” him more with the subject and research. He added that the method promoted him to think about how others view data and information visibility because: “*I think when you’ve got this, a vague idea of something, you don’t really engage with how other people might have a vague idea of it as well.*” The participant who played Deli Danny in the second workshop reported that wearing this character forced him to see things through other people’s perspectives given different demographic and work-life circumstances, “*imagining*” how his character would feel like “*given [the character’s] descriptions.*” He also noted that he learned from participating in the workshop that “*emotions*” form part of human experience with data and transparency, so data protection and security should take into consideration the emotional element of human experience.

Despite these positive outcomes, in the post-workshop survey, only 3 out of 20 participants reported having changed their mind about how they use information in their purchasing decisions and about their perception of information asymmetry. In contrast, 4 out of 20 reported changing their mind about their information sharing preferences. The changes that were reported, however, suggested a decrease in impulsive purchases and an increase in the level of conscientiousness in their purchasing decision, as well as a realisation from participants of the limits of their own information processing ability. This change resonates with a common problem about information overload raised by consumer characters in the LARP, as discussed earlier. Of the four participants who reported changing their mind about their information-sharing preference, their reported changes reflected a shift towards either a tighter control over their personal data or a data trading model. This change was anticipated as a consequence of running the workshop with relatively tech-literate and privacy-conscious participants.

6 DISCUSSION AND DESIGN CONSIDERATIONS

The application of our LARP-based approach derived two contributions to design and HCI research: (1) a method to engage people in a critical examination of transparency in their daily transactions, and (2) design considerations for transparency-enabling technologies.

6.1 The potential of the fusion of LARP and deliberation

The comparison participants made between their LARP and daily life experience, what they saw as the limits of transparency, and their proposed solutions highlight the potential of the combination of LARP and deliberation in problematising the use of technology to solve human problems, such as transparency and accountability. In participants’ own words: “*by using improvisation and creative, relational engagements, we actually learnt something in those relational connections that was much more than I would have learnt by just using my own head and experience to come at these issues today.*” LARP offered participants a playground to explore the consequences of one approach to transparency, as well as various alternatives. The functional and emotional dimensions of human experience co-created through the LARP provided inputs for participants to critique and envision measures to make transparency practices better aligned with their values, preferences, and requirements in the deliberative process. In this way, deliberation complements the functional and emotional aspects of human experience, co-created in the LARP, with a rational dimension. This open, reflective exchange of deliberation unlocked a “*collective intelligence*”, as one participant called it. Based on

this collective intelligence, we argue that careful consideration of the social context of use is required in designing transparency-enabling technologies to ensure meaningful benefits to people (users) and minimise the risks of misuse or abuse.

6.2 Design considerations

The reactions of participants' characters to the type, volume and consequences of information made visible by information technologies recorded in our findings (see section 5) highlight that people's expectations of transparency - information visibility - vary depending on the contexts of use and people's personal circumstances. The off-LARP deliberation further revealed participants' consensus that technology solutions alone were insufficient to deliver on their transparency expectations which included:

- The ability to dynamically manage and negotiate with various stakeholders the types and volume of information made visible, depending on contexts of use;
- Accountable and responsible data practices as well as general business practices; and
- The ability to trust the human and technology agents that they interact with daily.

As noted by participants who played Rural Rain in both workshops, fulfilling them requires information as well as technology literacy and regulation so that people, as consumers and citizens, can exercise their rights when utilising technology. Our analysis of the reactions of participants' characters to the transparency consequences revealed in the year 2030 scenarios and their off-LARP deliberation surfaced five design considerations to increase the potential of information technology in realising people's transparency expectations.

Complexity of information-based decision making and context of use. The narratives about transparency in the context of food and fashion labelling, as a form of business transparency practice and consumers' purchasing decision, highlight the complexity in both information provision and consumption. Such complexity resembles the existing social and economic factors that shape both businesses and consumers' information practices and implies that information consumption and provision are very contextual. Compared to the conversation in the food and fashion group, participants' characters in the finance group appeared more invested in information about their financial products and services, and transparency here was deemed more obligatory. If unmet or mishandled, this expectation affected not only the trust in the information provided but also consumers' trust in the business that provides the service. These differences in consumer expectations across food, fashion, and finance suggest that context is a crucial determining factor for which technologies aiming to provide transparency should take into account.

Cost barrier to technology-enabled transparency benefits. Conversations about competing priorities across all the groups led to discussions around the added costs to businesses, both financial and in terms of reputation, of making information publicly visible. These include not only the cost of any necessary technology but also—and more importantly—the cost of making the whole production process presentable as well as sustainable. Likewise, the consumer characters paid for increased information visibility through their time and higher prices. These added costs for both businesses and consumers point to the real-world issue of resources acting as a barrier for less affluent businesses to harness the benefits of information visibility that technology can provide. This barrier means that the potential benefits of transparency are not equally accessible across all socio-economic sectors.

Transparency and privacy trade-offs. Participants' in-character sharing of the consequences of their choices in 2030 revealed an under-discussed dimension—emotional consequence—of the tension between transparency and privacy in

the academic literature concerning transparency and DLTs. However, social anxiety as an emotional consequence of our data-intensive culture is very well documented in other research about Internet use and social media impact [15, 23, 71], as are the privacy challenges for information-based technologies such as DLTs [1, 56]. In the LARP, for example, the business decision to make worker welfare available had the unintended consequence of violating the workers' privacy. Although there are technical solutions for achieving privacy in DLTs [76], these solutions can undermine the visibility of information that should be made public for audit, particularly in the financial context [1]. Thus, a careful trade-off between transparency and privacy is required in relation to the intended context of use.

The limits of transparency. The limits of transparency to promote individuals' agency manifests in two ways: the ability of an individual to control information about themselves and to affect changes in the practices of others. The characters' experience sharing across our three contexts of use demonstrates that neither consumers nor businesses had full control over information about themselves. This is a real-world problem for individuals and businesses, who often struggle to exercise control over information related to them in their engagement with increasingly complex technology systems [21]. The limited ability to use information to better inform decisions, as reported in the characters' experience sharing, also resembles the real-world limits of using transparency to promote agency, as in the case of informed consent [17, 18, 40]. Ultimately, information-based technologies can address only part of this problem by designing more user-friendly control features to support users' exercise of their agency over their personal data.

Transparency abuse. Based on the narratives around consumer and business dilemmas, the potential to make more information visible does not necessarily make the human activities recorded true or ethical. Neither does information visibility directly translate into trust, as some DLT advocates assume [19, 26]. Indeed, the use of transparency to create a particular image and build a reputation, as recorded in the characters' reflection on their decisions and practices in the past, reflects parallel practices around information spin in various contexts, including politics and business management. In politics, such information practices are observed in the public relation strategies deployed to shape public opinion as well as decisions in democratic processes [12]. In business and business management, such information spin is observed in the use of facts to shape consumers' value perception [52]. These real-world examples demonstrate that information visibility can be manipulated to produce a perception that generates a particular value, including trust. Thus, information visibility and information-based technologies, such as DLTs, do not on their own guard against the abuse or manipulation of information about activities that are meant to build trust.

7 CONCLUSION

This paper demonstrates how our LARP-inspired deliberative approach successfully engages the public in critically assessing transparency practices to derive insights into people's expectations of transparency in daily social contexts: food, fashion, and finance. We contribute this playful and reflective approach to the design and development of transparency-enabling mechanisms. While transparency, as an operational principle, and its enabling technologies promise great potentials to address human challenges, such as trust and accountability, it is also important to understand how people make sense of and use the information made visible to them. Our approach reveals that people expect varying degrees of transparency, depending on the contexts of their exchanges and their personal circumstances. For example, people expected granular details about financial institutions' operations but less so when it came to clothes manufacturing. The application of our approach also shows that transparency alone does not directly translate into an increased sense or exercise of agency. Such perception and action depend on the efficacy of other social, economic, and political mechanisms available to individuals and on the individuals' abilities to harness these mechanisms to decide

where to place their trust or hold parties accountable. We argue that these insights can be capitalised in designing and developing transparency-enabling technologies to derive meaningful outcomes for users.

ACKNOWLEDGMENTS

We would like to thank the participants for their time and contribution to this research and Furtherfield for their design and coordination of the LARP. The first and last authors were supported by EPSRC Grant EP/N028104/1.

REFERENCES

- [1] Sarah Allen, Srdjan Capkun, Ittay Eyal, Giulia Fanti, Bryan Ford, James Grimmelmann, Ari Juels, Kari Kostiainen, Sarah Meiklejohn, Andrew Miller, Eswar Prasad, Karl Wüst, and Fan Zhang. 2020. Design choices for Central Bank Digital Currency: Policy and technical considerations. (2020). https://www.brookings.edu/wp-content/uploads/2020/07/Design-Choices-for-CBDC_Final-for-web.pdf
- [2] Gustavo Almeida, Kate Revoredo, Claudia Cappelli, and Cristiano Maciel. 2018. Improvement of transparency through mining techniques for reclassification of texts: the case of brazilian transparency portal. In *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age (dg.o '18)*. Association for Computing Machinery, New York, NY, USA, 1–9. DOI: <http://dx.doi.org/10.1145/3209281.3209332>
- [3] Imran Amed, Anita Balchandani, Marco Beltrami, Achim Berg, Saskia Hedrich, and Felix Rölkens. 2019. What radical transparency could mean for the fashion industry. (Feb. 2019). <https://www.mckinsey.com/industries/retail/our-insights/what-radical-transparency-could-mean-for-the-fashion-industry>
- [4] John Carlo Bertot, Paul T. Jaeger, and Justin M. Grimes. 2010. Crowd-sourcing transparency: ICTs, social media, and government transparency initiatives. In *Proceedings of the 11th Annual International Digital Government Research Conference on Public Administration Online: Challenges and Opportunities (dg.o '10)*. Digital Government Society of North America, Puebla, Mexico, 51–58.
- [5] Mark Blythe. 2017. Research Fiction: Storytelling, Plot and Design. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. Association for Computing Machinery, Denver, Colorado, USA, 5400–5411. DOI: <http://dx.doi.org/10.1145/3025453.3026023>
- [6] Rainer Böhme, Nicolas Christin, Benjamin Edelman, and Tyler Moore. 2015. Bitcoin: Economics, Technology, and Governance. *Journal of Economic Perspectives* 29, 2 (2015), 213–238.
- [7] J. Bryant. 2007. Drama theory: dispelling the myths. *Journal of the Operational Research Society* 58, 5 (May 2007), 602–613. DOI: <http://dx.doi.org/10.1057/palgrave.jors.2602239>
- [8] James W. Bryant and John Darwin. 2003. Immersive drama: testing health systems. *Omega* 31, 2 (2003), 127–136. <https://ideas.repec.org/a/eee/jomega/v31y2003i2p127-136.html>
- [9] Stephen Coleman and John Götze. 2001. *Bowling Together. Online Public Engagement in Policy Deliberation*. Vol. 7. Hansard Society, London. <https://www.medra.org/servlet/aliasResolver?alias=iospssr&doi=10.3233/IP-2002-0021>
- [10] Stephen Coleman, Kruakae Pothong, and Sarah Weston. 2018. Dramatizing Deliberation: A Method for Encouraging Young People to Think About Their Rights. *Journal of Public Deliberation* 14, 1 (June 2018). <https://www.publicdeliberation.net/jpd/vol14/iss1/art2>
- [11] Henriette Cramer, Vanessa Evers, Satyan Ramlal, Maarten van Someren, Lloyd Rutledge, Natalia Stash, Lora Aroyo, and Bob Wielinga. 2008. The effects of transparency on trust in and acceptance of a content-based art recommender. *User Modeling and User-Adapted Interaction* 18, 5 (Aug. 2008), 455. DOI: <http://dx.doi.org/10.1007/s11257-008-9051-3>
- [12] Anne M. Cronin. 2018. *Public Relations Capitalism: Promotional Culture, Publics and Commercial Democracy*. Palgrave Macmillan. DOI: <http://dx.doi.org/10.1007/978-3-319-72637-3>
- [13] Dylan Curran. 2018. Are you ready? This is all the data Facebook and Google have on you. (2018). <https://www.theguardian.com/commentisfree/2018/mar/28/all-the-data-facebook-google-has-on-you-privacy>
- [14] Ella Dagan, Elena Márquez Segura, Ferran Altarriba Bertran, Miguel Flores, and Katherine Isbister. 2019. Designing 'True Colors': A Social Wearable that Affords Vulnerability. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19)*. Association for Computing Machinery, Glasgow, Scotland Uk, 1–14. DOI: <http://dx.doi.org/10.1145/3290605.3300263>
- [15] Anca Dobrean and Costina-Ruxandra Păsărelu. 2016. Impact of Social Media on Social Anxiety: A Systematic Review. In *New Developments in Anxiety Disorders*, Federico Durban and Barbara Marchesi (Eds.). BoD: Books on Demand. Google-Books-ID: pTCRDwAAQBAJ.
- [16] John S. Dryzek. 2009. Democratization as Deliberative Capacity Building. *Comparative Political Studies* 42, 11 (Nov. 2009), 1379–1402. DOI: <http://dx.doi.org/10.1177/0010414009332129> Publisher: SAGE Publications Inc.
- [17] Lilian Edwards. 2016. Privacy, Security and Data Protection in Smart Cities: A Critical EU Law Perspective. *European Data Protection Law Review (EDPL)* 2 (2016), 28–58.
- [18] Lilian Edwards and Michael Veale. 2018. Enslaving the Algorithm: From a 'Right to an Explanation' to a 'Right to Better Decisions'? (2018). <https://papers.ssrn.com/abstract=3052831>
- [19] Chris Elsden, Arthi Manohar, Jo Briggs, Mike Harding, Chris Speed, and John Vines. 2018. Making Sense of Blockchain Applications: A Typology for HCI. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, Montreal

- QC, Canada, 1–14. DOI : <http://dx.doi.org/10.1145/3173574.3174032>
- [20] Motahhare Eslami, Sneha R. Krishna Kumaran, Christian Sandvig, and Karrie Karahalios. 2018. Communicating Algorithmic Process in Online Behavioral Advertising. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, Montreal QC, Canada, 1–13. DOI : <http://dx.doi.org/10.1145/3173574.3174006>
- [21] Heike Felzmann, Eduard Fosch Villaronga, Christoph Lutz, and Aurelia Tamò-Larrieux. 2019. Transparency you can trust: Transparency requirements for artificial intelligence between legal norms and contextual concerns. *Big Data & Society* 6, 1 (Jan. 2019), 2053951719860542. DOI : <http://dx.doi.org/10.1177/2053951719860542> Publisher: SAGE Publications Ltd.
- [22] Xianyi Gao, Gradeigh D. Clark, and Janne Lindqvist. 2016. Of Two Minds, Multiple Addresses, and One Ledger: Characterizing Opinions, Knowledge, and Perceptions of Bitcoin Across Users and Non-Users. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16)*. Association for Computing Machinery, San Jose, California, USA, 1656–1668. DOI : <http://dx.doi.org/10.1145/2858036.2858049>
- [23] Jennifer Golbeck. 2019. Dogs Good, Trump Bad: The Impact of Social Media Content on Sense of Well-Being. In *Proceedings of the 10th ACM Conference on Web Science (WebSci '19)*. Association for Computing Machinery, Boston, Massachusetts, USA, 125–129. DOI : <http://dx.doi.org/10.1145/3292522.3326009>
- [24] Jamie Harper. 2019. Meaningful play: applying game and play design practices to promote agency in participatory performance. *International Journal of Performance Arts and Digital Media* 15, 3 (Sept. 2019), 360–374. DOI : <http://dx.doi.org/10.1080/14794713.2019.1633148> Publisher: Routledge _eprint: <https://doi.org/10.1080/14794713.2019.1633148>
- [25] J. Tuomas Harviainen, Rafaek Buebua, Simon Brind, Michael Hitchens, Yaraslav I. Kot, Esther MacCallum-Stewart, David W. Simkins, Jaakkko Stenros, and Ian Sturrock. 2018. Live-Action Role-Playing Games. In *Role-Playing Game Studies: Transmedia Foundations*, Sebastian Deterding and José Zagal (Eds.). Routledge. Google-Books-ID: ix9WDwAAQBAJ.
- [26] Florian Hawlitschek, Benedikt Notheisen, and Timm Teubner. 2018. The limits of trust-free systems: A literature review on blockchain technology and trust in the sharing economy. *Electronic Commerce Research and Applications* 29 (May 2018), 50–63. DOI : <http://dx.doi.org/10.1016/j.elerap.2018.03.005>
- [27] Dorothy Heathcote. 1970. How does drama serve thinking, talking, and writing? *Elementary English* 47, 8 (1970), 1077–1081.
- [28] Jonathan L. Herlocker, Joseph A. Konstan, and John Riedl. 2000. Explaining collaborative filtering recommendations. In *Proceedings of the 2000 ACM conference on Computer supported cooperative work (CSCW '00)*. Association for Computing Machinery, Philadelphia, Pennsylvania, USA, 241–250. DOI : <http://dx.doi.org/10.1145/358916.358995>
- [29] Hannu Jaakkola, Timo Mäkinen, and Anna Eteläaho. 2014. Open data: opportunities and challenges. In *Proceedings of the 15th International Conference on Computer Systems and Technologies (CompSysTech '14)*. Association for Computing Machinery, New York, NY, USA, 25–39. DOI : <http://dx.doi.org/10.1145/2659532.2659594>
- [30] Karim Jabbar and Pernille Bjørn. 2017. Growing the Blockchain Information Infrastructure. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. Association for Computing Machinery, Denver, Colorado, USA, 6487–6498. DOI : <http://dx.doi.org/10.1145/3025453.3025959>
- [31] Hilary Johnson and Peter Johnson. 1993. Explaination Facilities and Interactive Systems. In *Proceedings of Intelligent User Interfaces '93*, 159 – 166. https://dl.acm.org/doi/pdf/10.1145/169891.169951?casa_token=r5ejTLrd2dsAAAAA:flrhgEoNngYBQ0VjrORKORDcVxcd4JtpWHgHuu9vOatev3M0YHuQFhix8HxM0psPqKY90JNyGVw
- [32] Staffan Jonsson, Markus Montola, Annika Waern, and Martin Ericsson. 2006. Prosopopeia: experiences from a pervasive Larp. In *Proceedings of the 2006 ACM SIGCHI international conference on Advances in computer entertainment technology (ACE '06)*. Association for Computing Machinery, Hollywood, California, USA, 23–es. DOI : <http://dx.doi.org/10.1145/1178823.1178850>
- [33] Jesper Juul. 2005. *Half-Real: Video Games between Real Rules and Fictional Worlds*. MIT Press.
- [34] Paul Kariuki, Jude A. Adeleke, and Lizzy Oluwatoyin Ofusori. 2020. The role of open data in enabling fiscal transparency and accountability in municipalities in Africa: South Africa and Nigeria case studies. In *Proceedings of the 13th International Conference on Theory and Practice of Electronic Governance (ICEGOV 2020)*. Association for Computing Machinery, New York, NY, USA, 410–418. DOI : <http://dx.doi.org/10.1145/3428502.3428558>
- [35] Jofish Kaye, Janet Vertesi, Jennifer Ferreira, Barry Brown, and Mark Perry. 2014. #CHImoney: financial interactions, digital cash, capital exchange and mobile money. In *Proceedings of the extended abstracts of the 32nd annual ACM conference on Human factors in computing systems - CHI EA '14*. ACM Press, Toronto, Ontario, Canada, 111–114. DOI : <http://dx.doi.org/10.1145/2559206.2559221>
- [36] Rob Kitchin. 2014. *The Data Revolution: Big Data, Open Data, Data Infrastructures and Their Consequences*. SAGE.
- [37] Jürgen Koenemann and Nicholas J. Belkin. 1996. A Case for Interaction: A Study of Interactive Information Retrieval Behavior and Effectiveness. In *Proceedings of the Human Factors in Computing Systems Conference*. ACM Press, NY. https://dl.acm.org/doi/fullHtml/10.1145/238386.238487?casa_token=dhlOF8y9P6cAAAAA:maNYejHp16-nn049V0HhMGkBsns1TujQ4VPQtvH4pBzo9fSmha9hxI3V5v5D_6oIZf88wlbn7kAQ
- [38] Yong Ming Kow and Xianghua Ding. 2016. "Hey, I know what this is!": Cultural Affinities and Early Stage Appropriation of the Emerging Bitcoin Technology. In *Proceedings of the 19th International Conference on Supporting Group Work (GROUP '16)*. Association for Computing Machinery, Sanibel Island, Florida, USA, 213–221. DOI : <http://dx.doi.org/10.1145/2957276.2957279>
- [39] Todd Kulesza, Simone Stumpf, Margaret Burnett, Sherry Yang, Irwin Kwan, and Weng-Keen Wong. 2013. Too much, too little, or just right? Ways explanations impact end users' mental models. In *2013 IEEE Symposium on Visual Languages and Human Centric Computing*, 3–10. DOI : <http://dx.doi.org/10.1109/VLHCC.2013.6645235> ISSN: 1943-6106.
- [40] Christopher Kuner, Dan Jerker B. Svantesson, Fred H. Cate, Orla Lynskey, and Christopher Millard. 2017. Machine learning with personal data: is data protection law smart enough to meet the challenge? *International Data Privacy Law* 7, 1 (Feb. 2017), 1–2. DOI : <http://dx.doi.org/10.1093/idpl/ixp003>

- [41] Bruno Latour. 1990. Technology is Society Made Durable. *The Sociological Review* 38, 1_suppl (May 1990), 103–131. DOI: <http://dx.doi.org/10.1111/j.1467-954X.1990.tb03350.x> Publisher: SAGE Publications Ltd.
- [42] Yuanchun Li, Fanglin Chen, Toby Jia-Jun Li, Yao Guo, Gang Huang, Matthew Fredrikson, Yuvraj Agarwal, and Jason I. Hong. 2017. PrivacyStreams: Enabling Transparency in Personal Data Processing for Mobile Apps. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* 1, 3 (Sept. 2017), 1–26. DOI: <http://dx.doi.org/10.1145/3130941>
- [43] Joseph Lindley. 2015. Crypto Heater: A Design Fiction. In *Proceedings of the 2015 ACM SIGCHI Conference on Creativity and Cognition (C&C '15)*. Association for Computing Machinery, Glasgow, United Kingdom, 355–356. DOI: <http://dx.doi.org/10.1145/2757226.2757367>
- [44] Conor Linehan, Ben J. Kirman, Stuart Reeves, Mark A. Blythe, Joshua G. Tanenbaum, Audrey Desjardins, and Ron Wakkary. 2014. Alternate endings: using fiction to explore design futures. In *Proceedings of the extended abstracts of the 32nd annual ACM conference on Human factors in computing systems - CHI EA '14*. ACM Press, Toronto, Ontario, Canada, 45–48. DOI: <http://dx.doi.org/10.1145/2559206.2560472>
- [45] James Mansbridge, James Bohman, Simone Chambers, Thomas Christiano, Archon Fung, John Parkinson, Dennis F. Thompson, and Mark E. Warren. 2012. A systemic approach to deliberative democracy. In *Deliberative Systems: Deliberative Democracy at the Large Scale*, John Parkinson and Jane Mansbridge (Eds.). Cambridge University Press. Google-Books-ID: uIUhAwAAQBAJ.
- [46] Elena Márquez Segura, James Fey, Ella Dagan, Samvid Niravbhai Jhaveri, Jared Pettitt, Miguel Flores, and Katherine Isbister. 2018. Designing Future Social Wearables with Live Action Role Play (Larp) Designers. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, Montreal QC, Canada, 1–14. DOI: <http://dx.doi.org/10.1145/3173574.3174036>
- [47] Elena Márquez Segura, Annika Waern, Luis Márquez Segura, and David López Recio. 2016. Playification: The PhySeEar case. In *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play (CHI PLAY '16)*. Association for Computing Machinery, Austin, Texas, USA, 376–388. DOI: <http://dx.doi.org/10.1145/2967934.2968099>
- [48] Ricardo Matheus, Manuela M. Ribeiro, José Carlos Vaz, and Cesar A. de Souza. 2010. Using internet to promote the transparency and fight corruption: Latin American transparency portals. In *Proceedings of the 4th International Conference on Theory and Practice of Electronic Governance (ICEGOV '10)*. Association for Computing Machinery, New York, NY, USA, 391–392. DOI: <http://dx.doi.org/10.1145/1930321.1930411>
- [49] Deborah Maxwell, Chris Speed, and Dug Campbell. 2015. 'Effing' the ineffable: opening up understandings of the blockchain. In *Proceedings of the 2015 British HCI Conference (British HCI '15)*. Association for Computing Machinery, Lincoln, Lincolnshire, United Kingdom, 208–209. DOI: <http://dx.doi.org/10.1145/2783446.2783593>
- [50] Deborah Maxwell, Chris Speed, and Larissa Pschetz. 2017. Story Blocks: Reimagining narrative through the blockchain. *Convergence* 23, 1 (Feb. 2017), 79–97. DOI: <http://dx.doi.org/10.1177/1354856516675263> Publisher: SAGE Publications Ltd.
- [51] Robert R. McCrae and Oliver P. John. 1992. An Introduction to the Five-Factor Model and Its Applications. *Journal of Personality* 60, 2 (1992), 175–215. DOI: <http://dx.doi.org/10.1111/j.1467-6494.1992.tb00970.x>
- [52] Jan Niklas Meise, Thomas Rudolph, Peter Kenning, and Diane M. Phillips. 2014. Feed them facts: Value perceptions and consumer use of sustainability-related product information. *Journal of Retailing and Consumer Services* 21, 4 (July 2014), 510–519. DOI: <http://dx.doi.org/10.1016/j.jretconser.2014.03.013>
- [53] Satoshi Nakamoto. 2008. Bitcoin: A peer-to-peer electronic cash system. (2008). bitcoin.org/bitcoin.pdf.
- [54] Helen Nicholson. 2014. *Applied drama: The gift of theatre*. Macmillan International Higher Education.
- [55] Bettina Nissen, Larissa Pschetz, Dave Murray-Rust, Hadi Mehrpouya, Shaune Oosthuizen, and Chris Speed. 2018. GeoCoin: Supporting Ideation and Collaborative Design with Smart Contracts. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, Montreal QC, Canada, 1–10. DOI: <http://dx.doi.org/10.1145/3173574.3173737>
- [56] Svein Ølnes, Jolien Ubach, and Marijn Janssen. 2017. Blockchain in government: Benefits and implications of distributed ledger technology for information sharing. *Government Information Quarterly* 34, 3 (Sept. 2017), 355–364. DOI: <http://dx.doi.org/10.1016/j.giq.2017.09.007>
- [57] Kruakae Pothong. 2020. Youth Jury Policy Deliberation: Towards a Fair and Responsible Internet - Pothong - 2020 - Children & Society - Wiley Online Library. (2020). <https://onlinelibrary.wiley.com/doi/full/10.1111/chso.12359>
- [58] Larissa Pschetz, Billy Dixon, Kruakae Pothong, Arlene Bailey, Allister Glean, Luis Lourenço Soares, and Jessica A. Enright. 2020. Designing Distributed Ledger Technologies for Social Change: The Case of CariCrop. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20)*. Association for Computing Machinery, Honolulu, HI, USA, 1–12. DOI: <http://dx.doi.org/10.1145/3313831.3376364>
- [59] Larissa Pschetz, Kruakae Pothong, and Chris Speed. 2019. Autonomous Distributed Energy Systems. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. Glasgow, Scotland, UK, 1–14. DOI: <http://dx.doi.org/https://doi.org/10.1145/3290605.3300617>
- [60] Larissa Pschetz, Ella Tallyn, Rory Gianni, and Chris Speed. 2017. Bitbarista: Exploring Perceptions of Data Transactions in the Internet of Things. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17*. ACM Press, Denver, Colorado, USA, 2964–2975. DOI: <http://dx.doi.org/10.1145/3025453.3025878>
- [61] John N. Reynolds and Edmund Newell. 2011. *Ethics in Investment Banking*. Palgrave Macmillan.
- [62] Dominik Roeck, Henrik Sternberg, and Erik Hofmann. 2019. Distributed ledger technology in supply chains: a transaction cost perspective. *International Journal of Production Research* 0, 0 (Aug. 2019), 1–18. DOI: <http://dx.doi.org/10.1080/00207543.2019.1657247>
- [63] Sara Saberi, Mahtab Kouhizadeh, Joseph Sarkis, and Lejia Shen. 2019. Blockchain technology and its relationships to sustainable supply chain management. *International Journal of Production Research* 57, 7 (April 2019), 2117–2135. DOI: <http://dx.doi.org/10.1080/00207543.2018.1533261> Publisher: Taylor & Francis _eprint: <https://doi.org/10.1080/00207543.2018.1533261>
- [64] Corina Sas and Irni Eliana Khairuddin. 2015. Exploring Trust in Bitcoin Technology: A Framework for HCI Research. In *Proceedings of the Annual*

- Meeting of the Australian Special Interest Group for Computer Human Interaction (OzCHI '15).* Association for Computing Machinery, Parkville, VIC, Australia, 338–342. DOI :<http://dx.doi.org/10.1145/2838739.2838821>
- [65] Corina Sas and Irni Eliana Khairuddin. 2017. Design for Trust: An Exploration of the Challenges and Opportunities of Bitcoin Users. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. Association for Computing Machinery, Denver, Colorado, USA, 6499–6510. DOI :<http://dx.doi.org/10.1145/3025453.3025886>
- [66] David Simkins. 2015. *The Arts of LARP: Design, Literacy, Learning and Community in Live-Action Role Play*.
- [67] Rashmi Sinha and Kirsten Swearingen. 2002. The role of transparency in recommender systems. In *CHI '02 Extended Abstracts on Human Factors in Computing Systems (CHI EA '02)*. Association for Computing Machinery, Minneapolis, Minnesota, USA, 830–831. DOI :<http://dx.doi.org/10.1145/506443.506619>
- [68] Rebecca Smithers. 2020. Quorn to be first major brand to introduce carbon labelling. (Jan. 2020). <https://amp.theguardian.com/environment/2020/jan/09/quorn-to-be-first-major-brand-to-introduce-carbon-labelling>
- [69] Jaakko Stenros and Markus Montola (Eds.). 2010. *Nordic LARP* (1st print ed.). Fea Livia, Stockholm.
- [70] Jaakko Stenros and Markus Montola. 2011. The Making of Nordic Larp: Documenting a Tradition of Ephemeral Co-Creative Play. (2011), 17.
- [71] Lee Taber and Steve Whittaker. 2018. Personality Depends on The Medium: Differences in Self-Perception on Snapchat, Facebook and Offline. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, Montreal QC, Canada, 1–13. DOI :<http://dx.doi.org/10.1145/3173574.3174181>
- [72] Matteo Turilli and Luciano Floridi. 2009. The ethics of information transparency. *Ethics and Information Technology* 11, 2 (June 2009), 105–112. DOI :<http://dx.doi.org/10.1007/s10676-009-9187-9>
- [73] Lois Vanhée, Elena Márquez Segura, and Katherine Isbister. 2018. Firefly: A social wearable to support physical connection of larpers. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–4.
- [74] J. Patrick Williams, David Kirschner, Nicholas Mizer, Sebastian Deterding, David Kirschner, Nicholas Mizer, and Sebastian Deterding. 2018. Sociology and Role-Playing Games. In *Role-Playing Game Studies: Transmedia Foundations*, José P. Zagal and Sebastian Deterding (Eds.). Routledge, 227–244. DOI :<http://dx.doi.org/10.4324/9781315637532-12> Publisher: Routledge.
- [75] Robert H. Wortham and Andreas Theodorou. 2017. Robot transparency, trust and utility. *Connection Science* 29, 3 (July 2017), 242–248. DOI :<http://dx.doi.org/10.1080/09540091.2017.1313816> Publisher: Taylor & Francis _eprint: <https://doi.org/10.1080/09540091.2017.1313816>
- [76] Danny Yang, Jack Gavigan, Zooko Wilcox-O'Hearn, and R3 Research. 2016. Survey of Confidentiality and Privacy Preserving Technologies for Blockchains. (2016). https://z.cash/wp-content/uploads/static-og/static/R3_Confidentiality_and_Privacy_Report.pdf