A ‘seamless’ experience of data sharing through a ‘seamful’ engagement

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A ‘seamless’ experience of data sharing through a ‘seamful’ engagement

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Abstract:
This paper explores conceptually and empirically the complex and multi-layered networks of interaction where personal data is shared across different platforms. This is explored through the vocabulary and tensions established by ‘seamful’ and ‘seamless’ design approaches and their limitations in allowing people to track the flow of personal data across complex assemblages of digital services. These ideas are explored using a participatory method to support the design of Inclusive Digital Services where a prototype of seamless service related to data reuse and sharing is co-designed to address friction, effort, risk and cost (FERC) inherent to third sector services. The conclusion suggests that we need to foster a new attitude towards the development of trust in human-computer interaction. This can be achieved by promoting the turn to privacy by design and addressing the gap between ‘seamless’ and ‘seamful’ design through participatory methods.

Keywords: Seamful, Seamless, HCI, Contextual Integrity

1. Introduction

In our lives as workers, citizens, managers, policy makers and designers we rely ever more on ubiquitous infrastructures (Korn & Voida, 2015) that are often assemblages of different digital infrastructures ‘stitched’ together to support new functions. The need to ‘stitch’ multiple digital services together (databases and apps) is a result of the growing need to support ever increasing functionalities, improved usability and dependability. However, as the assemblages become larger, more layers of security are required to ensure the safe flow of personal data between them. As the public become more data literate about the risks of mismanaging personal data, designers need to work harder to retain the trust of the individual. However, as the principles of trustworthy systems develop, the challenges of retaining easy to use services becomes harder. This presents an interesting design challenge that demands that we understand why and how people trust the systems that they use, and how to substantiate these in social and material infrastructures that are easy to use.

2. Background to the study

In the 1990s scholars of technology started systematically to bring together analysis of the context and processes of both development and use of technologies, and to identify the broad continuum of intermediary actors and processes that play a role in inventive and innovative actions. It is now almost 20 years since Verbeek stressed that there is a need to "bridge the gap between the context of use and the context of design" (Verbeek & Values, 2006, p. 378) but still the gap remains. This is particularly noticeable in the important legal and regulatory changes in the IT industry, especially the General Data Protection Regulation (GDPR) that attempts to promote more transparency and security for the handling of personal data. The purpose of GDPR was to enforce policies to better protect personal data, including the movement and transfer of data from one context to another, and indirectly to preserve the integrity of the individual. Whilst the introduction of the regulations has been widely adopted, there remains a gap between the context for the use of personal data, and the design solutions that are intended to engender public trust.

2.1 Identifying the gap

In exploring the gap between the context of use of personal data within digital services, and the design of them, we introduce two useful concepts, firstly the language of 'seamless' and 'seamful' design to define the attributes of the gap. The terms are recovered from the field of human-computer interaction, to explain the challenges facing designers as they bring together different digital infrastructures and the subsequent 'seams' that are created between them (Inman & Ribes, 2019). The second concept is the conceptualisation surrounding *Contextual Integrity* proposed by Nissenbaum (2004), which assists the discussion of how personal information moves across different platforms, so that we can gauge people's experience in making sense of trust and privacy in network privacy management. Finally, and to better understand what the gap might be, we formulated two questions that we aimed to answer by building upon relevant literature. These questions ask:

1. How do people understand and articulate the boundaries and norms of their everyday activities?
2. How might participatory design methods ameliorate the tensions that arise between the seamful and seamless movements of data from one system to the other?

3. Seamful and Seamless design

The assemblage of multiple technical systems, each one layered upon another, is not new and can be associated with the efforts of a field of research and development dubbed "Ubiquitous Computing' or 'Ubicomp' (Weiser 1994). A core aspect of Ubicomp was the argument in favour of a seamless computer-supported service that eliminated the visible aspects of a conventional human-computer interface. It is possible to understand that information systems are increasingly joined up to create pervasive infrastructures that cross organisational boundaries and link data from entirely different areas of private, social and professional life. This proposition triggered a debate within the research community about the tension between the seamless and seamful perspectives. Pertaining to this is the discussion established by Chalmers and MacColl (2003; 2002), which gave them the opportunity to formulate a critique over the invisibility of computing, pointing out that attempts to hide the seams between different digital services (Ubicomp utopia) has been unproductive because they mask security concerns on behalf of the person using the systems. Furthermore, there is a need to overhaul this idea and "rather than removing or reducing the uncertainty or imprecision, we could make a deliberate choice about how to present it and use this as a quality of the system that allows

users to pause and reflect on the best course of action” (MacColl (2003; 2002). Twenty years on, the idea of Ubicomp has changed considerably; we coexist with many seamless systems that work not just for us but move fragmented datafied versions of ourselves through deep networks of business, government and platform economies. While we appreciate the benefits of seamless systems, constantly moving data across organisational boundaries, we are concerned that this may be without our informed consent. For instance, imputing data about us in contexts which we do not expect and which violate the integrity of our data (Nissenbaum, 2004) and identity as pointed out by Kondova et al. (2020) and Carroll et al. (2001).

4. Case study: A seamless experience of data sharing through a ‘seamful’ engagement

The insights reported emerged from a project entitled Seamless Access to Inclusive Digital Services (SAIDS), highlighting a co-design intervention conducted with three Scottish non-profit organisations. To achieve this we developed an original method of analysis - the FERC analytical framework, and used it to extend traditional journey mapping. The inclusion of this framework allowed for the gauging of participants’ experiences in making sense of privacy and trust issues as they experience the ‘stitched’ together digital services across which the data of the citizens they provide services for flows. The method makes an original and relevant contribution to help in the co-design of solutions with the aim of addressing the dimensions of FERC, that can slow down the ability for a person to use a service, whilst seeking to empower individuals by introducing ways to regain possession and control of their data.

4.1 Data Collection and analysis

The first round of data collection was carried out during workshops conducted on 29th October 2019 in Edinburgh, on 3rd December 2019 in Glasgow, and on 20th January 2020 in Dundee. Three organisations operating in the domains of Care Services, Housing and Care, and Volunteer Services, were targeted as potential cluster lead. Further information about them and their current situation was gathered in another round of data collection. This was done in a workshop format in two cases, delivered on 6th December 2019 in Dundee and on 13th January 2020 in Ayr. In the third case in a one-to-one meeting in Edinburgh on 22nd November 2019. Informed consent was obtained, and all participants received information about the research, including how the data would be used and stored. Audio of key points, especially the description of the journeys maps and discussion of FERC was recorded and transcribed verbatim. The interviews were coded line-by-line (Corbin & Strauss, 2008), “moving back and forth between our own data” (Mason, 2002: p. 180). This was done in two cycles with the support of Nvivo11 which enabled the development of nine themes (Friction, Effort, Risk, Cost, Efficiency, Viability, Type of Data Collected, Aim of the Organisation, Initiatives and Next Stage).

4.2 Design Context

The workshop and interviews were specific moments of data collection, allowing us to consistently gather insights in order to develop understanding of the underlying logics, assumptions, and problematizations embedded in the use of Personal Data Stores facilitated by SAIDS, and to conceptualise “where preferable outcomes sit on a spectrum of probable, plausible, or possible futures” (Lindley et al., 2014: 245), allowing a design intervention based on the participants’ contributions to:

- mapping a range of existing stakeholder journeys and identifying 'pain points' in the current service journey, particularly in data capture and sharing;
- gathering insights into how service providers understand the challenges of capturing, storing, and sharing data;
- understanding how service providers perceive the benefits of digitally enabling their service;
- and observing any challenges in service providers' understanding of person-centred digitally enabled services.

To do this, we guided participants towards creating their own stories using prompts enabled by us, namely empathy and journey maps. Participants then conducted a colour coding of potential unnecessary dimensions of the analytical framework (FERC), which was specifically developed by the research team for this purpose, departing from current templates used in service design (Kimbell, 2014; Polaine, Løvlie, & Reason, 2013; Reason, Løvlie, & Flu, 2015). The analytical framework was upgraded with a data layer under each step of the journey map. The data layer aimed to secure an understanding of the type of data collected, the relevance of the service provided, and the storage and sharing procedures.

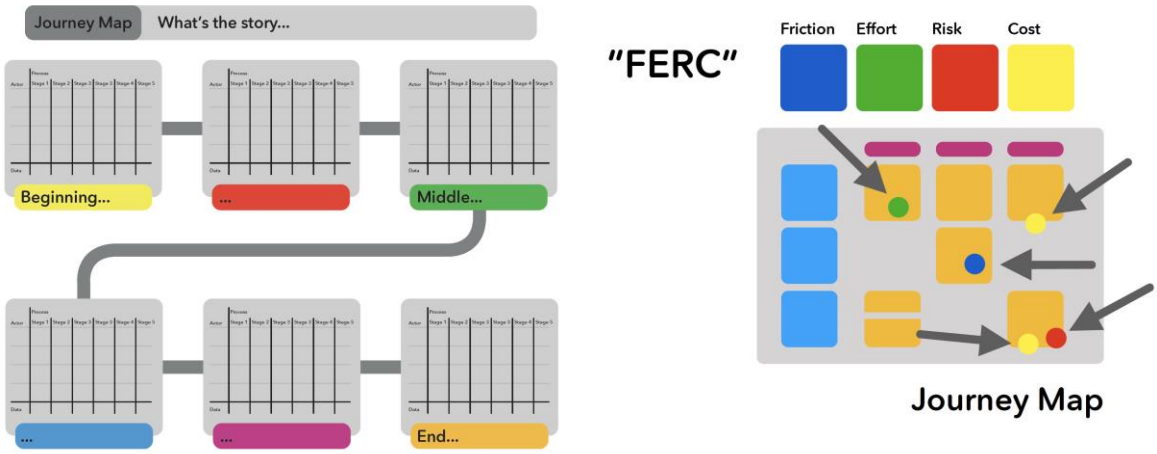

Figure 1. The journey mapping process to capture personal experiences of using digital services, with the use of additional FERC analytical framework that used colour coding to identify instances of friction, effort, risk and cost.

5. Reconciling the gap between Seamless and Seamful

This section focusses upon the outcomes of just one of the three organisations that were involved in the research. This third sector organisation, operating in the field of housing and care services, uses an advanced IT system to provide services to allow people with disabilities to live independently. The system works by "helping them to become more digitally enabled and less socially isolated" (interview with organisation 3) and crosses all aspects of an individual's care, housing, and support needs. Despite being an advanced technology-enabled organisation, with a sophisticated and active digital tool, it still depends on some paper-based data-collection. Key problems were identified during the one-to-one meetings and workshops. For instance, potential breaches in data protection, which could lead to incremental friction, and to reputational damage seem to be critical, as pointed out by one interlocutor when stating that "if we're not clear about outcomes and the quality of service then we have risks about our reputation and those bits of it" (interview with key actor in organisation 3). These situations would be improved with the design solution presented. The

organisations would have better ways to share information with other organisations (seamless approach). This would be done with the consent of the citizens who would have greater control (seamful approach) of the third-party organisations and stakeholders accessing their Personal Data Stores to retrieve information, considering that “if that kind of core data is available almost everybody is going to want to know” (interview with organisation 3). Opportunities for this organisation to improve its service and levels of interactions with the citizens they support is emphasized as one of the most relevant aspects of the co-designed interface presented. Key problems identified during the one-to-one meeting and workshop, such as “who is the next of kin, who is their GP [would be improved, enabling a better sharing of information taking into consideration that they are] vulnerable citizens. How you helped them make informed decisions about who is sent that information is very important” (interview with organisation 3). The design solution presented would support greatly these kind of organisations, which, with the consent of the citizens, would have greater control of the third-party organisations and stakeholders accessing Personal Data Stores to retrieve information.

6. Discussion

As described in the previous section, the fieldwork for this project attempted to operationalise important concepts (seamless and seamful design) inherent to personal data management to evaluate how these ideas shaped the search for knowledge and solutions in the work with stakeholders, and how it could be understood within our analytical framework (FERC). The analysis has identified three primary concerns for the design community to consider as they look forward to negotiating the gap between the context of the use of personal data and the context of designing seamless and seamful solutions:

- **Friction** – Probabilities for friction to emerge: this is due to the need to permanently cross boundaries (seams) between different areas of social intervention and across different platforms, where there are always invisible stitches, which will give a false sense of smoothness and, consequently, increase the chance for friction to emerge, as pointed out by Korn & Voida (2015). SAIDS addressed those issues by enabling citizens to see what is being shared with whom and where the data is coming from.

- **Ambiguity** – The flow of personal data within digital services remains ambiguous for the citizens. This was revealed by applying the analytical framework (FERC) that highlighted the perception that personal information (data) appeared to exist in different places to serve different purposes, which implies different formats, for instance, bringing issues of legacy to the surface. Third-sector organisations have different approaches to storing and encoding citizens’ data, which makes it problematic to share across different organisations. For instance, personal information is often confused with data about an individual, referred to as ‘ambiguity’ (Chalmers & MacColl, 2003), which in turn makes it harder to define where responsibility and accountability lies.
- **Multi-layered context of use** – Looking at the case study which was analysed, it is possible to argue that these actors perceived the existence of multiple ’contexts’ that often overlap, i.e. different organisations involved in the attempt to respond to citizens’ requests. This is characterised by different ways of working, different infrastructures and different practices regarding data storage and sharing. In these

circumstances, the presence of friction is unavoidable. Organisations when attempting to make things seamless (by hiding the points of transitions) frequently end up blurring the context where action takes place, which is very important for the citizen. The evidence suggests that it is important for the citizen to know what is going on, where they are, at what stage their request is, and who is dealing with it. SAIDS has facilitated this by making it easier and safer to share personal information, whilst giving back control, and this undoubtedly reduces FERC.

7. Final remarks

The need to provide personal information about ourselves to an organisation comprises a variety of challenges, which are often due to a lack of contextual clarity. Quite often it is impossible to know what happens after we have ticked the terms and conditions within a given context. Empirical material asserts that when there is too much invisibility (seamless approach) then the chances for the emergence of ambiguity will be considerable. Consequently, tension and inherently relevant levels of friction will emerge with implications for trust. This opens up opportunities for citizens to question why these organisations need the information that is already in their possession; they should find ways of securely sharing it but keeping its integrity. Based on the empirical evidence presented we argue in favour of less obscurity (hiding the seams) within the socio-technical infrastructure. Citizens should be entitled to know where the information they have provided is; if it is secure, how it has been used, and the potential outcome. Otherwise, ambiguity will generate a thick layer of fog and contribute to deteriorating levels of trust in human-computer interaction.

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