Providing informed consent as a vulnerable user: User perceptions of data collection in recommender systems

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Contents

Abstract

Recommender systems are a common AI technology in online platforms such as YouTube, Facebook, and Spotify. They personalise content to make your online experience more valuable. However, this erodes personal autonomy as the user no longer actively controls what they see. Recommendations lead to echo chambers reinforcing a potentially skewed representation of information. Digital immigrants (people with low digital literacy) are vulnerable users who can struggle to recognise online echo chambers. Through a digital survey, users engaging with recommender systems were asked about their perceptions of data collection in personalised online platforms. These perceptions lead to a discussion of how that impacts the provision of informed consent within online spaces.

It was found that users are scared and angry with current data collection practices regardless of their digital literacy. 62% of users had no idea what data was collected and did not know what they were consenting to. No strong correlation was found between users' digital literacy and their knowledge of the dangers of RSs or echo chambers. An additional 'in-between category' of digital literacy was found among participants. Many respondents lamented their lack of knowledge and expressed a desire to control their recommendations and their data.

Future studies should investigate how to give users more autonomy and deepen our understanding of the complexity of digital literacy.

Keywords | Recommender Systems, Autonomy, Informed Consent, Data Collection, Digital Immigrants, Digital Natives

Abbreviations | RSs – Recommender Systems; DIs – Digital Immigrants; DINs – Digital Inbetweens; DNs – Digital Natives; P*n* – Participant *number*; PI - Personal Information

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Introduction

With emerging AI technologies, giving and managing informed consent online is a formidable task (Burkhardt et al. 2023). Traditionally a legal obligation, consent is increasingly cited as a cornerstone to autonomy (Schuck 1994; Pallocci et al. 2023). Autonomy is the right to self-determination and is central to justice and personal well-being (Calvo et al. 2020). Exploring autonomy further also means acting according to your values (Soenens et al. 2007). However, AI technologies such as recommender systems (RSs) are increasingly found online. They collect mountains of user information and make recommendations (and predictions) based on behavioural data, which steadily erodes user autonomy. Therefore, understanding the data collection practices of RSs is vitally important. Only once a user understands what they consent to can the relationship between the user and platform be ethical.

Providing continuous consent online is essential in increasing user autonomy, especially when considering the impact of RSs on vulnerable users (Strengers et al. 2021). Users with lower digital literacy are less likely to have the skills to assess trustworthiness online. Additionally, digital data feels different from other personal information (PI), leading some users to regard it as less important (Bongiovanni et al. 2020).

Given these developments in UX, this paper seeks to understand how ‘Digital Immigrants’ (DIs) perceive data collection practices of popular RSs such as Amazon, Spotify, social media and more. How do they view the balance between personalisation and privacy, and how does that impact their ability to control their digital bodies?

Background

Recommender systems are everywhere. They personalise the online experience and maximise engagement (Shetty and Powers 2023). The YouTube RS aims to give users content that “uniquely inspires, teaches, and entertains” (Goodrow 2021) while TikTok claims to facilitate an ‘authentic global community’ with its ‘For You’ page (TikTok 2020). “While this sounds relatively innocuous (…), it has the secondary effect of exercising strong control over what the listener is exposed to and blocking content that is unlikely to engage” (Wu 2018). Personalisation can lead to echo chambers, leaving DIs unaware of potentially challenging situations (Hildebrandt 2022; Stray et al. 2022;

Areeb et al. 2023). Therefore, implementing RSs online is widely accepted as undermining autonomy/self-determination as users cannot provide informed consent (Calvo et al. 2020; Varshney 2020; Angwald and Areschoug 2021).

Giving informed consent is crucial for our digital bodies as it allows users to control which digital interactions they want to participate in (Pesce et al. 2012; Lee and Toliver 2017; Nguyen and Ruberg 2020). Existing research on informed consent in HCI is often focussed on smart health (Roache 2014; O'Connor et al. 2017) or digital privacy (Henze et al. 2016; Kokolakis 2017; Distler et al. 2020; Beattie et al. 2023). Providing consent to data collection in online platforms is often given through cookies or consent walls, which Gray et al. have identified as an *obstructive* dark pattern (2021). Blocking access to content develops consent fatigue, where users automatically dismiss selection options between them and their goal (Gray et al. 2021). Privacy fatigue is a similar phenomenon where users consider protecting their data futile. Choi et al. found fatigue has a bigger impact on behaviour than concerns about privacy breaches (2018). Protecting our digital bodies in the face of dark patterns and data leaks is increasingly complex, giving people a sense of hopelessness. Therefore, centring discussions of informed consent around user autonomy in RSs opens the conversation to the ethical collection and control of data in personalised platforms (Nguyen and Ruberg 2020).

However, the importance of providing informed consent is complicated when considering user opinions versus actions. The privacy paradox is where users continue to use a service despite having privacy concerns (Kokolakis 2017; Bongiovanni et al. 2020). Surveys have shown that people are willing to share their PI for relatively little reward (Carrascal et al. 2013; *The Data Dollar Store* 2017). Carrascal et al. found participants valued offline PI more highly than online information, which they posited was a lack of awareness rather than a lack of care (2013). For most of us, it is difficult to understand the power of predictive AI and what it can do with piles of data.

Understanding the importance of PI is vital to digital literacy. Digital Immigrants are users with low digital literacy making them susceptible to damaging effects of RSs used in platforms like YouTube or Facebook (Leavy 2022). They are an underrepresented group, as research often centres on 'Digital Natives' (DNs) (Tufts 2010). DIs were initially defined as born pre-1980 (Prensky 2001; Tufts 2010). However, Kesharwani

uses a scale of computer engagement, as age is not representative of digital literacy (Selwyn 2009; Kirschner and De Bruyckere 2017; 2020; Yates 2020).

The intersection of consent/privacy fatigue, digital literacy and the complicated nature of data collection in RSs highlight a significant ethical problem and the need to discuss the design of personalised online spaces.

Methods

This study employed a mixed-methods research design based on secondary research and data from an online survey. Questions varied and included closed, open-ended and multiple-choice. Participants were recruited directly by the researcher or through a call to action on private online forums (community Facebook group, WhatsApp groups, Discord).

Participants were chosen as users of platforms with recommender systems without regard for age or computer skills to remove potential bias (Yates 2020). Further participants were recruited through 'exponential non-discriminative snowball sampling' (Simkus 2023). Namely, participants were asked to pass the survey to family and friends.

In total, 81 people completed the survey spanning all age categories and representing various educational and occupational backgrounds. 73% of respondents came from the UK through the community Facebook group. However, the survey captured 14 distinct nationalities.

Participants answered filter questions to establish their digital literacy before the key questions of the study. The filter questions are based on the framework defined by Chetty et al. (2018), with a bias towards technical and ethical concerns for simplification. All survey questions follow the guidelines established by Groves et al. (2011).

Thematic analysis with an inductive approach was used to explore emergent patterns and themes in the data, with descriptive statistics to identify thematic frequency (Braun and Clarke 2006; Fisher and Marshall 2009).

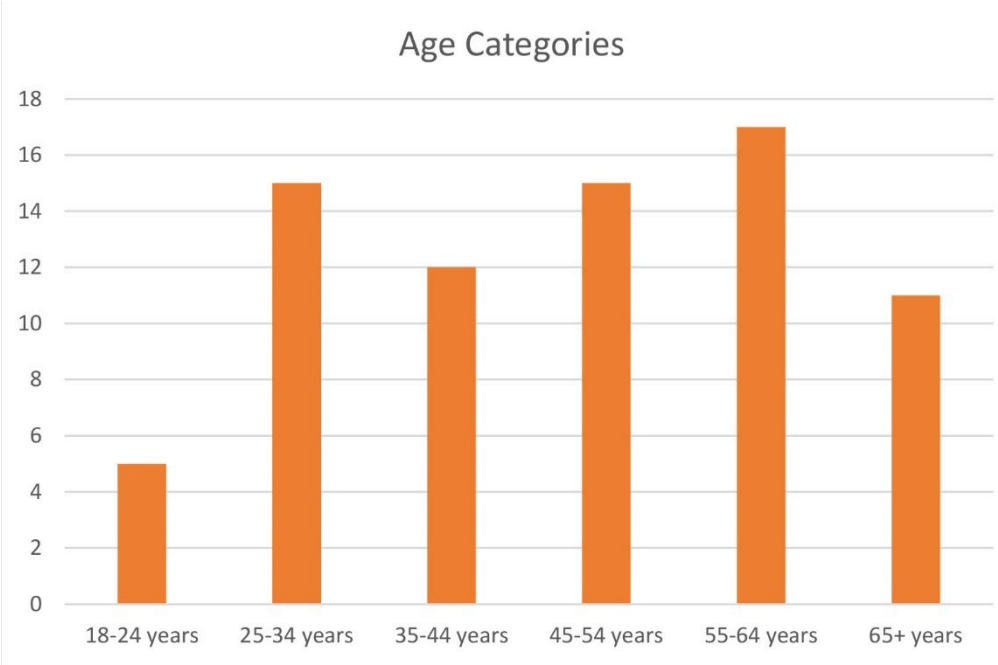

Figure 1 Respondents' ages.

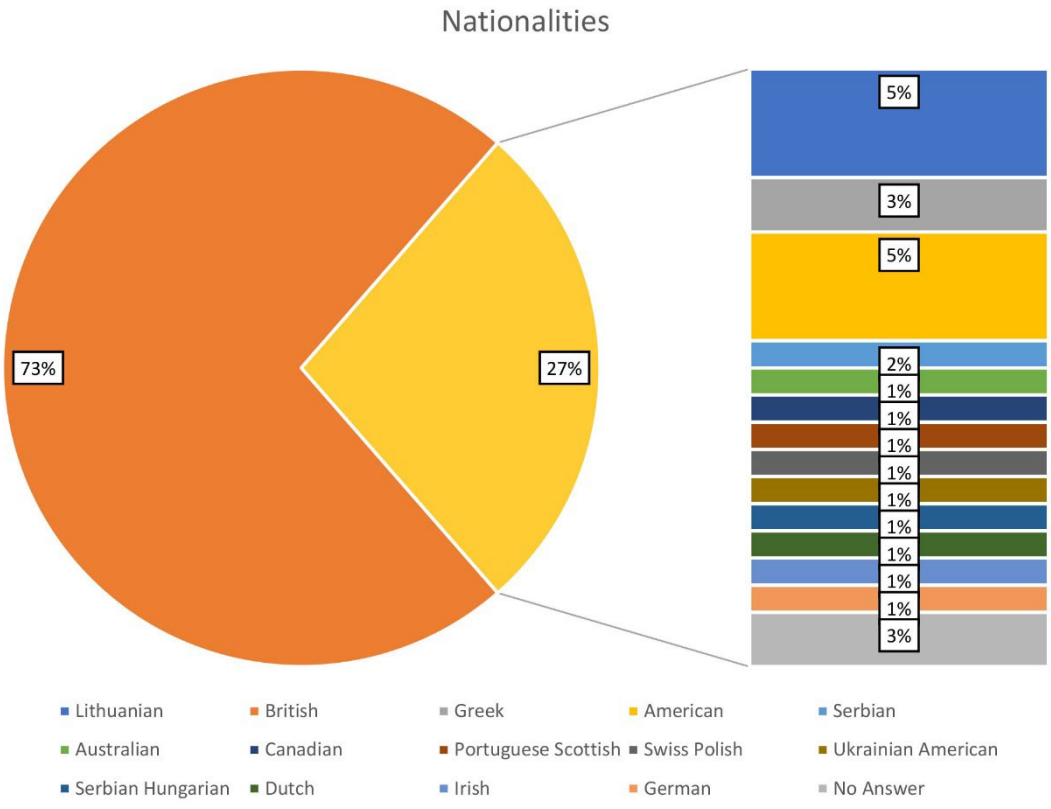

Figure 2 Respondents' nationalities.

Results

Of the participants, 32% were identified as DIs based on their overall digital literacy score (less than 8 of 16 on filter questions), with the majority 55-64 years old. 56%, however, were classed as Digital Inbetweens (DINs), scoring between 9-12 of 16 on the filter questions. DINs appeared in every age category, including 18-24 and 65+. They reported varied knowledge levels around RSs and data collection.

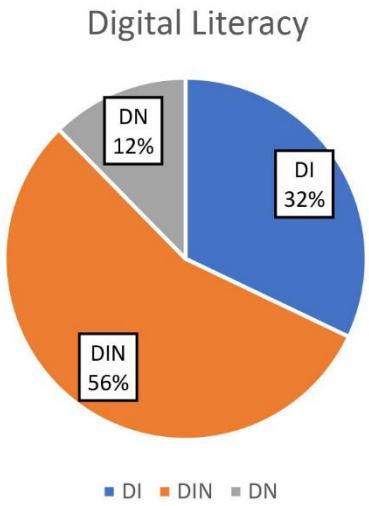

Figure 3 Respondents' digital literacy.

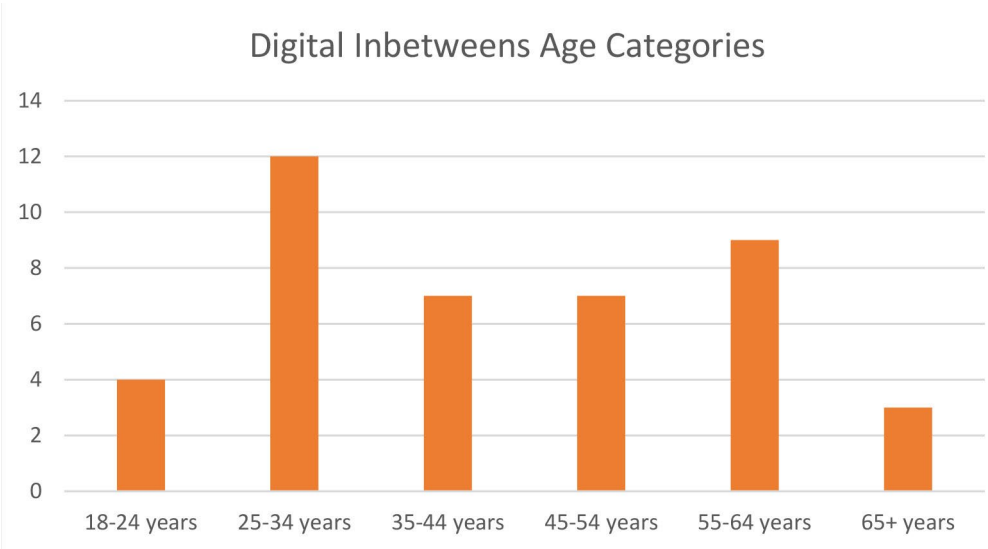

Figure 4 DIN age categories.

The data shows that while DIs and DINs were more likely to have basic/limited knowledge of RSs and their dangers, this was not exclusive, with 30% of DNs reporting basic/limited knowledge. Only 5% of respondents accurately explained an RS and echo chamber. 63% of respondents used at least 10 or more of 18 popular sites using RSs.

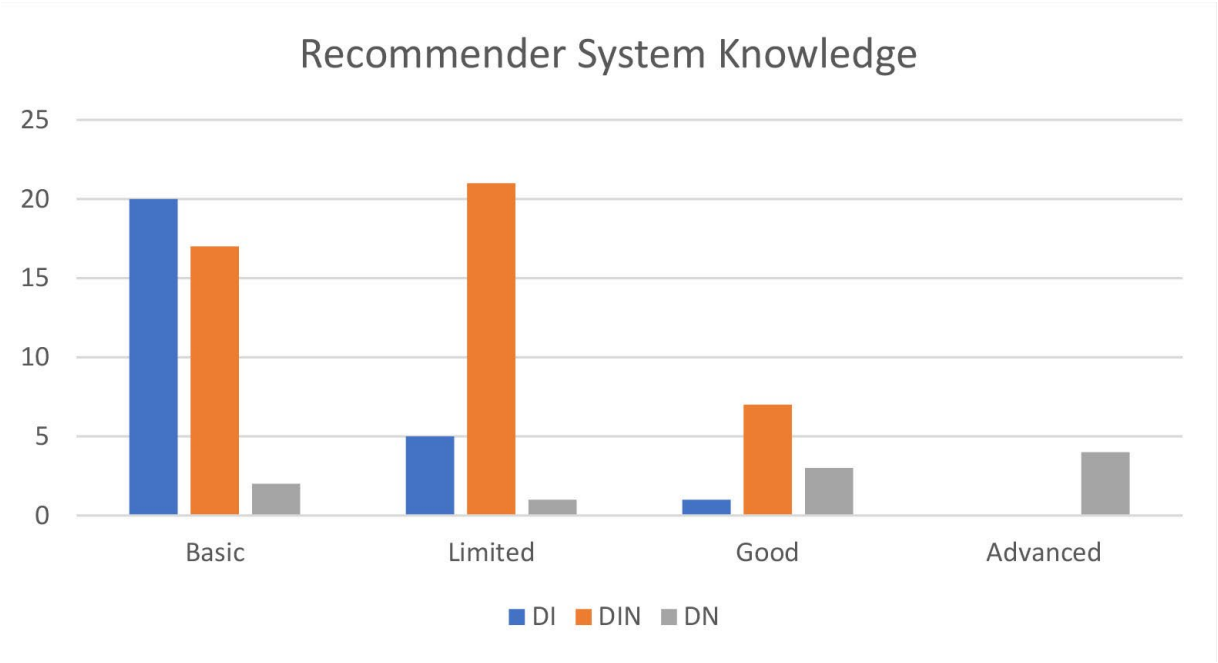

Figure 5 Digital literacy vs RS knowledge.

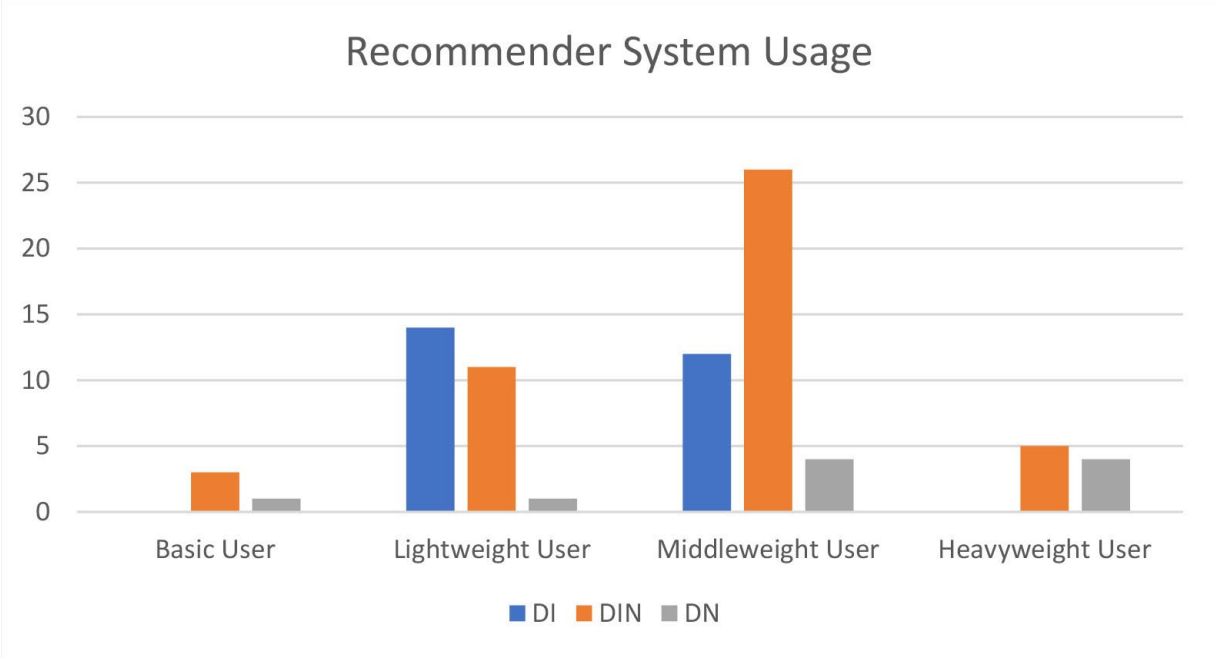

Figure 6 Digital literacy vs using platforms with RSs.

While 76% of respondents knew that websites collect their data, only 11% knew what is collected. 19% of people felt they had some control over their recommendations, while 70% thought they had no control.

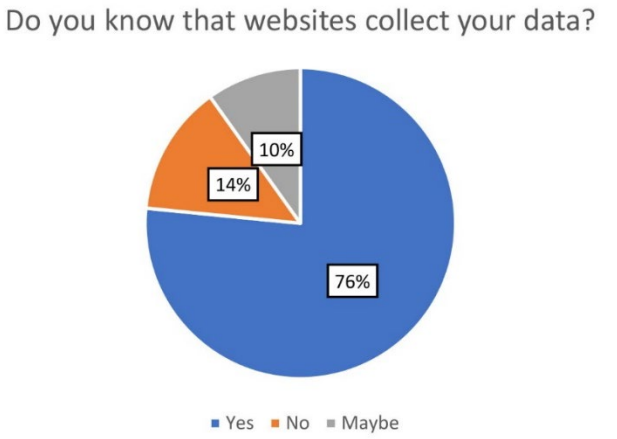

Figure 7 Websites collect your data?

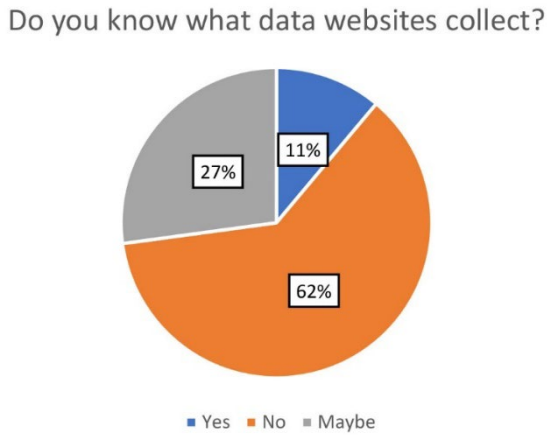

Figure 8 What data do websites collect?

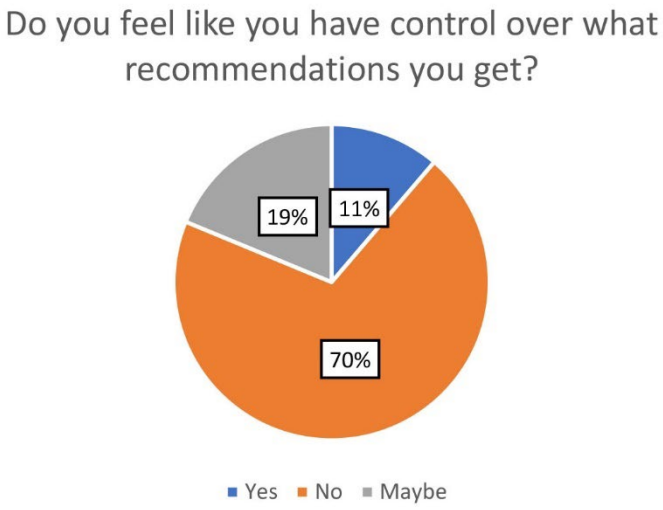

Figure 9 Control over recommendations.

The thematic analysis of survey responses yielded four main themes: negativity, positivity, helplessness, and a desire for control. These themes (organised by emotion) are shown in Table 1, with examples of the analysed material and the corresponding digital literacy of each respondent. The emergent themes indicate the complexity of data collection in RSs as responses range from angry to content. The situation is further complicated as the themes are evenly split across all three levels of digital literacy.

Negativity towards the current situation was, by a distance, the most mentioned opinion. Respondents cited anger, fear and lack of control. 70% reported general unhappiness, often paired with the idea that regular people can't change anything. There is also a level of distrust, with 10% of respondents feeling stress and paranoia and 6% stating their devices are spying on them.

Positive emotions were also common. However, responses on the usefulness of RSs often appeared combined with feelings of negativity and helplessness, complicating the notion of data collection. 36% of respondents were 'not bothered' as their recommendations were often useful. However, these people were simultaneously uncomfortable not knowing what else is collected.

Desire for control was often wished for from the most knowledgeable and/or anxious participants.

In contrast, P65 was alone and content: "I'm not at all bothered. I've got no secrets."

Main Themes				
Theme	Associated Codes	Frequency of occurance	Excerpt from survey responses	Digital Literacy of respondent
Negative feelings towards the current state of things	Unhappy	123	"Very angry to be honest"	DI
			"I just make sure to have a life outside of what I do online, it's creepy if a machine knows me better than I know myself. I always feel good when social media reels show me stuff I really don't care about, I feel like I've won the game."	DIN
			"It's frustrating at best, sickening and worrisome at worst."	DN
	Privacy violation	23	"Extremely angry. Invasion of privacy"	DI
			"Nasty Business that doesn't respect privacy"	DIN
			"Often times it's helpful but there are times I wished it didn't feel like an invasion of privacy."	DN
Helpless feelings towards the current state of things	It is what it is	31	"Goes with the territory "	DI
			"I understand that is just the way it is and I am mature enough to accept it. I worry how it may impact on younger people or more susceptible people"	DIN
			"It is not something I support or am [comfortable] with, but rather something I have come to expect when engaging with any material online. "	DN
Desire for Control	Control of Recommend ations	17	"Pain - if I want info then I'll source it myself."	DI
			"I can't control this , but I wish to have this option"	DIN
			"Get fed up and bored seeing the same sort of crap being recommended or pushed all the time. "	DN
Positive feelings towards the current state of things	Useful	59	"Quite handy :)"	DI
			"I rather they wouldn't know so much about me but also it is helpful if they streamline the content "	DIN
			"Mixed. Sometimes you're happy to discover this other band from who knows where, at the same time, I hate it when you look at one video on youtube and suddenly every other video shown on your front page is a spin off."	DN
	Not bothered	55	"Well if other people are similar to me I guess they might like what I like so why not"	DI
			"Doesn't trouble me."	DIN
			"I don't mind services collecting my information if it is to be used to remember my address for shipping, or next time I check out. I do however mind if this data is then used for analysis, third party services and anything else that I did not agree to (or didn't really have a true chance to disagree to)."	DN
		308		

Table 1 Main Themes

Discussion

While previous literature highlights vulnerable users' susceptibility to the dangers of data collection in RSs, this study shows it is not exclusive. When explaining their opinion on platforms using data to personalise their recommendations, Participant 30 (a DN) stated, "This is not something I feel comfortable with in my day-to-day life, and I have previously fallen into online 'echo chambers' without realising it." Consider the significance of those with advanced digital literacy who *can* fall prey to the dangers of RSs and *are* falling prey to them.

All age and digital literacy groups reported a feeling of powerless exasperation. P30 continued, it "concerns me knowing (...) online echo chambers are (...) primary factors [in cultivating prejudiced] beliefs in certain online communities, which has directly translated into increases in hateful opinions/hate crimes in recent years." This apprehension highlights the pressing need for transparent data practices in RSs.

Despite users emphasising their unhappiness, many respondents were indifferent to platforms collecting their data. Varying opinions indicate a pluralistic approach to further research and design on this topic is required (Bardzell 2010). Indifference, however, did not mean the same thing to every participant. Some were unhappy but decided there was no reason to worry about something they couldn't control, supporting previous findings around consent fatigue. The themes of negativity, positivity, helplessness and a desire for control were present in every level of digital literacy, showing that all user groups have concerns (and disinterest) in data collection in RSs. These nuances further indicate the need for users to be able to fine-tune their consent practices online based on their personal values.

Furthermore, when people continue to use a service that worries them for lack of a better option, it raises a significant ethical problem. Platforms coerce users into agreeing to share their data or pay a "freedom fee" (Bloomberg Originals 2023: 00:04:49). In the case of Facebook, the proposed monthly fee to protect your data from advertising is higher than most users can be expected to pay (Milmo and O'Carroll 2023). Therefore, understanding this complex social environment and the varied nature of user opinions is vital for UX designers and policymakers to readdress user-oriented consent practices around data collection in RSs.

In addition, these findings challenge the conventional model of digital immigrants versus digital natives, supporting a nuanced understanding of digital literacy as defined by Yates (Yates and Lockley 2018; 2020).

On a social level, the dichotomy between knowing a company collects user data versus knowing *what* it collects and uses it for indicates a need for more general education on data collection in RSs. Balanced discussion is critical as paranoia around AI is widespread in the media (Savolainen 2022; Schaake 2023; Thornhill 2023; Joan Is Awful 2023).

On a less fatalistic note, users were generally irritated by inaccurate recommendations ranging from repetitive music to inappropriate adverts. In such situations, users reiterated the desire to control their recommendations. Control of our personal autonomy is a crucial starting point for future research in the field of HCI and further development of government regulations. If the community develops that control in an accessible way, it will allow users of all levels of digital literacy to participate, having given full, informed consent.

Limitations

Despite all participants being active online, some did not know how to complete the survey, meaning it missed some essential perspectives. Digital literacy is complex, therefore only 4 filter questions may not have accurately captured respondents' skills. Survey responses were self-reported, and participants may not have judged their knowledge accurately.

Conclusion

Recommender Systems are everywhere, and that's great. They streamline monumental volumes of content to something manageable and personalise it to boot. However, this study clearly highlights the usefulness of RSs is obscuring their dangers, leading users to consent to terms and conditions without fully understanding what that means for their data. Furthermore, the prevalence of a large 'in-between' section within digital literacy highlights that designers must complicate their understanding of user skills.

Participants' discomfort shows the need for the digital community to develop ethical products that go beyond basic user requirements. We need to design products that help promote user autonomy, allowing people to live according to their values no matter what.

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Appendices

A – Supplementary material

See additional documents within the submission folder for:

- *Cattanach Hannah_Ethics Review Form.pdf*
- *Cattanach Hannah_Research Proposal.pdf*
- *Cattanach Hannah_Survey.pdf*
- *Cattanach Hannah_Codebook.pdf*

B – Additional graphs

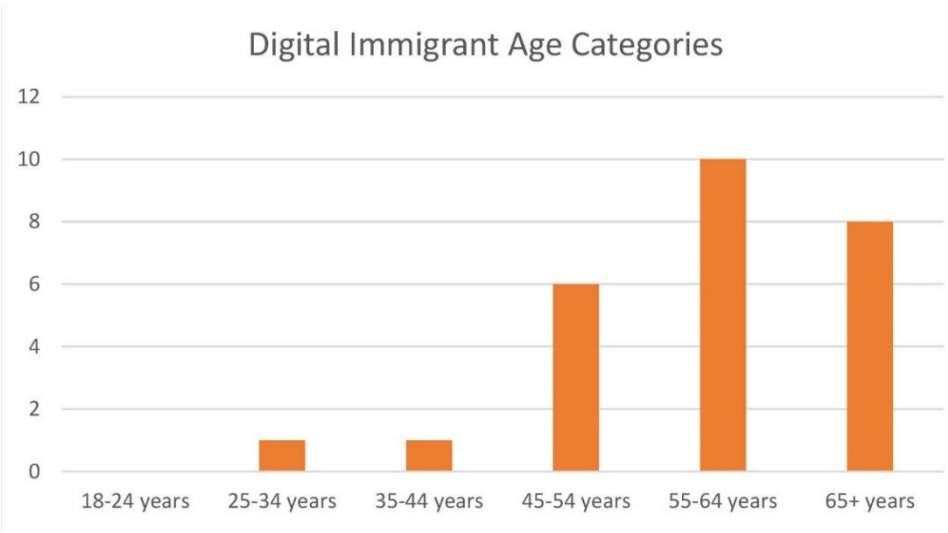

Figure 10 DI age categories.

DIs were most commonly found in the 45+ categories, but this was not exclusive.

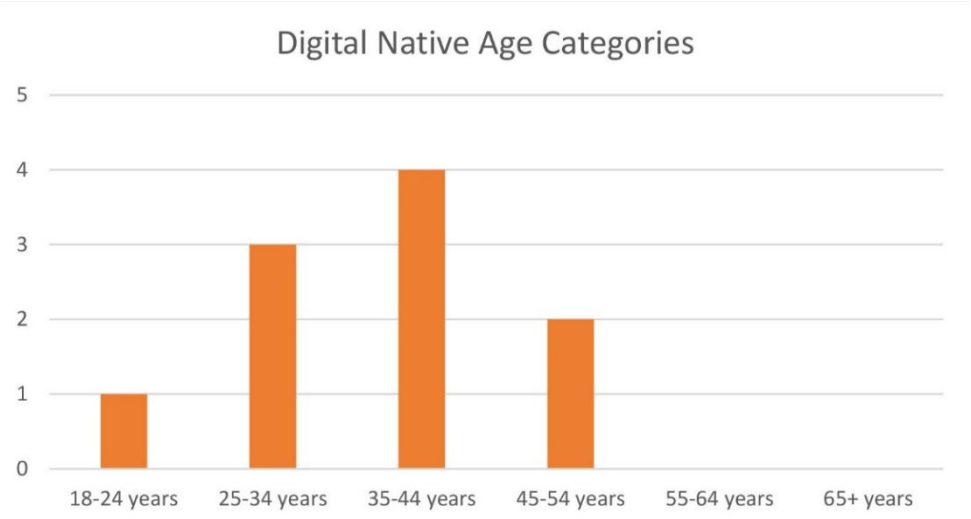

Figure 11 DN age categories.

DNs were found between 18-54 years.

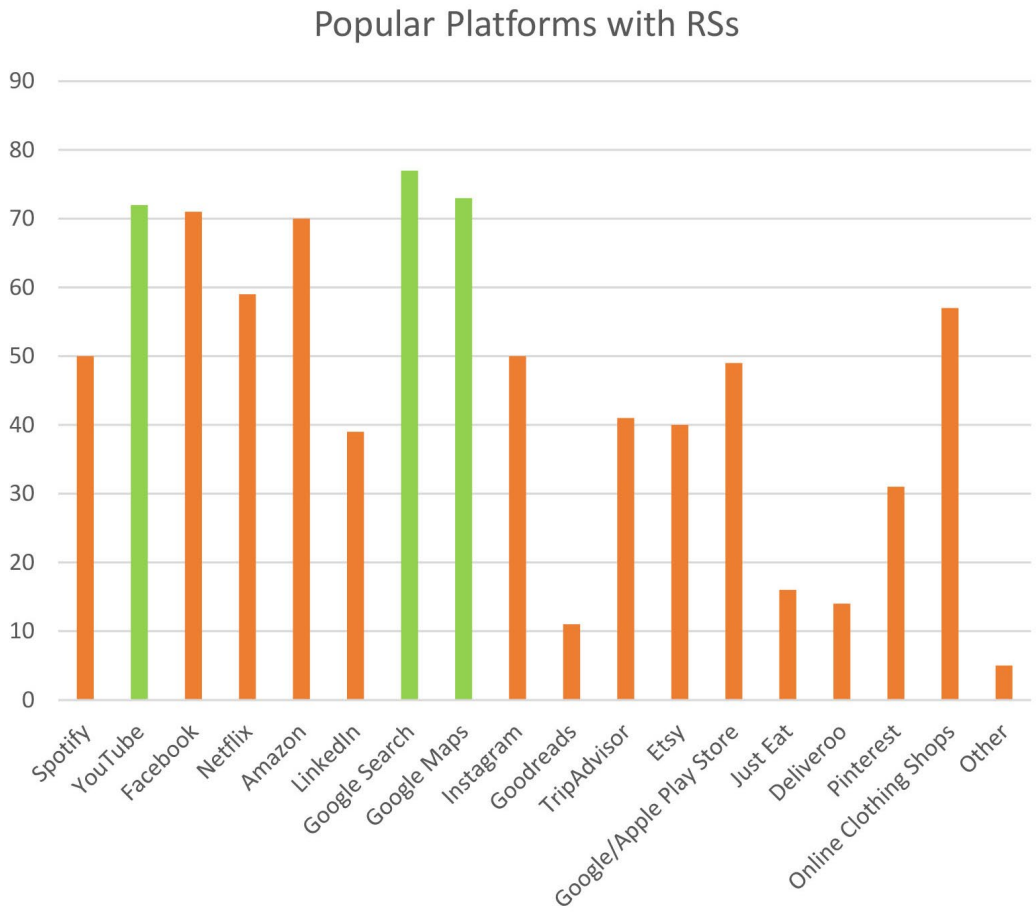

Figure 12 Platforms with RSs used by participants.

The top 3 platforms with RSs used by participants were 1 - Google Search, 2 - Google Maps and 3 - YouTube with Facebook and Amazon coming close in 4th and 5th place respectively.

C – Thematic map development

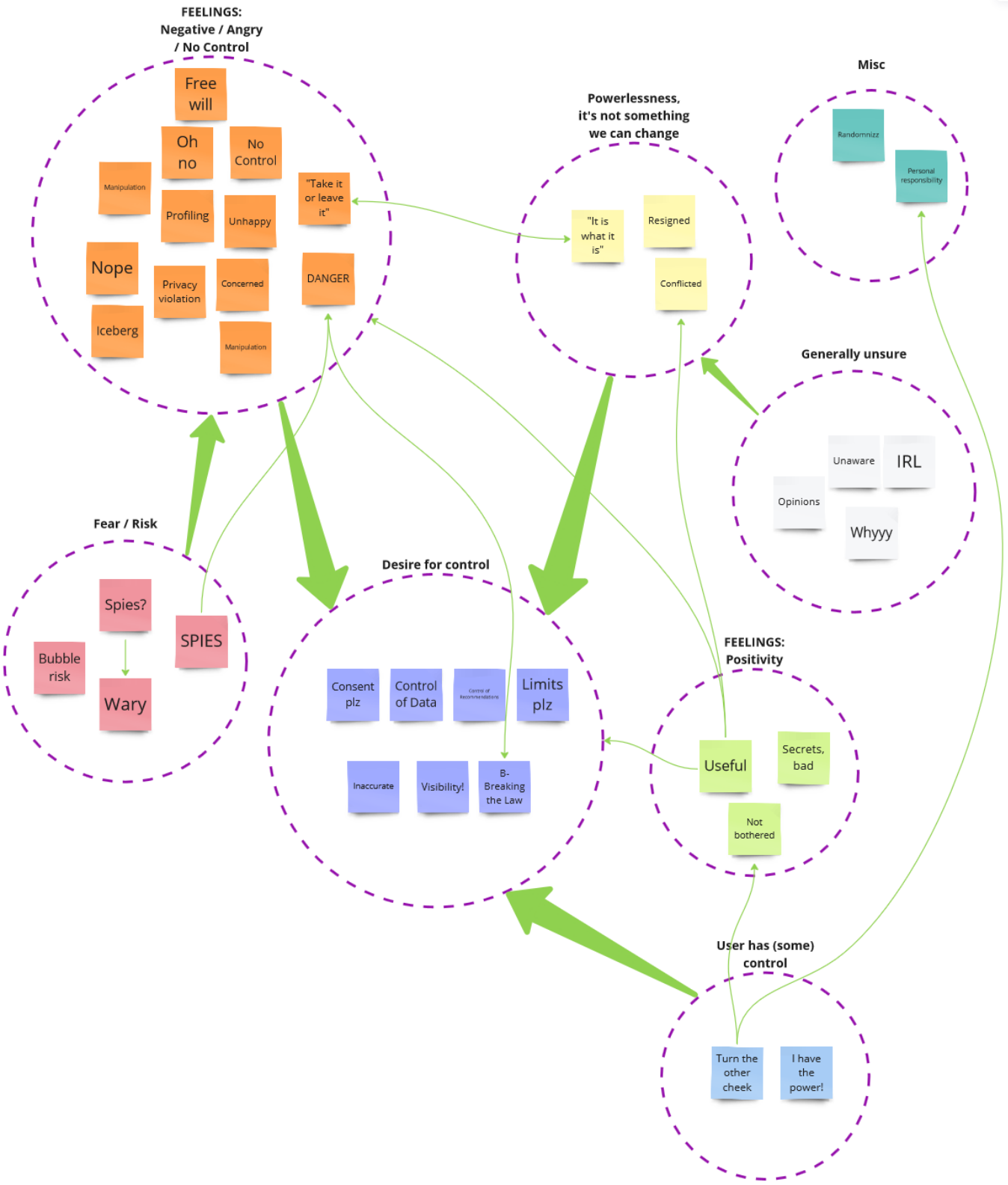

Figure 13 Thematic Map 1 - Initial groupings

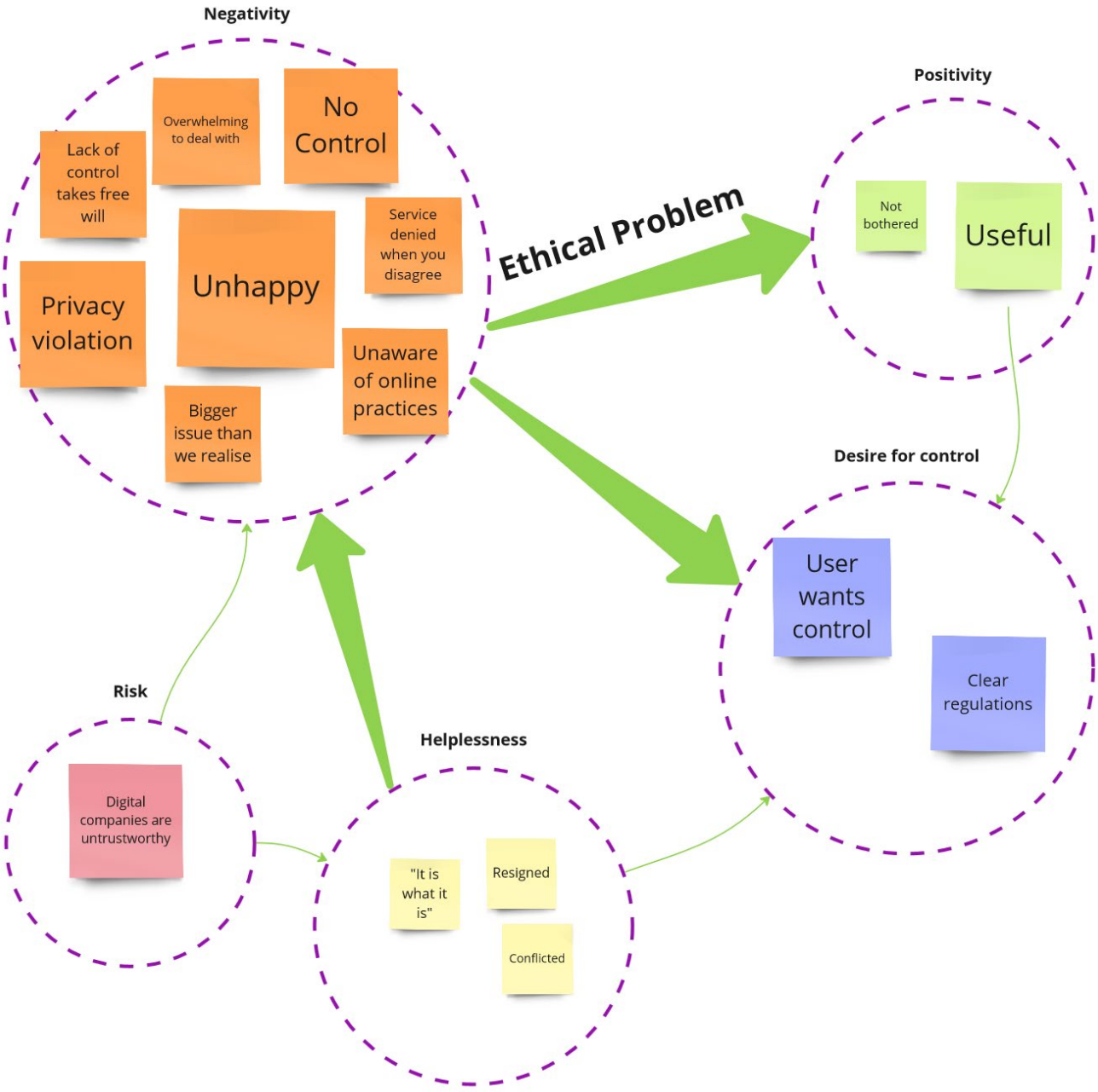

Figure 14 Thematic Map 2 - Developed groupings

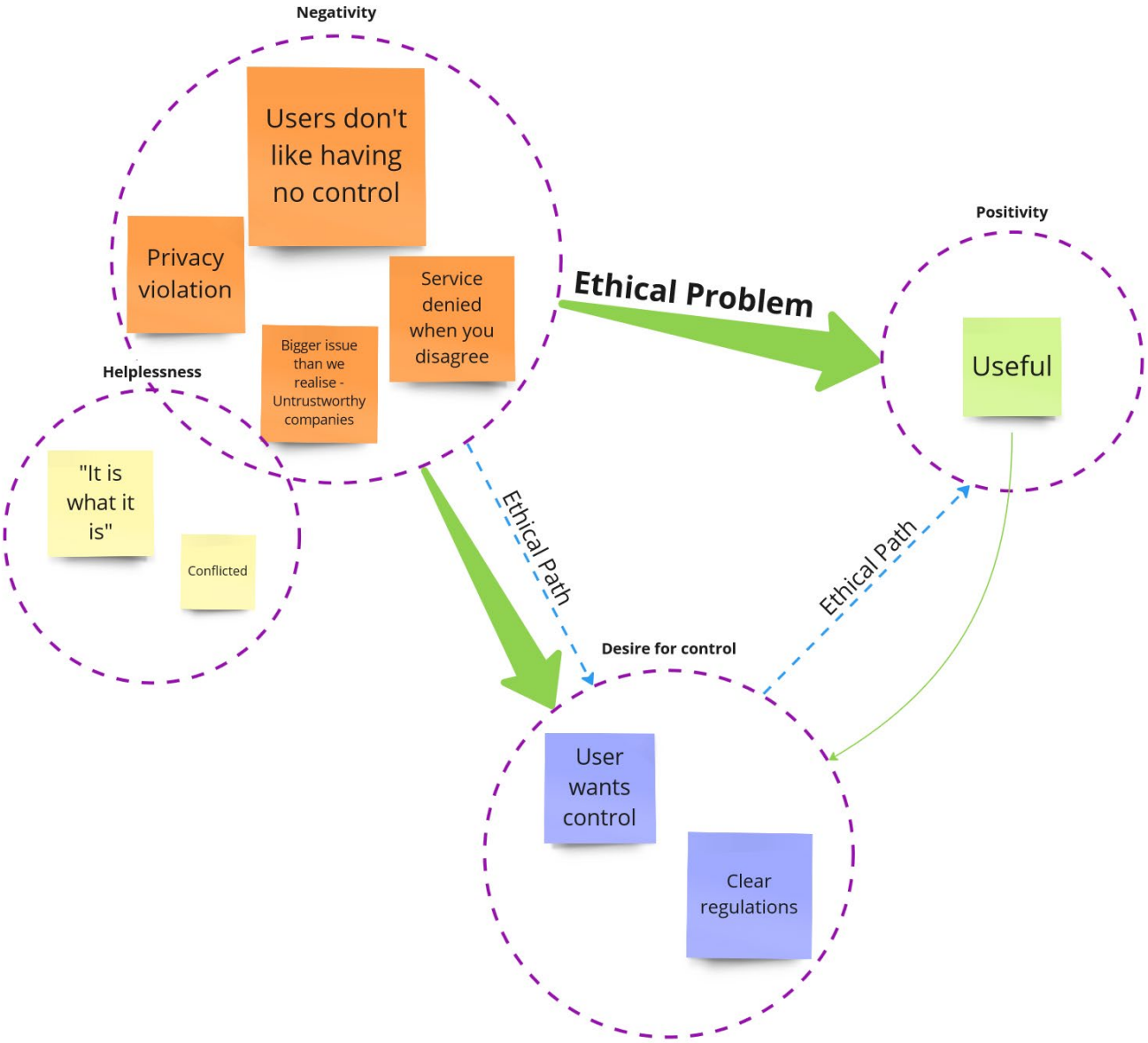

Figure 15 Thematic Map 3 - Final Map

D – Main themes expanded table

Main Themes				
Theme	Associated Codes	Frequency of occurance	Excerpt from survey responses	Digital Literacy of respondent
Negative feelings towards the current state of things	Unhappy	123	"Very angry to be honest"	DI
			"I just make sure to have a life outside of what I do online, it's creepy if a machine knows me better than I know myself. I always feel good when social media reels show me stuff I really don't care about, I feel like I've won the game."	DIN
			"It's frustrating at best, sickening and worrisome at worst."	DN
	Privacy violation	23	"Extremely angry. Invasion of privacy"	DI
			"Nasty Business that doesn't respect privacy"	DIN
			"Often times it's helpful but there are times I wished it didn't feel like an invasion of privacy."	DN
	No Control	22	"We live in a digital world [where] people like Mark Zuckerberg run the internet and there's nothing we can do about it, so just deal with it"	DI
			"Powerless "	DIN
			"Like your hands are tied. You can either not use a service, which has become integral to your life, or use it and deal with your lack of ability to have any control over it."	DN
	Oh no	17	"Scary"	DI
			"They want to sell me more and more stuff. They do get me even though I know what they're doing. Sometimes I find my self overwhelmed.	DIN
			"sometimes it's a good thing and makes searching easier, but at the end of day I can't control it and [it] makes me paranoid "	DN
Helpless feelings towards the current state of things	It is what it is	31	"Goes with the territory "	DI
			"I understand that is just the way it is and I am mature enough to accept it. I worry how it may impact on younger people or more susceptible people"	DIN
			"It is not something I support or am [comfortable] with, but rather something I have come to expect when engaging with any material online. "	DN
	Conflicted	17	"can be both good and bad."	DIN
			"not sure what I feel, not secure at least"	DN

Table 2 Main themes: expanded table with additional evidence 1/2

Main Themes continued				
Theme	Associated Codes	Frequency of occurance	Excerpt from survey responses	Digital Literacy of respondent
Desire for Control	Control of Recommend ations	17	"Pain - if I want info then I'll source it myself."	DI
			"I can't control this , but I wish to have this option"	DIN
			"Get fed up and bored seeing the same sort of crap being recommended or pushed all the time. "	DN
	Inaccurate	16	"It can be quite interesting at times. I sometimes enjoy going on to YouTube to see what they think I will enjoy. Sometimes it is right, sometimes wrong."	DI
			"Mostly think it's good. However I get bored with adverts for the same things, especially when I've already made a purchase."	DIN
			"I think it's creepy as ****. And they get it wrong 99% of the time. If you're going to be creepy, at least be accurately creepy."	DN
	Consent plz	16	"A bit scared that there's personal information about me out there I didn't knowingly consent to and what happens to it or how 3rd parties use it."	DI
			"I want those services to ask me what type of the information I prefer to share in easy and quick way."	DIN
			"I believe people should be free to navigate online spaces in the way they want, without these services cultivating their experience for them (especially without their knowledge)."	DN
Positive feelings towards the current state of things	Useful	59	"Quite handy :)"	DI
			"I rather they wouldn’t know so much about me but also it is helpful if they streamline the content "	DIN
			"Mixed. Sometimes you're happy to discover this other band from who knows where, at the same time, I hate it when you look at one video on youtube and suddenly every other video shown on your front page is a spin off. It just puts you into a basket way too quickly."	DN
	Not bothered	55	"Well if other people are similar to me I guess they might like what I like so why not"	DI
			"Doesn't trouble me."	DIN
			"I don't mind services collecting my information if it is to be used to remember my address for shipping, or next time I check out. I do however mind if this data is then used for analysis, third party services and anything else that I did not agree to (or didn't really have a true chance to disagree to)."	DN
		396		

Table 3 Main themes: expanded table with additional evidence 2/2