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Metaphors for Good Digital Identities

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Abstract

Digital identities are often discussed or explained as digital versions of physical documents such as passports. This metaphor tends to ignore, intentionally or not, the social challenges associated with real-world implementation of these technologies. This paper presents eight alternative metaphors for "good" digital identities which are derived from a 12-month Research-through-Design process. This process is presented as an annotated portfolio showcasing insights from a variety of design activities and stakeholder engagements, including design sprints, workshops, an artist residency and an exhibition, with the metaphors operating as "meta-annotations" on the portfolio. The eight metaphors intend to provoke and enable wider conversation with various stakeholders including academics, non-profits, industry professionals and policy makers about what "good" digital identities might mean, by focusing on societal rather than common technical concerns.

CCS Concepts

• **Human-centered computing → HCI theory, concepts and models**.

Keywords

digital identities, metaphors, digital good, design

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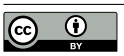
1 Introduction

Digital identities are commonly framed as digitalised versions of physical documents (such as passports) that help us verify *who we are* for businesses and service providers. For places such as the UK who are interested in creating "good" digital identities [31] but do not yet have systems implemented across society, there is comprehensive guidance. However, these guidelines tends to provide relatively high-level recommendations such as to create *"inclusive"* and *"secure"* systems [49, 55, 88, 120]. Whilst these sorts of high-level recommendations can be useful, it is unclear what notions such as "inclusive" and "good" really mean in the context of creating digital identities and also misses out how these technologies might be integrated into society.

Metaphors can help us explore thorny and difficult to define concepts related to emerging technologies in more concretised forms [38], with the dominant metaphor for digital identities being the commonly framed digital version of a physical passport. This focus implies that these technologies are simply replicating our current identification documentation in digitised forms to make common verification events quicker and easier to perform. This is partly true, but also (intentionally or not) excludes a significant number of known social issues which questions who these technologies are "good" for. Passports and other identification documents for some, are reminders of exclusionary state controls that create barriers and constraints rather than offer opportunities for convenience and safety e.g., the destruction of Windrush documents by the state which led to deportations of people who had lived in the UK for decades [76]. Digital identities have been found to create additional hurdles which can exacerbate these feelings. For example, when updating identity details that impact someone's ability to express their true identity [12], or new ways to access welfare services, which in turn impacts people's safety and lives [66, 87]. With metaphors possessing the power to *"shape the future"* [119] by simplifying and sharing our assumptions about the way things work, we argue that it would be valuable to explore alternative metaphors for digital identities from a range of different perspectives that embody different lived experiences. This requires questioning current assumptions [22, 41] embedded in digital identity metaphors by actively developing alternative metaphors that embody different perspectives of what "good" digital identity futures might look like (and if they are even possible).

This paper presents eight alternative metaphors for "good" digital identities which represent the authors' insights from across a multi-faceted 12-month Research-through-Design [48] (RtD) project. The various speculative design and provocative prototyping (or "provotyping") activities from this RtD project are outlined as an annotated portfolio to showcase the complexity involved in the presented metaphors. This comprised of three design sprints, various workshops, engagement with a diverse group of academic and non-academic stakeholders, a one-month artist residency and an exhibition. Acting as meta-annotations on the annotated portfolio, the eight metaphors are then presented. These embody a diverse set of perspectives around the future of digital identities which are not trying to resolve what "good" is but provoke questions about how digital identities might be considered "good", as well as the complexities within this. We conclude by packaging these metaphors as design concepts, acting as intermediate knowledge [68] that provides generative, inspirational ideas for the design and



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HCI community to utilise when considering what "good" digital identity futures might look like.

2 Related Work

2.1 Digital Identities

Digital identities encompass a set of emerging identification technologies (both hardware and software) including self-sovereign identity systems [27], biometrics [69, 84, 111], facial recognition [4, 5, 85], identification (ID) applications or cards [11, 15, 58, 70] and AI [121]. In this paper, we use the term *digital identities* instead of *digital IDs* or *digital identification systems* to encompass the whole process of identifying and being identifiable within these systems. Digital identities are used for both legal purposes and accessing products and services in person and online e.g., verifying your age to buy restricted products like alcohol or proving your credit rating to open a bank account online.

In some countries, digital identities have already been rolled out and are used by the general public to access services across society. For example, the Aadhaar system in India is the largest biometric identification system in the world [84] providing people with a unique identification number based on biometrics and demographic data that can be used to access government services, welfare schemes and mobile SIM cards. Estonia [109] has also introduced the first transnational digital identity scheme, creating an e-residency service that allows non-residents to access e-services regardless of citizenship. In other countries such as the UK, digital identity solutions are not yet widely adopted but are starting to be used to verify age for certain entertainment venues, collect post [122] and to evidence "right to work" [30, 112]. However, there is growing interest in exploring deeper integration of digital identities into public services and creating "good" digital identities, as seen through the UK Government's Trust Framework [31]. This framework forms part of larger UK Government initiatives to introduce a "Digital Information and Smart Data Bill" [57] that aims to establish digital verification services that can *"make people's everyday lives easier through innovation and secure technology"*, *"save people time and money"* and reduce *"costs, time and data leakage"* for businesses.

It is important to note that here the notion of "good" digital identities tend to be conflated with greater efficiency, data security and affordability of the underlying technology [55, 88, 117, 120]. This gestures towards the UN's Sustainable Development Goals target 16.9: *"provide legal identity for all, including birth registration"* [118]. However, this is a point of contention and as Cioffi et al., [28] argue there appears little evidence to suggest that digital identities are currently contributing to achieving this UN goal. This leads to questions about whether digital identities are indeed "good", and if so, when and for whom might they be "good"? In this paper, we follow The Digital Good Network's [110] emerging understanding of "good" through three major societal challenges; (1) equity, recognising how digital technologies mediate, sustain and challenge inequities including, but not limited to, race, gender, age etc., (2) resilience (collective wellbeing), highlighting the role digital technologies play in our wellbeing, mental health and recovery, and (3) sustainability, acknowledging the environmental impact digital identities have and how this alters relationships between the Global North and South. Our contention is that whilst the technical challenges required to make digital identities efficient, secure and affordable are important, there are significant social challenges related to these technologies, as seen in previously deployed systems, that require attention and discussion.

For example, digital identities can be seen to transform citizens into legible machine readable data points, referred to as "coded citizenship" [84]. On the one hand, as Weizberg et al., [113] describe this form of quantification can give *"power to"* people, as being recognised by the state provides them with access to essential aid and services. However, there are countless examples including digital identity systems in India [87] and refugee camps in Kenya [69] and Uganda [99] which highlight how digitised identity systems can have *"power over"* [113] individuals and communities, with errors or classification contentions that exclude people from essential services and protections e.g., food and financial aid. These systems have also been found to track and profile historically marginalised populations [87], with political environments [81] influencing how these systems are used in practice and who benefits from digital identities as a result. This highlights how new barriers and challenges can be created by digital identities, intended to provide equitable access to public services. A UK Government consultation in 2024 into trust in digital identity services [56] highlights a need to understand societal challenges and benefits such as inclusion and what digital identities offers users beyond convenience. This paper intends to offer insights into how these technologies might be integrated into society that acknowledges these concerns.

2.2 Conceptualisations of Digital Identities

HCI has a rich history of exporting and creating metaphors relating to emerging technologies. Metaphors have been used as a generative design tool, for example Lockton et al., [78] have showcased metaphor-based methods for reframing problems. Ricketts & Lockton [94] describe the value of externalizing mental models through metaphors and Logler et al., [79] present metaphor cards as a generative toolkit to support understanding implicit or hidden meanings within existing metaphors. Equally, design methods such as speculative design [40] have been used to develop alternative metaphors. For example, Pierce & DiSalvo's [91] work into Internet of Things (IoT), where alternative metaphors were developed to help explore alternative IoT devices. Metaphors can also help both familiarise people with technology and generate discussion, as shown by Desai & Twidale's [34] work into how people perceive voice user interfaces. Dove & Fayard [39] explore the origins of monsters applied to machine learning to challenge people's pre-existing assumptions about a technology during the innovation process. Others have critiqued existing metaphors as a means to prompt conversations. For example, Devendorf & Rosner [35] explore alternative metaphors related to the notion of "hybrid", while Alves-Oliveira et al., [2] explore how robots are understood in Human-Robot Interaction.

As shown, the use of metaphors in HCI and Design literature can be valuable in exploring, debating and critiquing emerging technologies – yet the use of metaphors to explore digital identities remains underdeveloped. Our intention is to present alternative metaphors that have emerged from a multi-faceted research-through-design process, as explained in the following section.

3 Methodology

Research-through-Design (RtD) is a methodology where design practice is used *"to bear on situations chosen for their topical and theoretical potential, [in which] the resulting designs are seen as embodying designers' judgments about valid ways to address the possibilities and problems implicit in such situations"* [51]. RtD is a common approach for exploring futures of technology and can be used to support generative exploration of challenges and opportunities with non-technical stakeholders in workshop settings [86], as well as explore longer term engagement with concepts and prototypes [52]. RtD can be seen as producing intermediate-level knowledge [68] where the design process produces knowledge different from generalisable findings in scientific studies, but insights which are less abstracted than theoretical knowledge. This type of knowledge is useful for researchers and designers providing insights to help generate ideas in their own research.

Our research uses RtD as an overarching methodology, taking the general principles of RtD such as openness to creative thought and ideas to produce intermediate-level knowledge through alternative metaphors for "good" digital identities. We intend for these metaphors not to be generalisable solutions for what "good" digital identity futures are. Instead, the metaphors synthesise different social considerations from a variety of perspectives across the RtD process as insights and reflections. The metaphors are generative, inspirational ideas, providing research reflection for what "good" digital identity futures might look like, helping provide starting points for future design research. To explain the process that led to these presented metaphors, we use "Annotated Portfolios" [50], a type of intermediate knowledge which showcases and reflects upon the various artefacts created throughout the process. Bowers [20] discusses the value of using annotations to highlight features and create *"topical discussion within a given community"*. Similarly, Gaver and Boucher [53], discuss how the process of abstraction and reflection on artefacts allow researchers to draw out themes that emerged throughout the process. These metaphors function as "meta-annotations" from the annotated portfolios to encapsulate synthesised insights and reflections from across this project. Figure 1 shows an overview of the entire RtD approach explaining how our process involved 3 design sprints including provotyping, workshops, an artist residency and exhibition which resulted in metaphors developed by the authors. The following sections explain this diagram in much more depth outlining the various activities involved and the themes which emerged from each sprint that helped contribute to the metaphors.

4 Design Sprints

4.1 Sprint 1 & 2 - Literature Scoping & Conversations with Experts

Sprints 1 and 2 began with a scoping stage whereby the researchers explored the literature. The areas of contention around what "good" digital identities are explained in Figure 2 as a geographic map. For example, there are two islands surrounding language in the literature. The first island debates the use of the word "good" versus "fairness" and "justice" [14, 99], as well as the difference between "identity", "identifying" and "identification" [28, 83, 105]. The second island focuses on vague terminology (buzzwords) associated with these systems which might require clarity, for example what constitutes "secure" or "inclusive" [49, 55, 88, 120]. This scoping stage also involved meeting and having conversations with various experts in different domains to generate themes and ideas for the sprints.

4.2 Sprint 1 & 2 - Fictional Artefacts (Provotypes)

The second stage of Sprint 1 & 2 used speculative methods [29, 40] [28, 38] to design various fictional artefacts, which we refer to as provocative prototypes or "provotypes" [100], to provoke debate around the selected theme. Notably, speculative methods have been used within identity literature to explore worlds particular communities might want [7, 19], create more inclusive discussions [24] and provoke debate [10]. In this process, our use of provotypes is to draw in multiple voices in subsequent stakeholder engagement events in order to surface normative notions embedded within existing designs and challenge what "good" digital identities might mean from different perspectives, with provotypes used in workshops, as explained in section 4.3.

4.2.1 Sprint 1 - Digital Identity App. To begin exploring what future digital identity systems might look like, we wanted to aggregate common verification processes into a singular fictional government digital identity app. The app was digitally prototyped for a smart phone (see Figure 3) with a selection of different screens. These began reflecting existing digital identity applications and became more speculative to provoke debate on different specific areas (see Figure 4). For example, verifying identity QR codes popular in current digital identity applications such as Aadhaar [58], Identity One [71] and Australian Post Digital ID [11]. Additionally, combining identity attributes from existing documentation e.g., Yoti app [122] and similar government initiatives where you could earn rewards in exchange for data [32], highlighting potential directions the app could take. A series of short videos were produced to introduce the app as if created as short social media ads developed by a government agency. To further explore the world surrounding the app, a fictional government press release was created, and screenshots from fictional YouTube videos discussing the integration of digital identity systems into public services (see Figure 3).

Figure 4 presents various features of the app inspired by different areas of literature around identity representation from personal informatics to online identities. This included the ability to connect your legal identity to social media profiles [36, 61], inclusion of education records into legal identities [74, 90, 105], potential for auto-generated / predicted attributes to fill gaps and ability to track touchpoints in real-time [80, 82], the potential to form family identities or collective identity support units, and options to donate real-time data to different causes [17, 54, 67, 107].

4.2.2 Sprint 2 - Rights Associated with Digital Identities. The second sprint focused on human rights associated with digital identities. We intentionally sought to move beyond "app as a solution" and focused on social aspects of identities. This sprint began by questioning how digital identities might be used at different points in

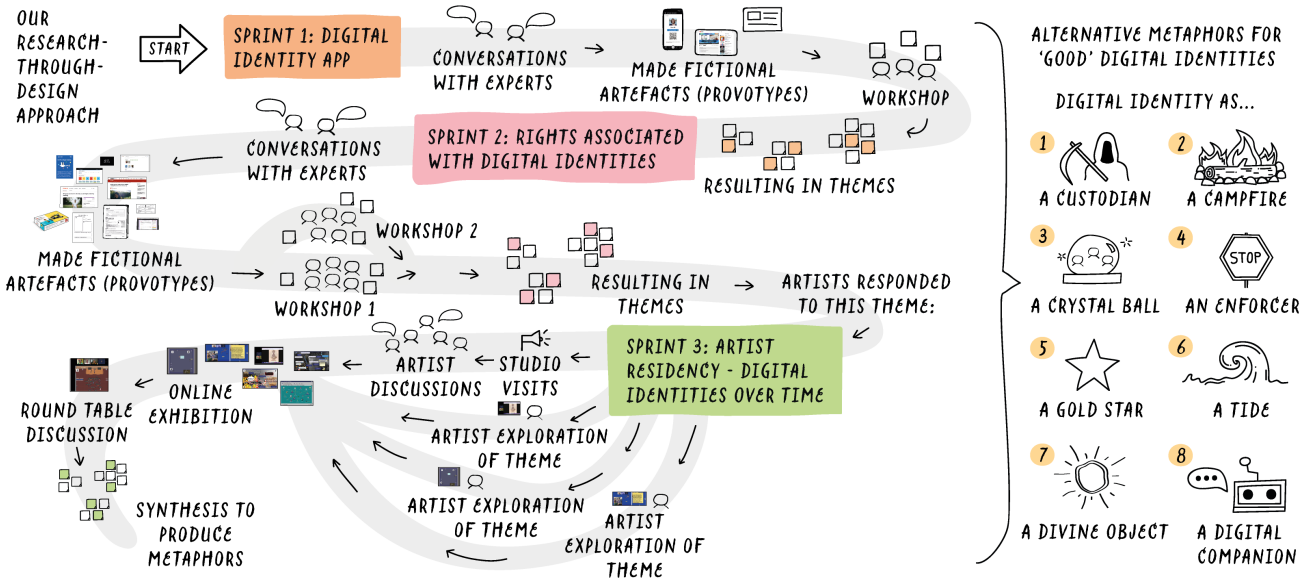


Figure 1: Overview of the Research through Design process.

a person's life. We first considered when digital identities might be issued and how. As shown in Figure 5, this resulted in the creation of a "My First Digital Identity" guidebook for parents which outlined how new digital identities would be issued and connected to traditional documentation e.g. birth certificates emerging from literature around children outgrowing identities [97]. This applied focus to a transitional period whereby some systems are digitised and others are not, it questioned who would have responsibility for digital identities during different times in a child's life. Next, we considered the mutability of digital identity data captured during a lifespan [43]. To do this, we created a government dashboard that allowed users to delete different branches of data, and considered the knock-on effects that this might have in terms of eligibility for services, similar to that of the Wayback machine [72]. We then considered how long digital identities might last, and what might happen to them after we are gone. To do this we created a Google Ancestry page that would auto-generate family trees and provide open and searchable documents for all, inspired by personal informatics literature [44, 59]. We also considered a more closed option whereby people would sign up for ID archival in the same way that people sign up to become organ donors.

Following our exploration of birth, life and death of a digital identity, we focused on the visibility of digital identity. As shown in Figure 6, this questioned the ways in which migrants, LGBTQIA+ communities and political activists could be impacted by increased visibility, inspired by rights groups and academics work into identity exposure [1, 6, 9, 18, 83, 101, 102]. This was done through the creation of fictional articles and forum posts that identified specific challenge areas relating to deportation, doxing, gatekeeping. Finally, we explored the question of what 'informed consent' might look like, and whether enhanced digital literacy might support this inspired by Barbosa's exploration into digital inclusion in digital identity [14] and Smertnik and Bailur's work exploring children's perceptions of digital identities [13]. To do this we created a school exam paper that contained a series of questions that we might expect people to be able to answer if they had satisfactory digital literacy relating to digital identities. We also created a digital identity LEGO kit targeted at younger children as part of an educational initiative to enhance literacy. These artefacts acted as an entry point to a larger discussion around digital literacy across a person's lifetime and was not limited to early years education.

4.3 Sprint 1 & 2 - Workshops

The third stage of sprint 1 & 2 involved participatory engagement with stakeholders. During sprint 1 & 2 we ran 2-hour online workshops where participants were shown provotypes which helped focus discussion on themes related to "good" digital identity futures. Sprint 1 involved 3 designers whereas sprint 2 consisted of 2 workshops – the first with six participants from sociology, economics, education, computer science & the non-profit sector and the second workshop had five participants from law, political geography, design, sociology & computer science. All workshops and engagement activities that involved participants were granted ethical approval by an institutional ethics board, and participants were recruited using a combination of social media and posting on the project's newsletter via a Qualtrics form. During each sprint, workshops were recorded and transcribed, then thematic analysis was [23] conducted from both verbal and activity responses e.g., post it notes.

4.4 Workshop Themes emerged from Sprint 1 & 2

Thematic analysis was undertaken to explore patterns across all the data gathered, offering a flexible approach to reflect on our

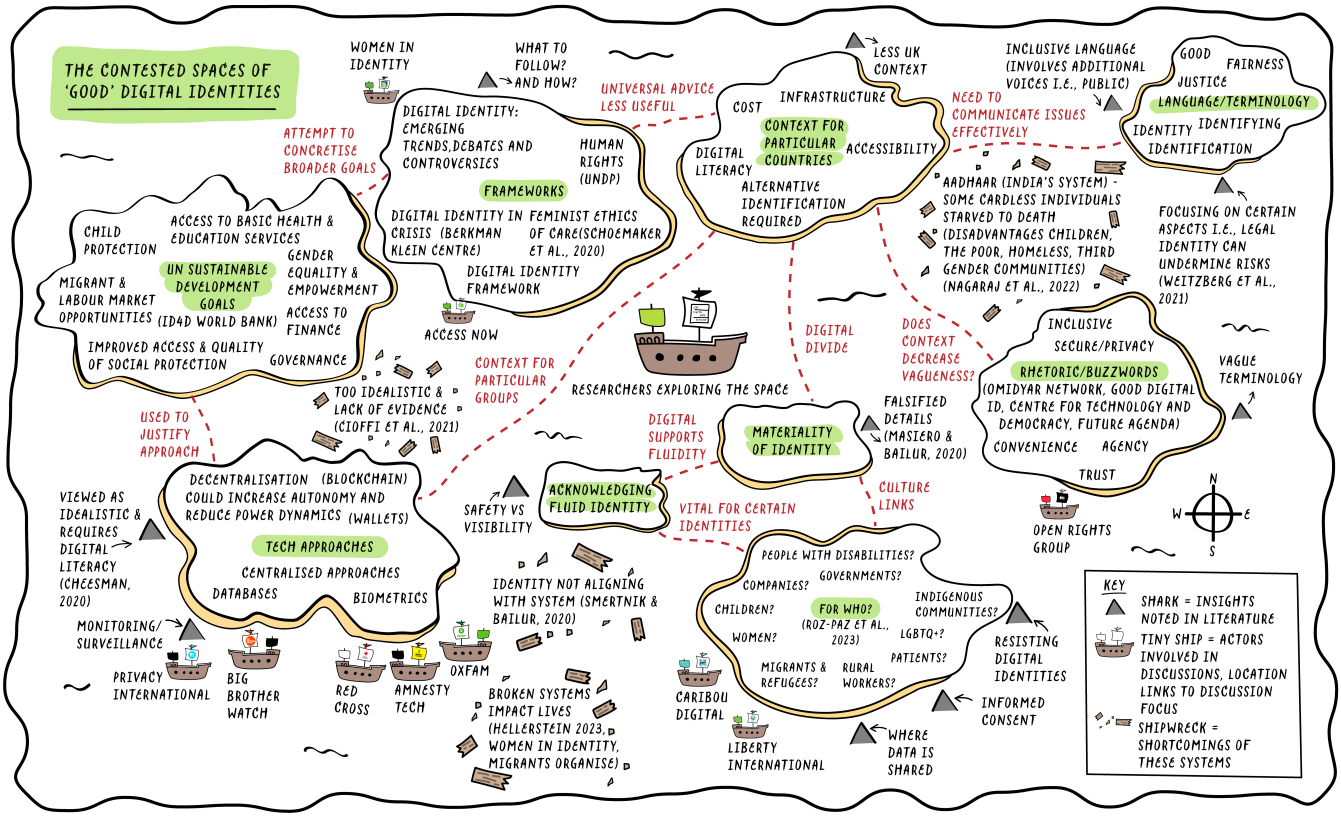


Figure 2: The Contested Spaces of 'Good' Digital Identities Map. Each island shows a key theme discussed in digital identities literature in relation to 'good', these being: UN sustainability goals, frameworks, context that might be required for particular countries, language/terminology used in relation to 'good', rhetoric/buzzwords linked to 'good', materiality of identity, acknowledging fluid identities, questions around good for who? And technological approaches. Sharks show emerging insights noted around these themes and ships show actors involved in discussions. Shipwrecks showing challenges with existing systems e.g., the shortcomings of these systems. Dotted red lines show connections between these themes.

process including surfacing assumptions from the creation of the provotypes. Initially a semantic approach was taken, forming numerous codes from workshops to reflect participants' responses to specific provotypes they were shown. This was so we could understand the influence the provotypes had on the direction of discussions. Following each sprint, initial themes were derived from these codes to surface more implicit meaning around perspectives of what "good" digital identity futures might mean. For example, 7 initial themes during sprint 1 including fragmentation as a feature not a bug, afterlife IDs and the digital divide and 8 initial themes during sprint 2 including fragmentation needed to prevent context collapse, legality of IDs and permanence of IDs. An example of these themes that emerged during workshop discussions can be seen in Figure 7. As we reflected on and disseminated the insights from this project, further synthesis of these themes took place, sometimes merging overlapping themes to better represent shared meanings e.g., fragmented identities to better represent themes of fragmentation throughout the process. The annotations in our annotated portfolio are supported by the thematic analysis conducted during each sprint. However, they also include the researchers' subjective insights and designerly reflections derived from the RtD process itself.

In this section, we discuss some of the themes that emerged from these workshops and related RtD processes that shaped our annotations. Direct quotes used are a mixture of verbal and post it note responses, as such these are not attributed to a particular participant.

4.4.1 Afterlife IDs and the Permanence of ID . Afterlife IDs emerged as an early theme from sprint 1 and were further explored more directly in sprint 2. In sprint 1, a participant had asked *"what happens to all of this information if someone dies?"*, which had led to discussion about the purpose of keeping digital identity data, whether this would be *"passed down to next of kin?"*, and also the potential legal aspects of death such as wills, inheritance, taxes. Workshop discussions also noted the potential memorial aspects of digital identities, helping families to remember and reflect on a person's life and preserve their memory. There was also discussion about what aspects of a person's identity might remain and be documented indefinitely, i.e. would this be *"basic demographics"* for *"longitudinal research"* or part of *"countries census"* data. Participants tended to assume that

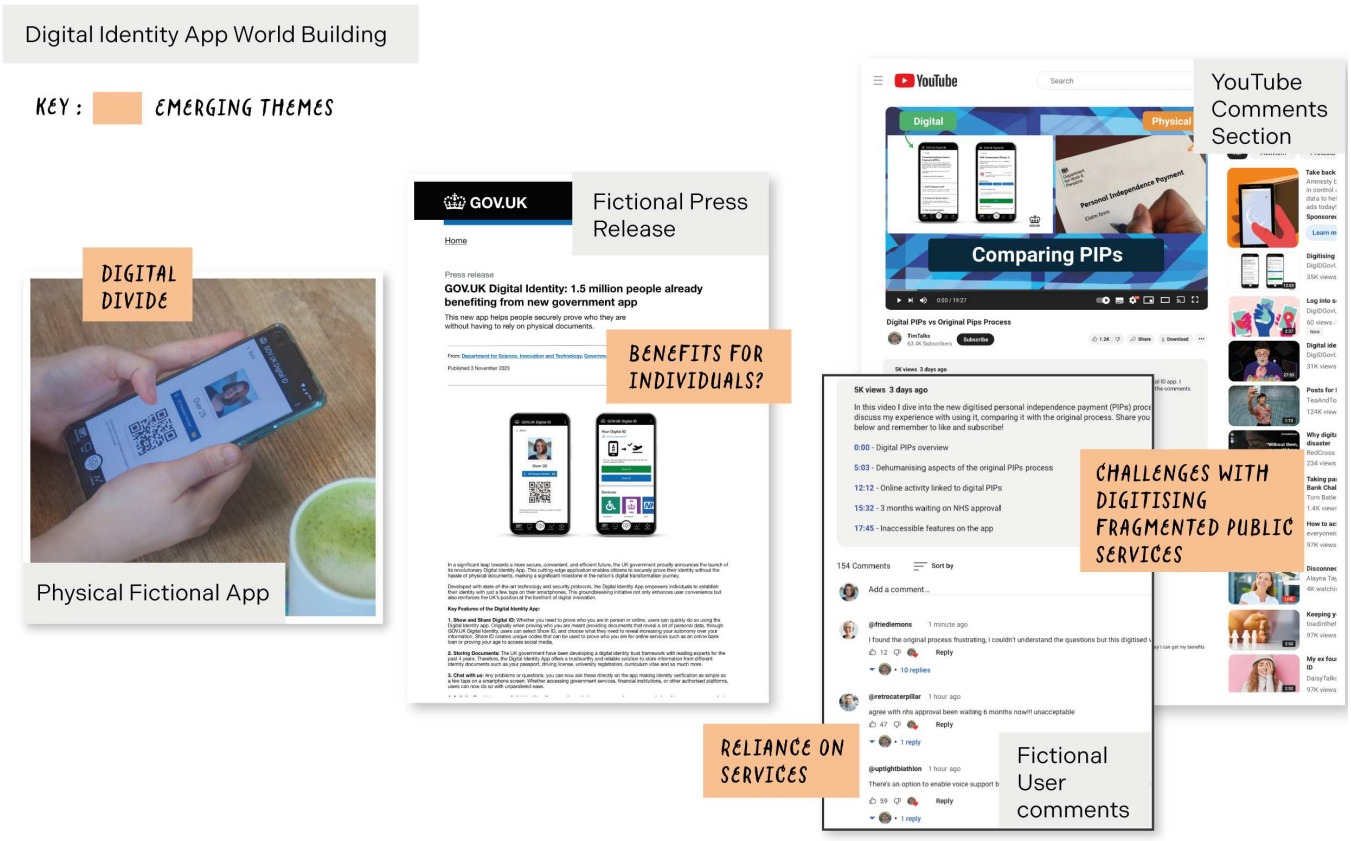


Figure 3: Provotypes created exploring a fictional government digital identity app. Provotype details are not intended to be readable at this scale.

data could not be easily *"wiped away"* and may even require legal proceedings to decide what happens to a person's digital identity after they are gone. Participants also acknowledged the potential burden involved within these processes such as if family members are *"not willing to maintain a digital ID, despite the person's wishes"*. Equally, questions remain about the permanence of the data collected e.g. would there be a *"transitional point"* like *"juvenile records which are sealed"* once someone becomes a certain age.

4.4.2 Fragmentation of Identity . Fragmented identities or separate identities that prevent context collapse was a reoccurring theme [36, 123]. This refers to boyd's work [21] which explored how social media platforms could fail to represent different aspects of our identity for different audiences resulting in a *"context collapse"*. Participants noted that certain information might be kept *"incredibly private"* to keep someone safe e.g. related to gender or sexuality. There were concerns about the accumulation of data in centralised bodies/authorities such as governments or businesses. This concern was primarily related to levels of *"surveillance"* and mistrust in how that data might be used to quietly categorise individuals which could be shared *"without your permission"*. Participants referred to this becoming an *"unconscious thing that's ingrained within our society"* and *"conveniently forgotten"*. From here, the idea of *"fragmentation as a feature rather than a bug"* was discussed, embracing positive decentralised approaches to resist power and control, and increasing safety rather than viewing fragmentation as a "bug" or something which needs to be fixed.

4.4.3 Cultural Identity Construction . Participants described how digital identities are only a *"subset of identity"* capturing one small part of identity rather than the *"multiplicity"* including culture and history. Tensions related to *"heavily western perspectives"* of identity were discussed, leading to questions about representation of identity and ways in which communication differences such as *"oral histories"* may alter the way identities are constructed and understood. Similarly, the way language changes how we talk about certain identity attributes was noted: *"Inuit cultures that talk about having a spiritual gender as well as having a sort of physical gender"*. The ways in which different cultures will or can use these systems was discussed also, for example, one participant noting that from an Indian context, communities can have *"a significant amount of parental controls in children's lives"* with families often living together into adulthood. To consider multiple and marginalised

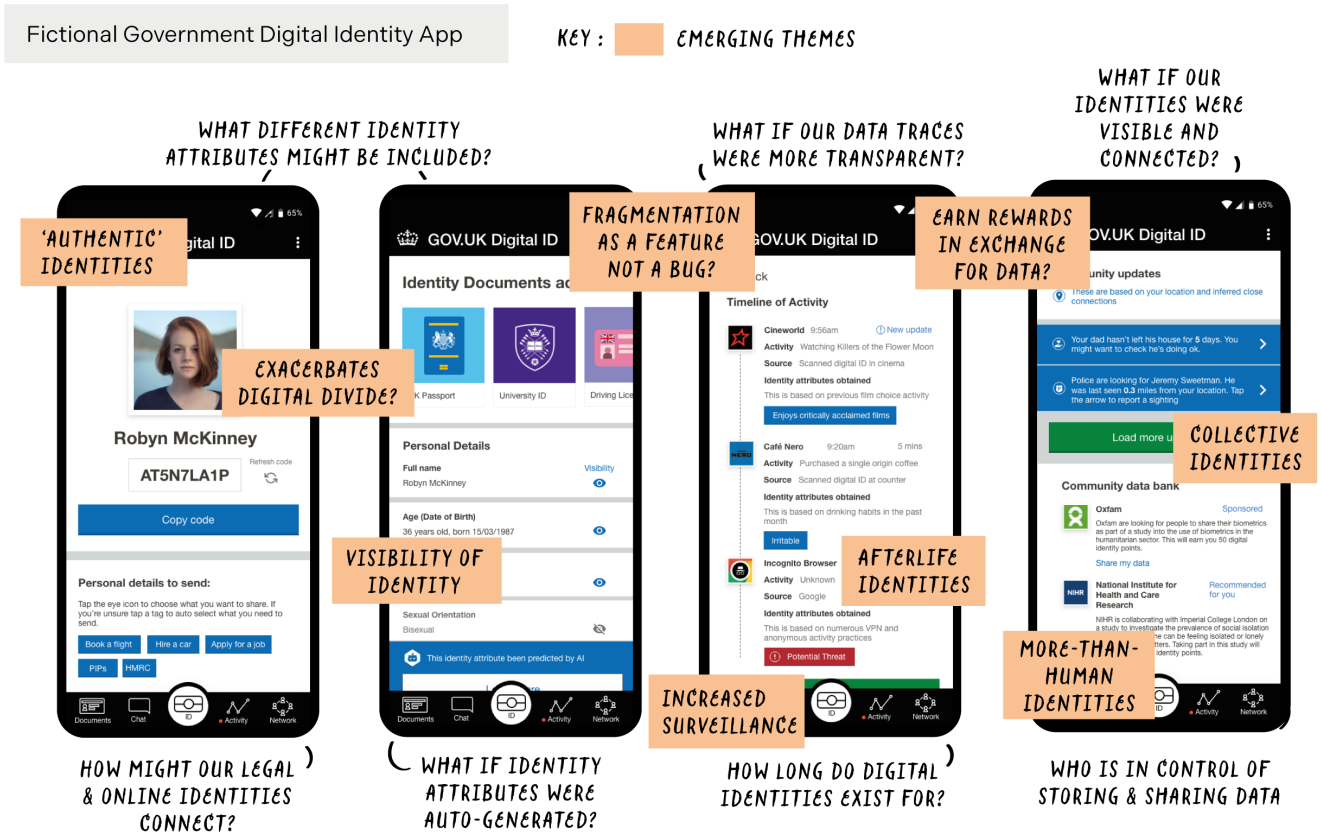


Figure 4: Emerging themes and questions explored in different screens of the phone app. App screen details are not intended to be readable at this scale. To see the phone app in action please see our playlist of short fictional advertisements.

perspectives of identity, there were suggestions to focus on grassroots approaches such as community initiatives to *"leverage existing systems in the real world"* first.

4.5 Sprint 3 - Online Artist Residency

In questioning our own positionality, our third sprint sought to draw in different voices from individuals with different lived experiences to help us run a series of parallel sprints that explored a reoccurring theme from sprint 1 and 2 about identities across a person's lifetime. This can be seen through the themes discussed in section 4.4.1 - 4.4.3 which highlighted questions across the workshops around our identity after we are gone, the complexities of identity fragmentation as well as future considerations for identity management in the different ways culture influences how identity is understood. To do this, we designed and ran a one-month online artist residency exploring this theme titled as: *Digital Identities Over Time*. The residency was hosted in a custom designed online space in gather.town where artists and researchers would meet to discuss ideas and explore concepts, as can be seen in Figure 8.

The artist residency itself was multi-faceted and the process involved can be explored in a separate paper [103]. Three artists were recruited via a competitive selection process whereby they applied to join the residency through advertisements on social media and the project website. Artists were paid a total of £2,500 for their involvement in the residency. These costs covered a residency fee to cover their time and a production fee for the work produced for a final exhibition. The artists worked with us for a one-month period, where we regularly met them online (as digital avatars). The residency culminated in an online exhibition and launch event where we provided a 2-hour online guided tour of the curated exhibition spaces and also hosted a roundtable event whereby invited experts joined the artists to publicly discuss the work and its relation to future digital identities. The reasoning behind a digital/online residency was to ensure we could reach international voices within the limited time frame of this project.

Artists were given the freedom to respond to the theme based on their digital identity interests. To mitigate the risk of these contributions seeming disparate, the researchers' contribution to the exhibition was the creation of "metaphor rooms". These connected the artist works during the guided tour, which audiences could move through on their way to the artist's works. These rooms provided a way for us to trial our emerging metaphors 'meta-annotations'. Therefore, we considered the exhibition as an interactive annotated portfolio whereby our metaphor rooms were functioning as annotations for the wider work and discussion that took place. The rooms

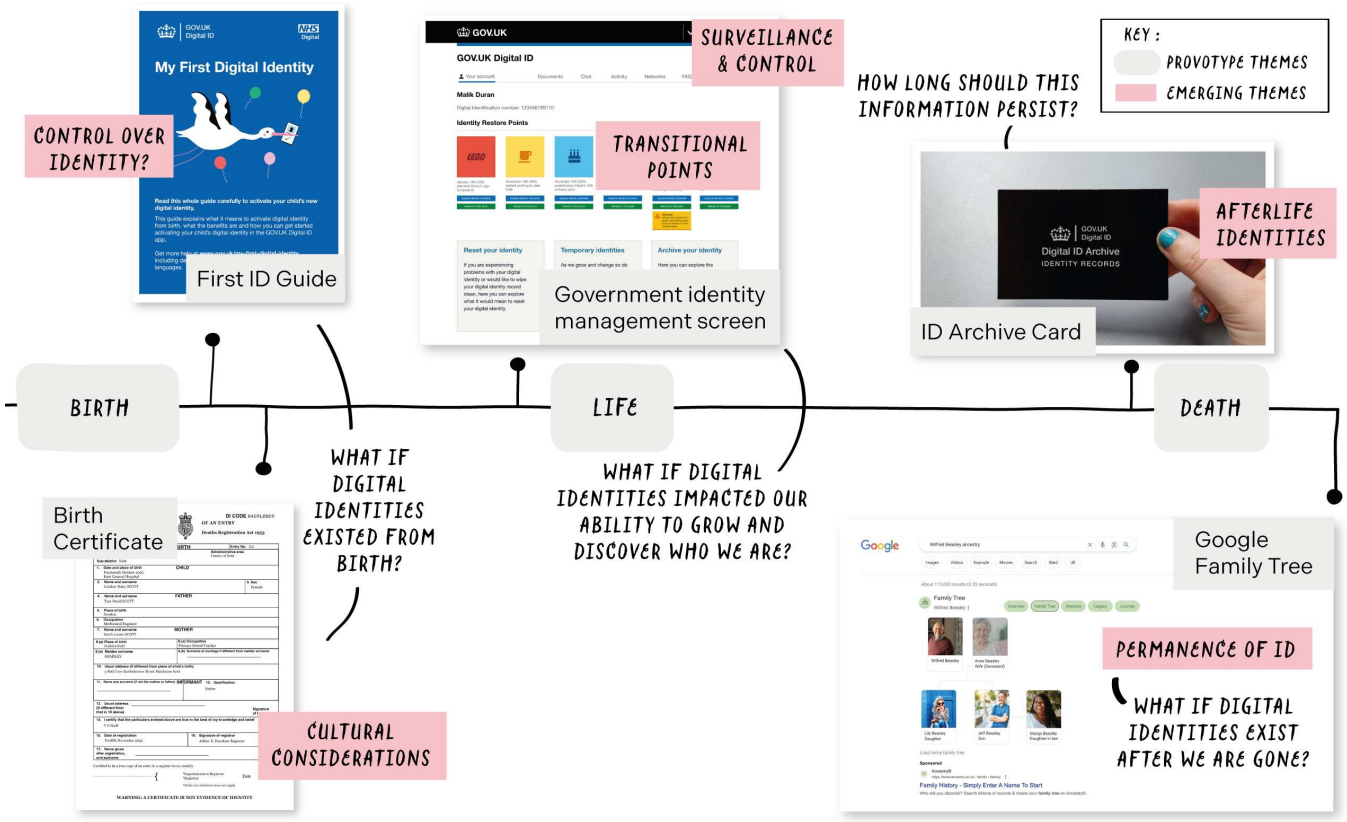


Figure 5: Provotypes created around digital identities over time looking at 3 time points: birth, life and death & the themes that emerged. Questions surrounding the provotypes helped to create the final provotypes shown. Details of the provotypes are not intended to be seen at this scale.

contained a collage of images alongside annotations to consider digital identity "as something" e.g., as a grim reaper or story. This provided audiences less familiar with creative exploration with memorable takeaways from the exhibition, to start thinking about what "good" digital identity futures might mean. These metaphor rooms can be seen in Figure 9 with the final synthesised metaphors presented in section 5.

4.6 Overview of artist work and emerging themes

Each of the three artists in residence produced a stand-alone work that explored the idea of "good" digital identities. We now provide an overview of the works produced, and the questions and themes they explored (Figure 10).

4.6.1 Archived and Remembered Identities. Anshul Roy is a visual artist, based between New York, USA, India and London during the residency. Their work is inspired by Postcolonial discourses, exploring issues like cultural representation, identity, historical memory and visual ethics. Anshul produced a Google Chrome extension & a performance art piece as part of their ongoing project "*Rage Against the Archive*" [96]. The Chrome extension blocks content on the New York Public Library's website [95], to critically examine how archived image collections like *The People of India* might be more ethically consumed by future viewers. Through a lecture performance, Anshul highlighted how colonialism and violence are embedded within these images and often taken without consent by those in power, preserving identities in a particular way. This performance used examples from *The People of India* to explain how, through digitisation, moments of extreme grief and violation are available for anyone to see at any time. Anshul's work extends themes which arose from the first two sprints, further questioning the purpose of our identity after we're gone. This includes examining what informed consent looks like in these systems, raising questions such as do people have a choice to identify or are there power dynamics at play which results in some people having to unwillingly consent to be identified within such systems?

4.6.2 Life Transitions. Jeanne Jo is a visual artist and film maker, based in Los Angeles (LA), USA during the residency. Their work uses single-channel and multi-channel narrative film, large-scale video installations, and durational performance to explore themes such as power dynamics and interpersonal relations. Jeanne produced a short film exploring how one's online identity might act as an anchor to their past selves. The film shows a grid of CCTV

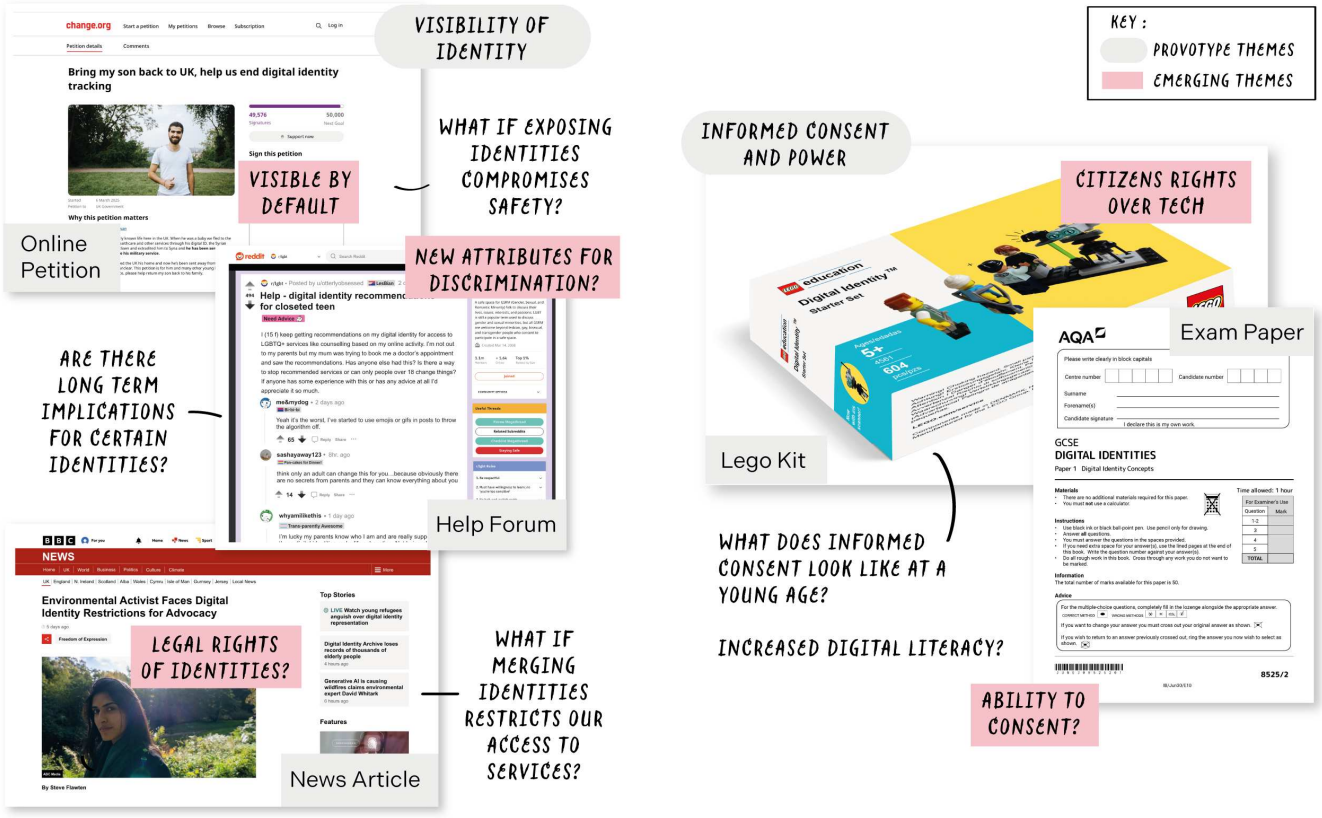


Figure 6: Provotypes created for sprint 2 around the themes: visibility of identity & informed consent and power. This image shows the themes that emerged and the questions that helped to create the provotypes shown. Details of the provotypes are not intended to be seen at this scale.

cameras filming a construction site in LA with three characters representing the same individual at different points in their life meeting for the first time. The work questions how identity is represented online, challenging understood notions of truth, fragmentation, transition and the potential utility of digital identities to steer life decisions. There are also broader themes around how this data might be used for surveillance, monitoring and control, given the need to amalgamate these separate identities into one coherent representation of ourselves that can be used to understand us in ways that might be unknown to us.

4.6.3 Unknowable Identities. Mac Andre Arboleda is an artist, based between Paris and London during the residency. Their work explores a term they coin as the "sickness of the internet" through research and dialogue, art and text and organising and publishing. Mac produced a performance art piece, inspired by Jonathan Beller's book *"World Computer: Derivative Conditions of Racial Capitalism"* [16]. Participants entered a blue room filled with pixelated interactive computers. Some of the computers could be used by participants to write prayers and affirmations related to their own personal identity. Participants then collectively turned their cameras on and stepped out of shot for a short period of time as music played. Upon returning, the screenshots of the participants' physical backdrop had been added to the space in a move intended to provoke discussion about feelings of intrusion, privacy, and unknown use of personal data. Mac's work drew from an ongoing exploration of a "divine image", arguing that there is more to identity than what can be known through a digital image. This raises questions about what is not known, cannot be known or captured about identity through these systems.

5 Alternative Metaphors for "Good" Digital Identity Futures

In this section we present eight alternative metaphors for discussing "good" digital identity futures, to inspire new questions about these futures based on insights and reflections from across this process. Figure 11 illustrates where these metaphors emerged across our RtD process. Digital identity as a digital companion, campfire, gold star, tide and an enforcer can be seen as emerging from the provotypes and associated insights during workshop discussions. Digital identity as a crystal ball, divine object and custodian emerging directly from artist explorations, as will be explained in each of the relevant metaphor sections that follow.

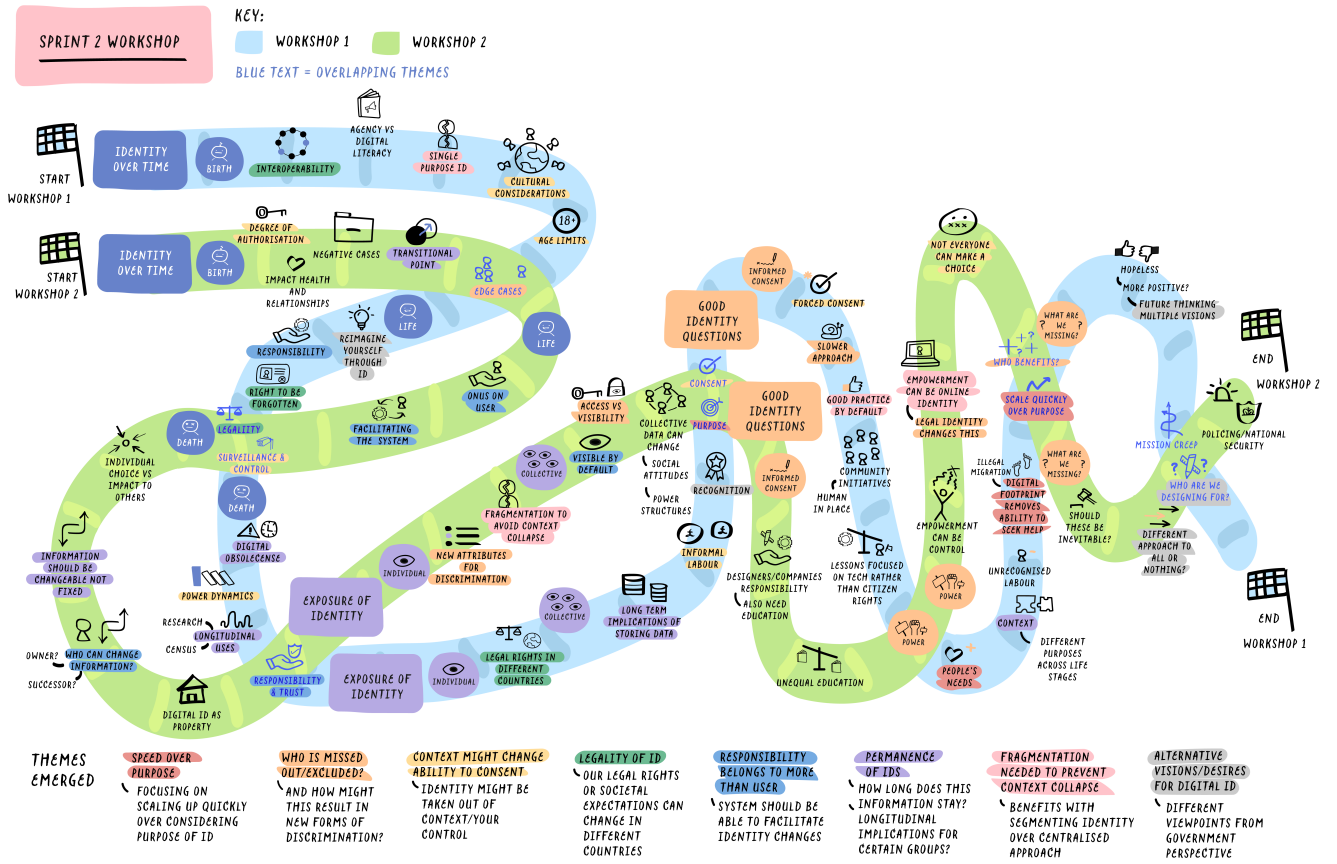


Figure 7: A diagram showing workshop discussions from 2 workshops during sprint 2. The top path represents conversations which took place in workshop 1 and the bottom path represents conversations that took place in workshop 2. Each session was shown the same provotypes around three themes: identity over time, exposure of identity and good identity questions. Themes that emerged across these conversations are highlighted throughout the paths and then described briefly below these paths: speed over purpose, who is missed out/excluded?, context might change ability to consent, legality of id, responsibility belongs to more than user, permanence of IDs, fragmentation to prevent context collapse and alternative visions/desires for digital id.

5.1 Digital Identity as a Custodian

Digital Identity as a Custodian is about considering whether we are being good custodians, caretakers or guardians of the data we collect as part of our digital identities. This means focusing not purely on the security of our data in digital identity databases [65, 88], but instead thinking about how we care for our past identities or information about our identities stored in archives, offering ways to support digital resilience. To do this, *Digital Identity as a Custodian* relates to literature in philosophy, personal informatics and decolonisation to question how we are currently remembered through digital systems.

As explained by Derrida, the archive is historically bound to government, power and law [33] and with it who has control over how identities are remembered. This, Mbembe [63] notes, means the archive becomes *"not a piece of data, but a status"*. This status means an archive can be used to exert power and authority, controlling what identities are given *"privileged status"* and what identities are judged as *"unarchivable"*. This prioritisation of which identities are cared about, determines which identities are made visible and therefore what lives and deaths are rendered invisible through *"not being shown"* [106]. With social media, the role of who has control over our identities is changing. Many people now have platforms to tell their own subjective experiences and create personal archives by curating what information remains about themselves, even after they are gone [43]. As Foucault [75] points out these histories are not fixed but *"transformable"*, with discourses online allowing our histories to be reshaped and reflective of a multitude of perspectives. However, societal pressures still alter this self-curation, between *"who we are and who we can be allowed to be"* [74]. Caring for data collected about digital identities requires us to be able to know why this information might be kept and whether it would be used for multiple purposes. These are points that arose from Anshul Roy's work around informed and longitudinal consent. The way personal and cultural experiences are stored within archives, can highlight the ways in which archival data was obtained and who was in control of the narratives of these identities. The People of India

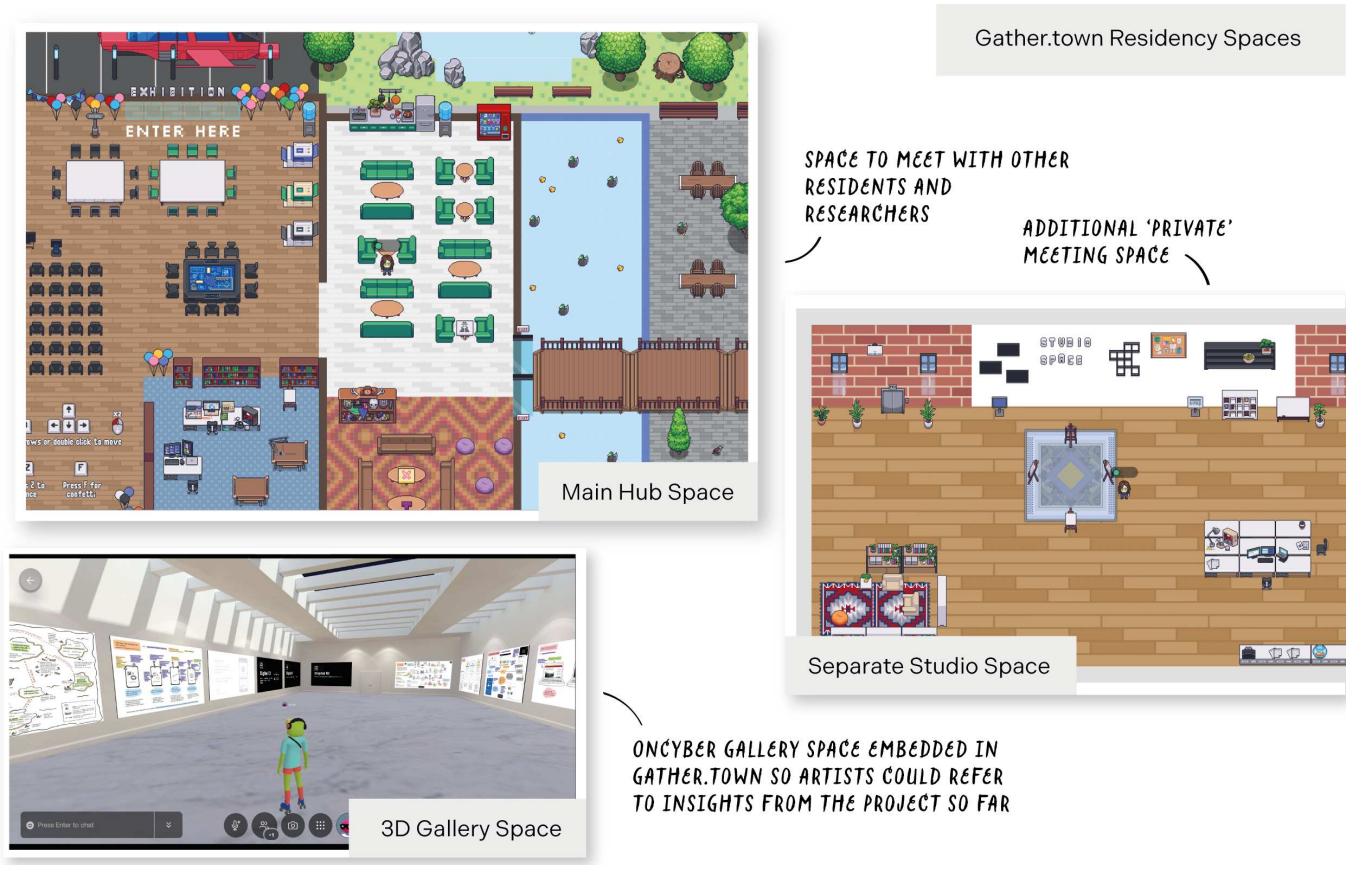


Figure 8: Gather.town spaces where artists and researchers would meet to discuss and explore concepts. Details of these spaces are not intended to be seen at this scale.

is a prime example of violent imagery taken under duress. Now these images are publicly available to anyone, despite people at the time having no idea how their identities would be remembered today. This could also be true of digital identity data captured, even as simple as images of ourselves uploaded to someone else's social media without our consent, altering how we are remembered. Therefore, as custodians we need to reflect on the way information about our identities is displayed and disseminated in future systems.

5.2 Digital Identity as a Campfire

Digital Identity as a Campfire aims to question different ways our identities might be remembered and memorialised, representing ways in which people fondly share stories e.g. around a campfire. As found during the workshops, in many different cultures use *"oral histories"* or telling stories as a way to connect to our past, share our histories and understand our identities over time. This challenges how our identity can be represented, remembered and constructed, beyond a reliance on documentation and evidence. As explained by Sontag [106] there is often a need to provide proof, to establish some kind of "truth" or "fact" about stories such as photographic evidence. She explains how this results in stories about *"how it* [past events] *happened . . . which encapsulate common ideas of significance and trigger predictable thoughts, and feelings"*. This means that there is a focus on one shared "truth" about a series of events, rather than acknowledging a multiplicity of different subjective accounts or perspectives of our past identities. However, Saladin d'Anglure explains how the Inuit, for example, retain no history but draw on *"knowledge from oral traditions handed down by the elders, as well as experience of the natural world"* [98]. Sharing stories could help keep identities alive and acknowledge who might be missed out through the way identity is currently represented in these systems, embracing ways of sharing and being to support shared collective resilience.

Within digital identities literature, storytelling has proven vital for young refugees connecting to their past, such as making trees to represent towns in Palestine known for citrus fruits [102]. This focus on exploring people's local histories to reflect on identities is especially necessary, given fixed forms of identification do not fully represent who people are [12, 102]. Social media has been used to remember loved ones [43], sharing stories to reminisce and create legacies [59]. Could viewing *Digital Identity as a Campfire* encapsulate this rich cultural and historical value, bringing people together to share and reflect on stories that make up our identity? Could this provide communities a voice within digital identity systems?

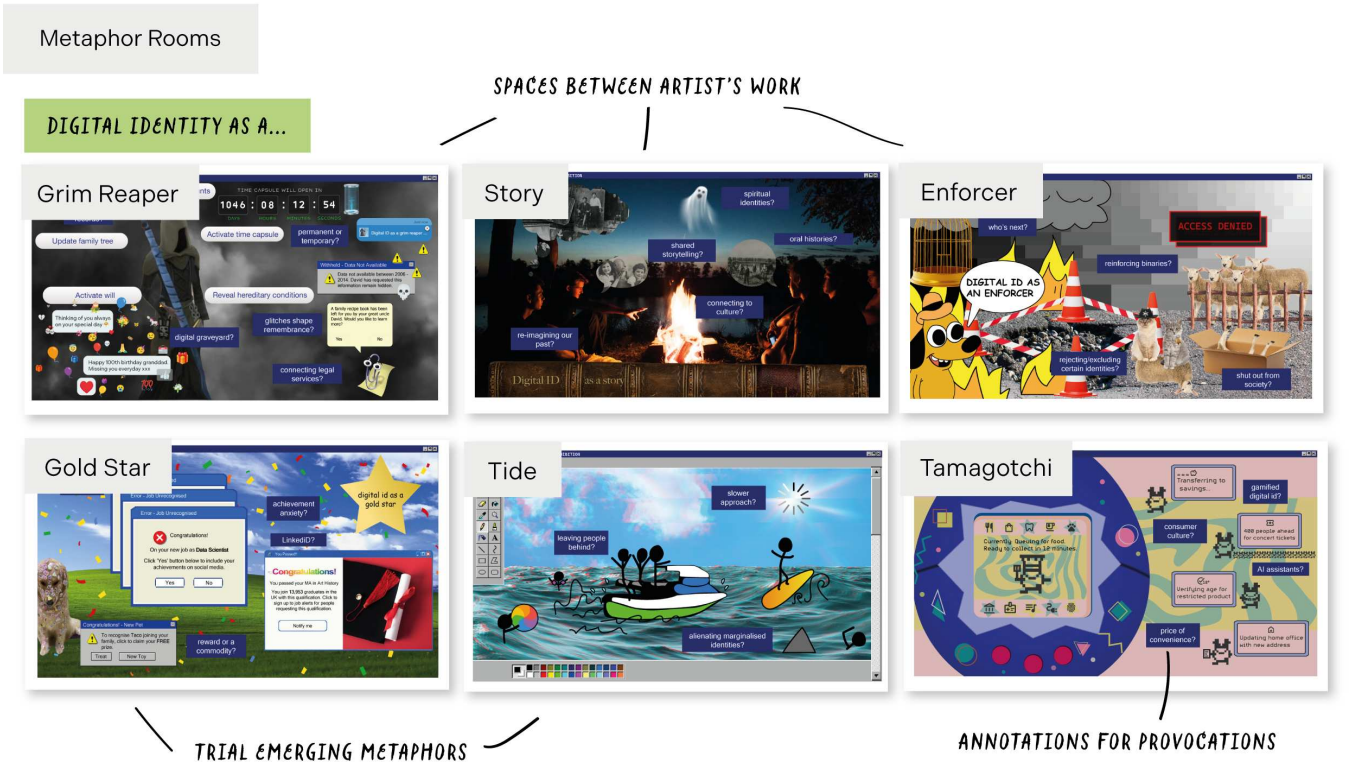


Figure 9: Metaphor rooms are digital spaces that can be explored as an avatar as part of our exhibition. The details of these rooms are not intended to be seen at this scale, but can be explored via our project page.

As advocated for by different rights groups [1, 4, 116] as well as noted by participants calling for *"community based approaches"*.

5.3 Digital Identity as a Crystal Ball

Digital Identity as a Crystal Ball questions how our present identities could be used to reflect on our past selves, as well as harness the predictive power of data to help individuals consider their possible future selves. This could also be thought through a cultural reference to Charles Dickens' "A Christmas Carol" [37]. Ghosts that appear, representing our past, present and future, intending to help us reflect on our lives and identities as we grow and change over time. *Crystal Ball* was chosen as the metaphor over ghosts, due to its clear link to divination practices for predicting the future. This is following on from Jeanne Jo's exploration of the present self's ability to influence our future self, based on knowledge about our past self. *Digital Identity as a Crystal Ball* intends to challenge how information about our identity is gathered and used to categorise or define us. Digital identity currently focuses on our present identity as something that is fixed and rarely changes e.g. your name, age, gender, reflecting physical documentation forms such as passports [11, 70, 122]. However, as explained by Hall [62], our identity is much more fluid, it is *"a never-completed process of becoming – a process of shifting identifications, rather than a singular, complete, finished state of being"*. Not acknowledging identity as constantly shifting in digital identity systems has led to interference with various life transitions [123] and reliance on fixed attributes such as "refugee" used in digital identity aid systems, which fails to capture people's whole identities [102].

This lack of context about people's identities is also evident in personal informatics literature, with a reliance on quantified metrics only representing one small part of who we are [73, 104, 115]. Within digital identities there is a focus on gathering lots of personal information (both in real life and online) to categorise people. This is to determine who has access to certain services [6, 87] or allowed entry to certain places [83]. Additionally, this information can be used to predict likely future behaviours to increase surveillance over particular identities [5, 85]. *Digital Identity as a Crystal Ball* questions who these systems are for? In a similar way to how we can use personal informatics technology to learn more about ourselves, could this be the next stage of digital identities? Understanding how predictive technologies could be used to benefit the individual, over businesses and other actors. While current systems rely on quantifying or creating fixed identities, how could reflecting on our past, present and future identities embrace our fluid identities to benefit our own growth? Could this be through considering our

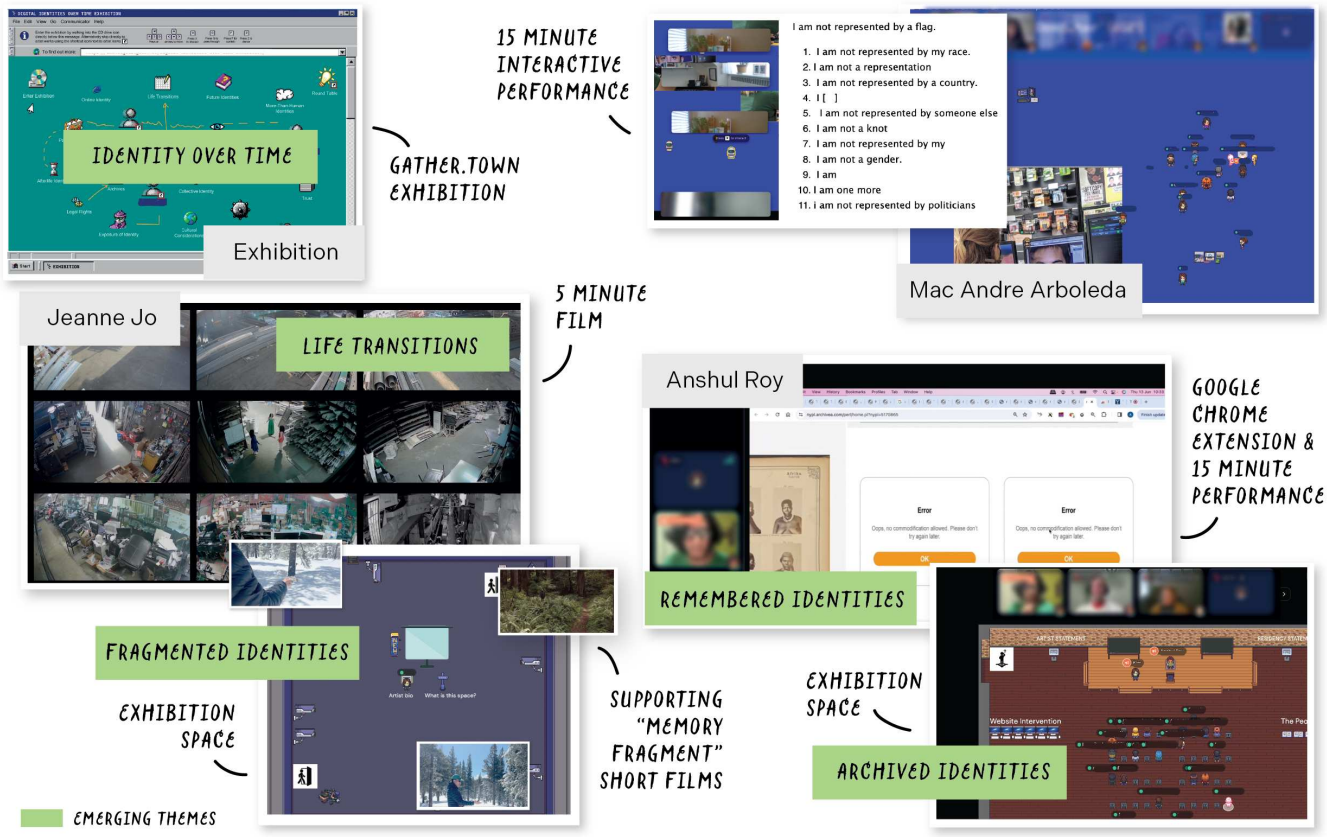


Figure 10: Excerpts from artists' work produced during the artist residency. Annotations show details of the work produced but the images themselves are not intended to be seen in detail at this scale. The exhibition space is available to explore via our project page. ©Anshul Roy, Jeanne Jo and Mac Andre Arboleda.

identities in relation to society rather than our behaviours, or just altering the purpose of what these digital identities are used for?

5.4 Digital Identity as an Enforcer

Digital Identity as an Enforcer is about questioning whether defining our identities through rigid categories, reinforces binaries that might purposely identify and exclude specific identities from these systems – and for whom this may benefit? The idea around enforcement extends from understandings around current bordering technologies which aim to create new forms of control, commonly used in policing contexts.This arose during the workshops through conversations around surveillance, control and policing. For example, participants noting that *"government digital ID systems are always an expression of power over individuals and over truth about people's identities"* which can also have alternative agendas if not explicit, e.g., *"links to policing and national security"*. The role of an enforcer could be seen as "good" from a policy perspective, using bordering technologies to support political agendas such as controlling migration [26]. Indeed, these technologies are arguably very effective for determining who has the "right" to certain services and privileges in society, and who should be excluded. *Digital identity as an enforcer* challenges the idea that efficiency will lead to inclusivity within digital identity systems, which has been implied through different "good" digital identities frameworks[88, 120]. One way of implementing bordering technologies is through prediction models such as risk analysis. These systems can create judgements based on a series of biased risk categories [64] e.g. race, gender and immigration status to determine who is considered low or high-risk in different contexts such as recidivism, domestic violence and immigration. Activist groups have challenged the use of digital identities in this way, arguing that these can be seen as forms of state surveillance creating a database state [1, 4, 18]. This form of surveillance also permeates through our online activity, referred to as surveillance capitalism by Zuboff [124]. This means any human experience can be turned into behavioural data for further control & power. Foucault refers to this as biopower [47], limiting people's autonomy through top-down surveillance. This results in us reinforcing this power by acting in accordance with perceived societal standards and norms.

These perceived societal standards and norms perpetuate inequalities and increase the division between who benefits and who is penalised through digital identity systems. Eubanks [45] explains

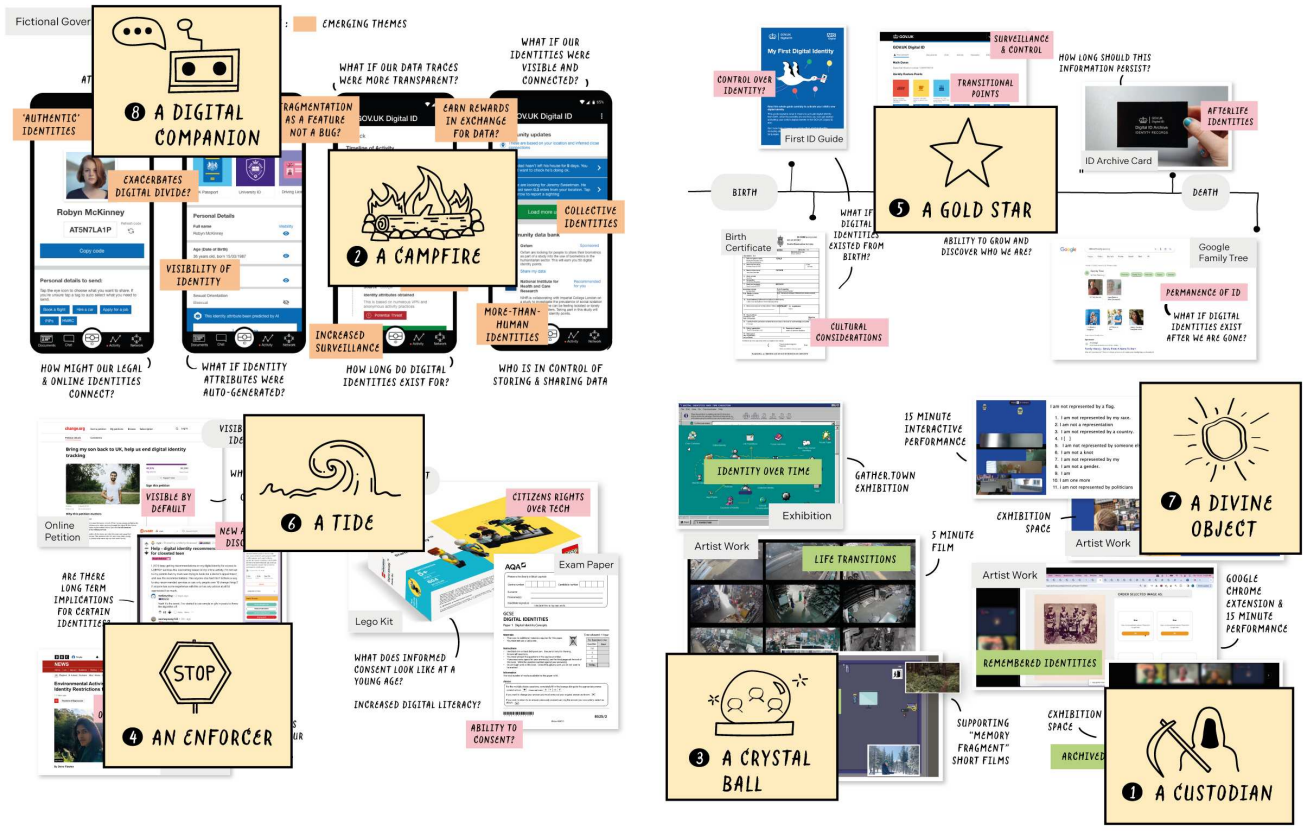


Figure 11: Points where metaphors emerged across this project.

this in comparison to Orwell's 1984 *"Big Brother is not watching you, he's watching us. Most people are targeted for digital scrutiny as members of social groups, not as individuals"*. This argues that advantaged groups are less likely to be monitored and tracked in comparison with *"oppressed and other exploited populations"*. Even standardised forms such as birth certificates are not neutral but can reinforce racial and class-professional dimensions [74] and increase inequities. Other scholars note how bordering technologies continue to implement colonial practices, around who is categorised or classified and through *"establishing what is inside and what is outside"* [42]. This can disadvantage already extremely marginalised groups, for example attitudes towards refugees of certain ethnic origins which has led to policies of confinement and deportation by using digital identities technologies to identify people [69]. The use of digital identities can also create new enforcer roles by those subjected to these oppressive systems. For example, the Alternatives to Detention scheme in the USA created digital borders with individuals being tracked beyond the border through different surveillance technologies including apps and ankle monitors [66]. This meant migrants had to be both immigration officer as well as migrant, creating feelings they were enforcing their own surveillance and upholding these borders. *Digital Identity as an Enforcer* queries this role of the enforcer through technology to further increase burden on people in extremely vulnerable situations. While technologies might make our lives more convenient, will this also mean an increase in more efficient enforcement strategies potentially removing friction in digital identity systems? This friction helps people challenge these systems and dispute or appeal against the use of these technologies. Removing this ability could heavily impact already extremely marginalised people but could also lead to the rapid enforcement of new rules without room to challenge whether these are effective or necessary rules.

5.5 Digital Identity as a Gold Star

Digital Identity as a Gold Star considers the idea of digital identities becoming a next phase of social media used to signal and celebrate our achievements. The gold star here symbolises a way of acknowledging an achievement, often used in the context of rewarding children in school. This metaphor directly extends workshop discussions around the positives of recognising *"prior learning"* or achievements through digital identities. For example, education certificates that are currently not recognised in the UK, but acknowledging these achievements through digital identities could broaden prospects for migrant populations e.g. access to university. This could help explore more equitable outcomes by redistributing resources and opportunities.

Rather than focusing on technological approaches to interoperability between different countries, *Digital Identity as a Gold Star* questions the purpose of these achievements in relation to benefits for people's day to day lives. Within existing systems, digital identities are being used for both our legal and online identities e.g., the UK post office EasyID app noting how digital id can be used to verify both your right to work and your age for social media and gaming platforms [92]. Aadhaar also tried to implement this by allowing logins to Facebook through digital identity systems [46] However, the question did not seem to have been asked about what it would mean to have these identity types merged? This could be similar to the social media platform LinkedIn [77], allowing people to share their professional and personal achievements linked to digital identities which could be easily recognisable or searchable. However, this could lead to digital identities being used to influence status, ranking, comparison and further control over populations. This status links in with questions about validating these achievements, in other words whether they are real. Perhaps using some form of verification (similar to verified ticks on social media) to be able to accrue or display certifications, memberships etc. which provide access to certain services. Additionally, as studies have shown that there are expectations to present yourself positively through social media, it may not be possible to show your authentic self online [61]. Therefore, focusing on achievements may continue to increase anxieties about presenting ourselves in a certain way. Viewing identity as a *Gold Star* means questioning how we see these digital identities connecting to our existing platforms and online personas and whether recognising achievements is what we want or whether we can challenge how our digital identities become connected in this way.

5.6 Digital Identity as a Tide

Digital Identity as a Tide shifts the view of digital identity as a suite of technologies towards a tide of digitisation that will be spread across society, potentially increasing the digital divide in the process. This metaphor emphasises the role of speed in developing these systems to make sure all people are taken into account and carried through each stage of development of these technologies. This also means questioning whether digital identity systems are "voluntary" [27] or whether for certain individuals these would become mandatory, with only some benefitting from fast adoption of digital identities. This arose as a theme across the workshops, for example one participant raising how certain people are *"lured"* into using these technologies through the *"promise of welfare benefits" and so these technologies are "forced upon them". Digital Identity as a Tide* considers citizen rights within digital identity solutions, extending past a focus on the technology itself. Within various countries, these systems have been implemented with clear implications about what this will mean for certain members in society [69, 83, 99, 113]. Despite these concerns, these technologies are becoming more widespread across the world, with arguments made that countries need to adopt digital identities quickly, to be *"at the forefront of technological advancement"* [89]. This implies these technologies will have a smooth technical rollout, rather than considering the tricky social challenges of applying technology to society. This includes considering the impact this will have for people's varying life experiences that changes how they adopt and rely on these technologies for access to services. Not considering the unequal access in these systems could have disastrous consequences for our most vulnerable in society. Repeatedly it has been shown what happens when certain groups are not considered in the process of designing and developing these systems e.g. through the automation of welfare [6, 87, 93]. As explained by Guyan [60], this further shows priorities of decisions made about *"who to count, what to count and how to count are not value-neutral but bring to life a particular vision of the social world"*. In other words, if we want to create inclusive approaches to digital identities [81, 88, 97, 120], our insights suggest a slower approach, scaling slowly to *"ensure that everybody's being carried forward"*, embracing a transition period that is more likely to work for a greater number of people. This approach needs to be reflective on why certain decisions are made and who is impacted as a result. This also means there needs to be more emphasis and focus on the process of the rollout and access throughout this process so different lived experiences are considered in order to create digital identity systems which are more resilient.

5.7 Digital Identity as a Divine Object

Digital Identity as a Divine Object challenges the notion of transparency. Given the complexity of the suite of hardware and software systems that comprise digital identity systems, can transparency ever really be achieved? Digital identities are conceptualised as a simple technology, transferring pre-existing documents such as a passport into a digitised form. This viewpoint undermines the complex and distributed nature of these technologies. Within these systems, there can be many different interacting software/hardware aspects e.g. biometrics, centralised and/or decentralised data storage strategies, facial recognition & AI models [5, 27, 31, 69, 121]. These integrated aspects leave room for potential error and bias to creep in [114]. When this is applied to data about ourselves, these systems are given the power to determine who is included or excluded from society and what access or opportunities people are given, increasing the complexity of these systems further and increasing inequities. The complexity involved in the decision-making process lacks the ability to check or verify how these decisions are being made, despite knowing that there is room for error and bias. Instead, we have to have faith that these systems are doing the right thing, but as explained by Hong *"the collective faith in the purity of data entails using the data to try to bypass important political and moral questions". Digital Identity as a Divine Object* is about exploring these political and moral questions, does this faith remain when applied to our own personal data and rights as citizens? The *Divine Object* symbolises how these technologies become almost god-like. The unknowability and potential power digital identities hold through controlling access, status and opportunities mean they are elevated to a god-like position.

This metaphor is influenced by Mac's contribution, that explores how humans are connecting via digital technologies and when they act unexpectedly, we feel violated in some way because the technology didn't match our expectations. Part of the faith in these systems can be seen through things such as the use of rituals, believing if we interact with these systems in certain ways then

something is more likely to happen. As explained by Bridle [25], these systems shape *"how we act and how we think"*, with false understandings of these systems helping people believe in these systems. *Digital Identity as a Divine Object* questions what we are willing to give up to use these systems? What is the extent to which we value agency over efficiency as it relates to our relationship with digital technology? This challenges the focus on trust in digital identity systems [31, 114] and asks is it trust or faith that we as individuals require in these systems?

5.8 Digital Identity as a Digital Companion

Digital Identity as an Companion challenges the notion of convenience. Convenience is often positioned in digital identity frameworks as the key benefit of digital identities for individuals and businesses [49, 88, 117, 120], therefore this metaphor seeks to consider future digital identities optimised for their ability to assist their physical counterpart. This seeks to question how we imagine interacting with digital identities in the future? Perhaps via Alexa [3] or Siri [8] based voice interfaces, or perhaps delegating tasks to artificial intelligence tools that can complete transactions on our behalf? Equally, how might people at different ages interact with extremely convenient digital identities? Perhaps via gamified devices rendering our digital identities more like Tamagotchi [108], a virtual pet or assistant who can manage our identity for us? Digital companions have been discussed as metaphors with Donath [38] explaining how technologies can be viewed as a pet, as something to take care of, which can create deep devotion. This could create a deeper attachment or greater sense of responsibility over digital identities, caring for a digital identity in the same way someone might look after a physical passport. This might require just checking in on our digital identities, if perceived that it is acting autonomously and acting on what it "thinks" is best to do. However, this further raises questions about the purpose of these identities, reflecting discussions in the first workshop around how *"prevalent [digital identities] would be?"* Whether there is a relationship with this digital entity or whether digital identities are autonomously handling tasks for our convenience, therefore blending into the background and being *"conveniently forgotten"*.

6 Discussion

The metaphors presented in section 6 showcase our reflections from across our Research-through-Design process. While the intention of the metaphors is to showcase intermediate knowledge, designers could take these metaphors to test them in design or policy contexts to empirically analyse how they might be adjusted or used in these different contexts. For future work, this type of analysis could be used to create a framework to evaluate the metaphors effectiveness influencing design decision making, including thoughts from digital identity developers, policymakers and users to extend these initially presented metaphors. Additionally, researchers may wish to take these metaphors to engage marginalised communities and those with lived experiences of digital identity systems, potentially through co-design or other participatory design approaches.

To make it clearer how these metaphors could be utilised, we have summarised these metaphors into some key concepts. These concepts can be used by design and HCI researchers to discuss and critique the notion of "good" digital identities. Table 1 outlines these with the following sections expanding on these overviews.

6.1 Digital Identity as a Custodian

This metaphor is useful for designers as it is about how we reconsider a sole focus on security and instead think about how we become better 'custodians' by treating digital identities with more care. Given that there are many questions about how our information is not only obtained and shared but also maintained, archived and reflected upon, designers need to consider early on how users might be protected from future identity capture and usage. This might be through challenging the role of consent within digital identity systems, for example acknowledging power relations embedded within information about our identities. Equally this could by questioning who is storing this information, why it is necessary and why these histories are recorded or remembered over others.

6.2 Digital Identity as a Campfire

This metaphor can help designers consider data rituals associated with identity construction, archival and remembrance. Through storytelling, social and cultural preservation of local histories can be celebrated in ways that go beyond purely documentation, highlighting to designers how different aspects of identity preservation might effectively and respectfully keep our identities alive. Rather than reducing identities down to data points, designers can explore the use of data to better represent lived experience, perhaps through developing cultural repositories that hold stories to contribute to collective identity remembrance.

6.3 Digital Identity as a Crystal Ball

This metaphor can be seen as useful for enabling data-mediated conversations with our past and future selves, adjusting focus towards individual benefits over other actors. Designers should view identity as a process which is constantly changing, adapting and growing over time instead of something which is static and quantifiable. Digital identity systems need to help people grow and manage their lives through various transition periods while still allowing people to express themselves throughout these life changes.

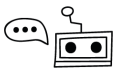
6.4 Digital Identity as an Enforcer

This metaphor can help designers explore how we work with friction to give people more control or agency to manage their identity, being able to dispute collective governance changes which impact large-scale public services. For designers, this means reconsidering how these systems could become centralised forms of control through striving for goals such as efficiency. Designers need to acknowledge how these goals might interfere with inclusivity, and challenge ideas around streamlining as a positive which instead creates new societal standards and norms about who is allowed to both identify and be identified.

6.5 Digital Identity as a Gold Star

This metaphor encourages designing for humility. Given the known issues with social media in relation to our general wellbeing and mental health, future digital identity systems reliant on data can learn from these past mistakes to create systems that better support

Table 1: Table outlining key concepts from each of the metaphors for designers of digital identity systems

Metaphor Icon	Metaphor Title	Concept
	Custodian	Designing systems to shield users from unknown future uses of personal data. Considering custodianship over security to better care for identity information.
	Campfire	Designing collective data rituals associated with identity construction, archival and remembrance to celebrate local histories and culture through data-driven storytelling.
	Crystal Ball	Designing identity systems that enable data-mediated conversations with past and future selves to support self-growth and life-management across life transitions.
	Enforcer	Designing friction into identity systems to actively maintain opportunities for dispute and collective governance of changes which impact public services.
	Gold Star	Designing for humility to actively avoid importing known issues from social media relating to mental health and our anxiety inducing "like economy" into mandatory identity systems.
	Tide	Designing slow transitions that anticipate the challenges of unifying fragmented systems and allow people to comfortably live through transitional periods.
	Divine Object	Designing user agency into identity systems and the complex surrounding ecosystems to empower individuals to verify how their data is being used rather than asking for blind faith in the service providers.
	Digital Companion	Designing digital identities that we care about and want to keep safe.

the way we are represented through technology. For example, as different aspects of our identity might become interconnected through identity systems, it is up to designers to make sure these systems are not focused on arbitrary metrics or comparisons between people that might increase negative feelings such as anxiety.

6.6 Digital Identity as a Tide

The role out of digital identity systems are unlikely to be smooth. This metaphor helps designers to acknowledge the challenges with unifying fragmented systems, highlighting the ways in which people will live through transitional points or shifts between new digital processes and pre-existing ones. Designers can use this metaphor to think through how we actively design for these transitions. This means designing from the margins inwards to consider the most vulnerable in society first and thinking through issues they might experience accessing essential services during these shifts.

6.7 Digital Identity as a Divine Object

This metaphor is about designing user agency into digital identity systems, as well as the complex surrounding ecosystems. For designers, this is about increasing trust in digital identity systems, understanding that it is hard to trust these systems if we are reliant on transparent explanations of complex systems which have the potential to act unexpectedly. This means empowering individuals to verify how their data is being used to support their rights as citizens, rather than faith being placed entirely on the service providers.

6.8 Digital Identity as a Digital Companion

Viewing *Digital identity as a Digital Companion* shifts our relationship with a suite of technologies that could become a fundamental part of people's everyday lives by considering how we interact with these systems. Designers can rethink this relationship to focus on designing for care. This means creating systems that people actively want to use and be involved in, or care for but also systems that are protected or looked after in the same way people take care of physical identity documentation.

7 Conclusions

This paper presents eight alternative metaphors for exploring "good" digital identity futures, these being digital identity as a *custodian*, *campfire*, *crystal ball*, *enforcer*, *gold star*, *divine object*, *tide* & *digital companion*. These are presented as meta-annotations for our annotated portfolio, representing key insights and reflections developed by the authors from a 12-month Research-through-Design project. We hope that these metaphors can help to broaden conversation and debate around digital identity futures, rather than creating definitive answers to what "good" digital identities are but instead questioning what makes them "good" and for whom they might be "good". These metaphors embody a range of perspectives from a

diverse disciplinary group of researchers, participants and artists which we suggest are useful for enriching discussions about futures of digital identity systems. We hope these metaphors will be seen as generative, inspirational ideas for further research by designers, technologists and policymakers to further expand conversations beyond technical considerations of digital identity systems and apply more focus on the social challenges which arise from these emergent technologies. We conclude by providing design concepts as intermediate knowledge to help explain how these metaphors can be utilised by designers to consider what "good" digital identity futures might look like.

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