

**A Method for Anticipation of
Undesirable Interactions in
Software for a Digital Society
informed by a Thematic
Analysis of Discovery Practice**

by

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requirements for the degree of Doctor of Philosophy at the
University of Central Lancashire

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Declaration

Concurrent registration for two or more academic awards


I declare that while registered as a candidate for the research degree, I have not been a registered candidate or enrolled student for another award of the University or other academic or professional institution.

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Abstract

This research explores current user experience design practice in the IT sector through empirical studies with practitioners. The focus is how interactions that are undesirable are identified, because they are contrary to the interests of the users. The practice area of interest is the discovery stage when designers are working to understand the user's aims and identifying opportunities to achieve the desired outcomes.

Two research questions are explored: what methods are used in current software design practice to identify undesirable interactions during discovery activities, and how can designers be helped to structure their work in a way that assists them in identifying undesirable interactions.

Three empirical studies were conducted with user experience practitioners. The first used Ketso workshops to gather data on discovery goals, practices, and challenges. These informed the second study, which used interviews to gather data on attitudes and practices. Reflexive thematic analysis was used to analyse findings. Using findings from the first two studies and lessons from the existing literature, I developed a new method of anticipating undesirable interactions by identifying ethical properties that the design should preserve and considering how they might be lost. This Jeopardy Analysis method was evaluated in the third study through remote workshops with user experience design practitioners who were asked to apply it to an unfamiliar scenario and provide feedback on its use.

Findings about current practice from the first two studies indicate that user experience practitioners favour methods that build a shared understanding, but select them to suit the context. They tailor their approach, and actively

explore and experiment with new methods. There was some recognition of the need to anticipate problems, but no methods were applied at the discovery stage, instead relying on usability testing.

The evaluation of the Jeopardy Analysis method found that it helped to challenge assumptions. Practitioners found framing the problem in ethical terms unfamiliar and difficult, but felt they could use it by themselves with more practice. The generic properties used for the evaluation were found to be too abstract, so the method step tailoring them for the domain would be an important part of its application.

The research contributes insights into the goals practitioners have for their discovery activities, and their current approaches to identifying undesirable interactions. It identifies practitioner interest in recent ‘consequence scanning’ approaches to anticipating problems that differ from current practice, and are associated with a more risk averse mindset. It contributes a novel Jeopardy Analysis method, and reports encouraging results from its initial evaluation.

Further work is needed to refine Jeopardy Analysis for use in industry, and to evaluate practitioner selection of ethical properties tailored to their domain and product. Its natural domain of use is seen as software applications supporting life in our increasingly digital society, where the general public are co-opted into our designs, and the ethical case for intervention is most compelling. Extension of Jeopardy Analysis to involve prospective users in co-analysis and design would further address the potential imbalances of power in current practices. It is suggested that teaching Jeopardy Analysis in higher education settings would contribute to learning outcomes in inclusive design, societal impact, the making of ethical choices, risk management, and the recognition of responsibilities.

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Chapter 1

Introduction

The software usability approach set out by Gould and Lewis [130] in 1985, of a continual focus on users, empirical measurement of usability, and iterative redesign to resolve problems, is still the basis of most current practice as described by practitioners [129, 53, 363]. However, evaluations of usability testing methods have raised concerns about their reliability [183, 242, 327]. Even experienced usability professionals carrying out usability inspections will not find all the usability problems in the product [242]. Analysis of a design early in a product's life, to identify undesirable interactions before it is built, is normal practice in the safety [87] and security [232] domains, but not in most other business contexts.

This research explores current user experience design practice in the IT sector through empirical studies with practitioners. The focus is how interactions that are undesirable are identified, because they are contrary to the interests of the users. The practice area of interest is the discovery stage when designers are working to understand the user's aims and identifying opportunities to achieve the desired outcomes.

Undesirable interactions

In this research I focus on undesirable interactions that stem from incorrect and unchallenged assumptions at the design stage, that result in unwanted

outcomes. These outcomes can range from the local, affecting a single user, to the global, affecting large numbers of users and potentially having consequences for wider society. I focus on outcomes within the scope of the application design, which will generally be those that directly affect its users.

Users are sometimes annoyed enough by undesirable interactions to comment on social media, as in this example. Mobile phone applications are increasingly being used instead of paper ticketing, and train station barriers have been adapted to work with them. These applications also gather customer feedback, but sometimes ask for it when the phone is being used at a barrier, blocking the ticket code from being read [72]. Any assumption that users could always see the screen when using the application was invalid, as the phone is held screen-down to be scanned by the barrier.

Some examples are serious enough to attract media attention. In 2015, *The Guardian* reported that automatic image tagging at *Google* and *Flickr* was labelling dark skinned people as animals [178], and as recently as 2020 face recognition failures were still reported to be erasing black people from *Zoom* meetings and cropping them out of *Twitter* pictures [149]. Regardless of what technology was used to build these systems, the underlying problem was their discovery process as it did not adequately identify who the product was being built for.

Interaction discovery

Identifying undesirable interactions is not only a problem in software design, it is also a problem in drug design, where biological interactions might lead to adverse side-effects [253]. There it is called “interaction discovery”, and I have adopted the term to describe analogous methods that might be applied to a software design or product.

The earliest opportunity to start [interaction discovery](#) is when designers are beginning to understand the user’s aims, identifying opportunities to achieve the desired outcomes, and visualising solutions that will provide a positive user experience. During this stage user researchers are planning and conducting

research activities to gathering the information needed. These early design activities are described by Torres [363] as *discovery*.

Definitions vary, but the term *discovery* is widely adopted by practitioners, and by the *Government Digital Service (GDS)* in its training material [131]. Discussion of *discovery* as a distinct activity is less common in the academic literature, due to the limited research into design practice in industry. Reviews of practitioner oriented ‘grey literature’ [246], and recent case studies, show a variety of prefixes in use distinguishing the aims, such as design discovery [44] and product discovery [53], or the methods, such as lean discovery [57] and continuous discovery [363]. For the purposes of this study, those distinctions are not significant, as practitioners may select from several authors when tailoring their own approach.

Usability inspection [251] methods such as heuristic evaluation and cognitive walkthroughs, which require expert evaluators, and usability inquiry methods, that involve current or prospective users to gain insights into how they will use it, require at least a detailed design and usually a prototype of some kind, so cannot be applied until sufficient discovery has been completed. Methods that try to anticipate problems, such as “consequence scanning” [45], are now emerging but do little to frame the problem or provide the scaffolding that I believe, based on my own past experience of safety analysis, that practitioners will need in order to identify undesirable interactions and address them early enough, before they are embedded in the design and expensive to resolve.

With current methods of framing [172], *discovery* activities do not usually consider whether any interactions implied by the design might be harmful or place the user in jeopardy unless the problem is potentially a safety or security issue. Finding that undesirable interactions are often not considered in advance, the present work aims to integrate the anticipation of undesirable interactions into discovery.

Study scope

This thesis concerns [User Experience \(UX\)](#) design practices used in industry. Safety and security issues may overlap with [UX](#) and share a common basis, as I discuss later, but generally their impact means they require different methods. In framing the research questions, I focus on interactions that the intended *users* will consider undesirable. There are circumstances where designers and users will disagree on which these are, but recognising the imbalance of power between them I have taken the side of the user. Malevolent use belongs to the security domain. Knowingly reckless or malevolent design [[137](#), [136](#)] is likely to be unethical if not illegal, and would not be avoided by further methods of discovery. My focus is the inadvertent and accidental.

Assumptions about how long software would remain in use led to urgent work to correct leap-year calculations and date formatting before 2000 [[103](#)], and that kind of problem will continue to appear. However, I do not address legacy issues as it would be unusual for a design to include an explicit ‘sunset clause’ setting a finite life for its use, and I wish to focus more on challenging assumptions about ‘who’, and ‘why’, and ‘how much’ rather than ‘when’ as the important questions.

Assumptions can be embedded in data, and can result in unfair outcomes. For example, when predictive models are applied to policing and probation services [[30](#), [49](#)], feedback loops could reinforce previous patterns [[241](#)]. Using research data from a context shaped by historical unfairness requires particular care, and skills from other disciplines, so is outside the scope of this thesis.

The problem addressed by this research concerns emergent properties and non-functional qualities, the need to be resilient and adaptive under change, the need for new structuring schemes to separate concerns about correctness and efficiency and desirability [[95](#)], and the need to adapt methods to support rapid non-classical styles of software development: five of the key areas for software engineering research highlighted by Finkelstein and Kramer [[113](#)].

1.1 Motivation

1.1.1 Professional challenges

The programme of study that produced this thesis followed twenty five years of professional practice as a scientist, consultant, and senior engineer. While researching better systems for air traffic management and collision avoidance, and assessing the effectiveness and safety of fighter aircraft, I encountered challenges that existing approaches struggled to cope with. My hope was that techniques developed to provide a better experience might usefully be applied to improving safety. During the study described here, it became apparent that the reverse might be the case: that safety thinking might contribute to improving usability.

As an independent observer, my flight test reports were often different from those made by the company, because our observations are a product of our current focus of attention [124, Chapter 8]. The test engineers were focussed on whether their functional tests were passed, whereas my focus was how it worked and how it might not work when, for example, flown by a less experienced pilot. I was concerned with the non-functional properties of the system, and whether the non-functional goals had been met. Primarily, these were safety goals, but in some contexts safety can be inseparable from effectiveness and usability.

Understanding the consequences of human-computer interactions starts with one-to-one interactions of one user with one feature but how one interface works creates expectations of other interfaces, and if those expectations are not met then misunderstandings or harmful misuse may result. These second order interactions can be important when our intentions are communicated more widely to third parties, and contribute to their situation awareness. In the past, dependencies like this were addressed through the training that specialist operators received. Mass participation has brought them into the mundane software used by the wider population, for example on social media platforms when bookmarking behaviour is confused with approval [230].

So, the challenge was to find a way of discovering unwanted interactions that

could be applied early enough in the product life to avoid rework, which would scale up to more complex designs developed at greater pace, and which all the members of a cross-disciplinary team could participate in and understand. The nature of this challenge is further developed in Chapter 3.

1.1.2 Knowledge gap

The knowledge gap that is explored by this study is what current software design practice does to identify unwanted interactions, and how that might be addressed as part of the design [discovery](#) activity when the team is developing its broader understanding of the problem to be solved.

The mechanistic view of safety that was developed for hazardous industries assumes that harmful events have causes that can be readily identified and prevented. It aims for robustness, where failures are to be eliminated, and safety is achieved when tolerably few things go wrong. Many modern systems are too complex for that assumption to hold [194], so a more proactive approach has developed that aims for resilience, where success is maximised, and safety is achieved when as many things as possible go right [154].

A proactive approach to avoiding unwanted outcomes tries to anticipate them by looking for patterns of failure rather than individual events, and assumes that both success and failure arise from the same working practices through pragmatic adjustments and variations in performance rather than by ‘unusual’ mistakes. That makes it as important to understand how organisations get things right as how they “drift into failure”, as Dekker puts it [89]. Software engineers do not necessarily have the ethnographic study skills to form that understanding. Some [user experience](#) practitioners and [user researchers](#) have the necessary skills, but often lack the time and resources, so may benefit from a supporting framework to reduce the overhead of creating a bespoke approach for their organisation and help them to reflexively study a process that includes their own work.

1.2 Aims and objectives

1.2.1 Aims

This study aims to understand how practitioners anticipate usability problems, and to explore a means of facilitating that anticipation that would be suitable for practical application in a typical Agile workplace.

1.2.2 Motivating question

Some industries have products independently assessed before their delivery to the ultimate customer and address shortfalls by imposing limitations on how they are used. The motivating question (MQ) that underlies this study arises from my participation in these evaluations, where I observed that experienced teams still deliver products that have undesirable interactions:

**How can the software design process be improved
to reliably deliver systems that maximise usability (MQ)
while minimising undesirable interactions**

This research is an exploration of how teams establish a shared understanding of the product, what they do to identify undesirable interactions prior to the testing of a solution, and the role that the ethical properties of the design might play in their discovery.

1.2.3 Research Questions

The motivating question (MQ) is too broad for a single study, so the research questions focus on understanding current practice (RQ1) and exploring how that might be modified (RQ2) to anticipate and avoid problems.

Current practice RQ1

Within the broader question of what current practice is, my focus is how practitioners identify interactions with potential usability issues:

What methods are applied in current software design practice to identify interactions with the user that the intended users will consider undesirable (RQ1)

Future practice RQ2

The initial literature review identified that [discovery](#) was under-researched, and discussions with practitioners had not identified any one dominant approach, so the future practice question needed to be flexible enough to reflect that. This was done by thinking more generally about the structures that designers create for themselves:

How can designers be helped to maintain a structure for their work that assists identification of undesirable interactions (RQ2)

The information on current practice needed to address [RQ1](#) was gained through two studies. Study 1 involved Ketso workshops with practitioners, and Study 2 involved practitioner interviews (Chapter 5).

After investigating current practice, [RQ2](#) was explored by developing the Jeopardy Analysis method (Chapter 6) and then evaluating its usefulness to practitioners in Study 3 (Chapter 7).

1.3 Contributions to knowledge

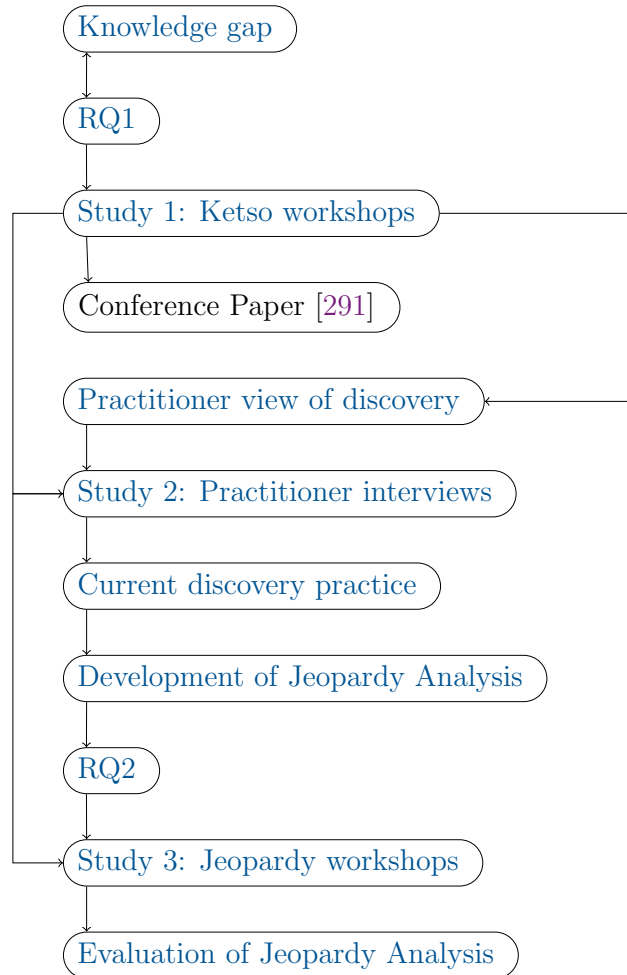


Figure 1.1: Conceptual map of contributions from each study

This thesis makes an original contribution to knowledge in three principle areas: insights into how practitioners view *discovery* and conduct it in the workplace, the development of a novel approach to identifying potential harms by applying safety and resilience techniques to the ethical properties of the design, and an initial evaluation of this Jeopardy Analysis method. A conceptual map of the contributions from each study is given in Figure 1.1. The contributions are described in section 9.3.

1.4 Thesis structure

The conceptual links between the chapters are mapped out in Figure 1.2.

The research is introduced and motivated in Chapter 1, and the research questions stated.

A review of practice as described in publications and relevant recent literature is given in Chapter 2. Relevant findings are summarised and put in context.

In Chapter 3 the nature of the problem is further analysed and examples used to set out general categories of poor user experience that current methods often fail to pick up at the design stage. The challenges of doing effective discovery in an Agile working environment are identified.

The general approach and detailed methods used to explore the research questions are described and justified in Chapter 4.

Current practice is explored in Chapter 5. The use of Ketso community engagement workshops with retail practitioners is described, and key themes in their ideas about successful discovery methods are identified. These themes are further explored in structured interviews with practitioners from the civil service, design agencies, and contractors selling services into the public sector.

The jeopardy analysis method (a usability counterpart to hazard analysis in the safety domain or threat analysis in security) is introduced and developed in Chapter 6. The reasons for a focus on the ethical properties of the design are set out and explained.

The use of user jeopardy workshops is evaluated in Chapter 7. Application of the technique to a pre-prepared scenario is compared to a session using a problem suggested by the participants themselves.

A synthesis of all the findings and a discussion of the implications for each of the identified challenges is provided in Chapter 8.

The summary conclusions of the study, its contributions to knowledge, and my recommendations for further work are set out in Chapter 9.

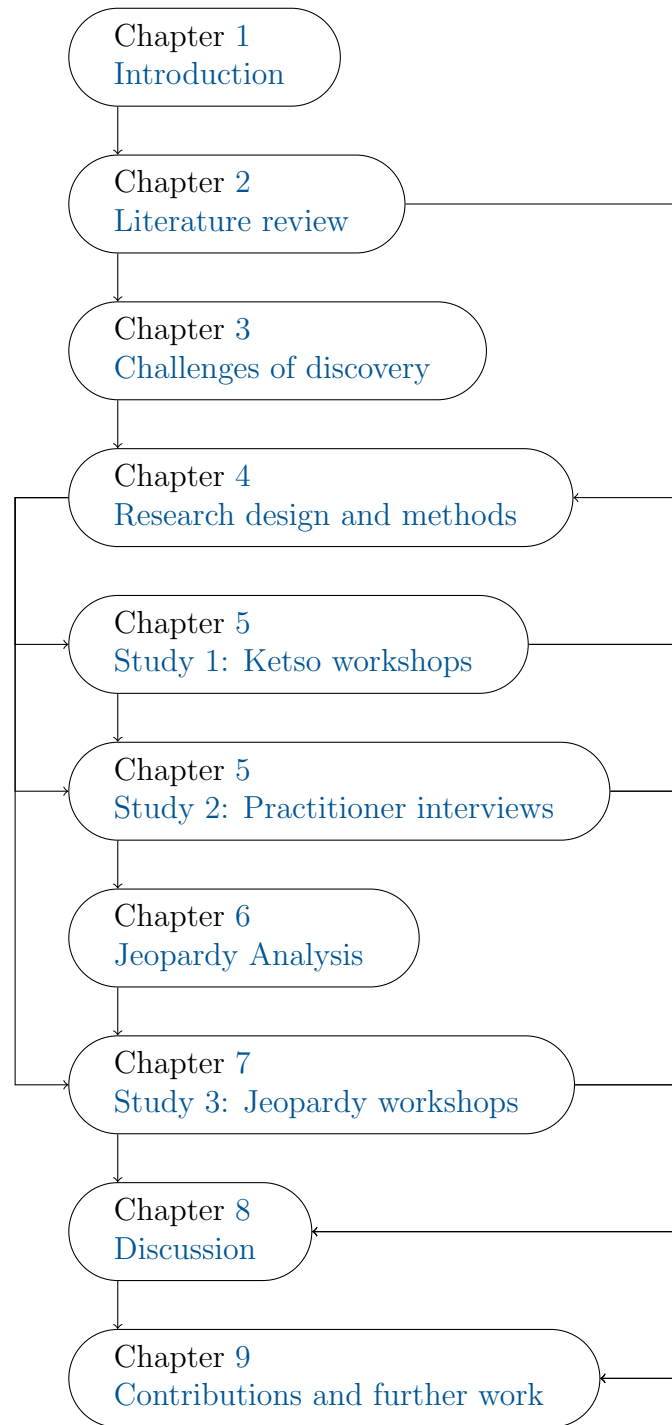


Figure 1.2: Structure and conceptual map of the thesis

Chapter 2

Literature review

2.1 Introduction

This chapter describes how the research goals and questions were mapped onto literature searches to identify prior work and gaps in knowledge. The social context of the problem, the professional practice context of **user research** and **UX** design and **discovery** activity is explored, and related to the theoretical context used for the analysis. Key background material is summarised and its implications for this research identified.

2.1.1 Exploration of the question

Research goal breakdown

The broader question of what an understanding of **interaction discovery** would entail was initially broken down into sub-goals, using a GSN diagram [182], using possible contributing factors as decomposition strategies. This captured my initial understanding of the problem and identified topics relevant to the research questions for the initial literature search. Relevant factors identified at this stage were practitioner use of different data capture techniques, ideation under resource and organisation constraints, and responses to design outcomes.

Research question breakdown

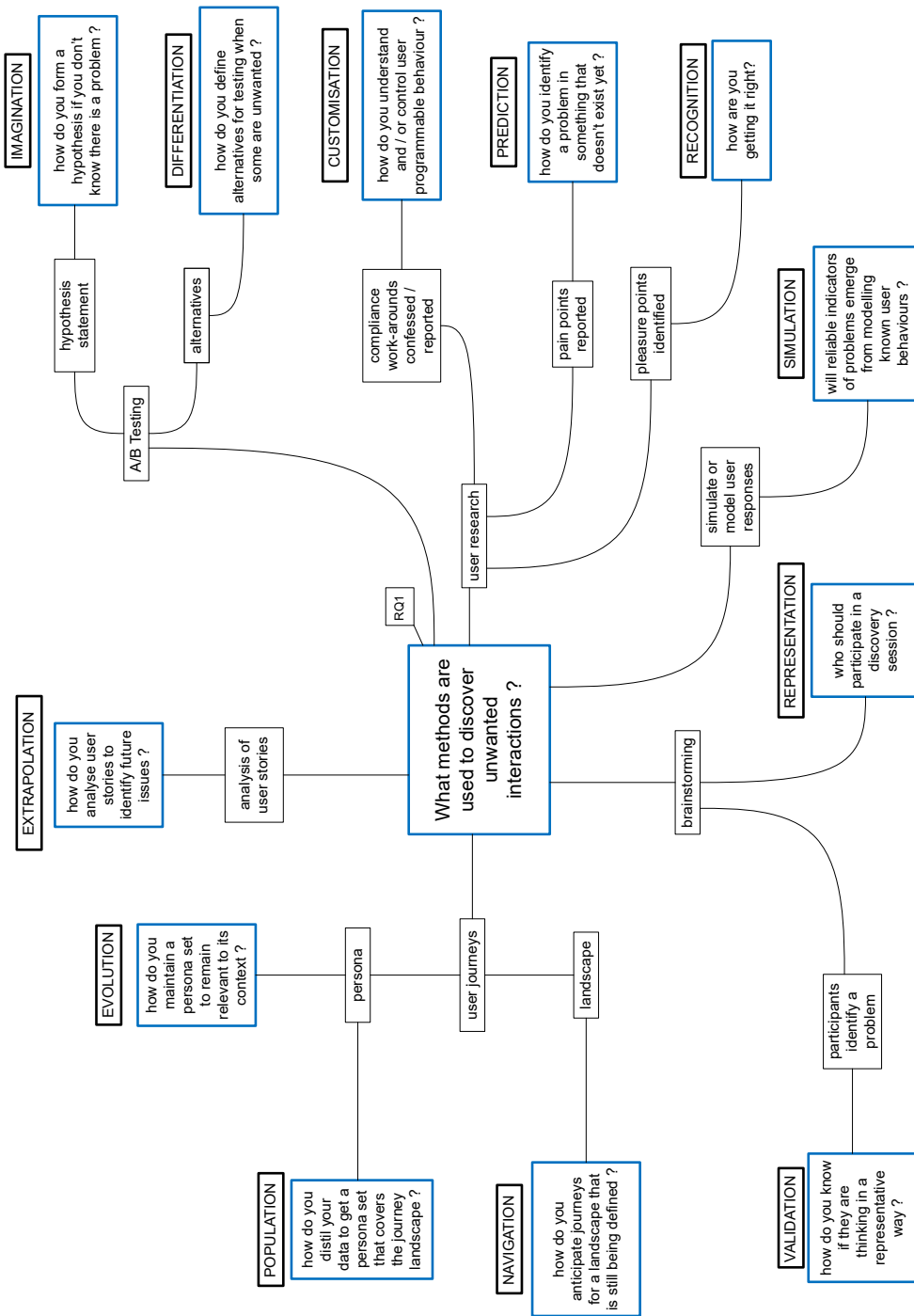
The question of how to discover unwanted features (RQ1) of a design was decomposed by mind-mapping [51] into a set of closely related questions, as shown in Figure 2.1. This decomposition helped shape the literature search by providing a broader view of the problem, as given in the following paragraphs.

Pain points as predictors

If user research identifies **pain points**, specific problems that current users are experiencing, how relevant a **PREDICTION** they are for a new or modified system that does not exist yet may be difficult to determine. An analysis of the use of user support data by Oskarsson [260] suggested that pain points may provide useful insights, but creation of the categorisation meta-data needed to support efficient retrieval was found to be onerous. A recent study by Salminen *et al* [309] applied machine learning to the identification of pain points expressed on social media, and demonstrated comparable accuracy to a human operator, but again found classification to be challenging and recommended that companies train up their own bespoke classifiers by supervised learning. The use of user journey maps from two interacting viewpoints, which were then merged to identify mutual pain points, was described by Sinitskaya *et al* [326]. Their findings suggested that increased in-person interaction at designated points influenced satisfaction for both, but that pain points were not consistently reported by different individuals.

User customisation

Current use may also include important workarounds developed by the users themselves if elements of the system are programmable in some way, raising questions of **CUSTOMISATION**. In a study of highly configurable systems, Han and Yu [143] found that the majority (69%) of performance problems in the open-source web server, database, and browser studied (Apache, MySQL, and Firefox) were configuration related, so harder to anticipate or reproduce.



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Figure 2.1: Breakdown of Current Practice Question

Differentiating undesirable alternatives

Design alternatives are commonly investigated by comparative testing. How the alternatives are chosen when some might have undesirable outcomes, and whether they would be sufficiently different for any suspected problem to be seen in typical use or would need an unusual scenario for **DIFFERENTIATION**, was not discussed in the available literature. A systematic mapping study by Ros and Runeson [296] found comparative ‘A/B’ testing use described in diverse settings, but a lack of guidance on ethical experimentation techniques and techniques compatible with **General Data Protection Regulation (GDPR)**.

Hypothesis design during discovery

Lean UX methods [129] use testable prototypes to validate design choices. The practicality of writing a clear and pertinent test hypothesis while still exploring a problem, and the consequences of any over reliance on **IMAGINATION**, were not addressed in the available literature. The challenges identified by Aarlien and Colombo-Palacios [1] included communication and knowledge transfer within the team, and cumbersome decision making processes in large organisations, and dependence on the thoroughness of the testing conducted if problems are to be discovered early. My concern with the Lean UX approach was the risk that the hypothesis would be chosen to be easy to test and target desired business outcomes rather than guiding the design in the way that will result in good outcomes for the user.

Recognition of success

When considering resilience, **RECOGNITION** of how you are currently succeeding was highlighted by Kitchens [186]. Bagchi *et al* distinguish resilience-by-design, using anticipation of likely perturbations, and resilience-by-reaction, achieved by detecting a perturbation at run-time and responding appropriately [20]. The former is more relevant to the discovery activities of interest to this thesis. Their suggestion that testing should consider the distribution of inputs as well

as individual values, as a way of minimising assumptions, may be applicable to more than the machine learning context that they discuss.

Simulation and model-based design

Use of modelling and **SIMULATION** in design, in for example **Simulation Based Design (SBD)** [229], can be used as a way of animating a specification to understand its consequences before a full system is available, and I have previously used fast-time simulation in that way when assessing fast-jet mission systems. However, it raises questions of how reliable indicators will emerge from those models, and whether **REPRESENTATION** of the user **POPULATION** is adequate at the start and how its **EVOLUTION** should be managed to track contextual changes. It may be difficult to anticipate the user's **NAVIGATION** of a future system, and **EXTRAPOLATION** to identify future issues may have **VALIDATION** problems. Use case models can be used to describe usability problem scenarios, just as they can be used for hazard mitigation scenarios as described by Allenby and Kelly [5], but design teams might find it difficult to do at the discovery stage with only an outline functional requirement to base them on. Stålhane and Sindre found the textual form of use cases more effective in identifying failures than the diagram form [334], so a lack of **Unified Modelling Language (UML)** tools need not be an obstacle, but **user researchers** and designers might nonetheless be resistant to it if it is not part of the team's normal toolset, as it may not be given previous adoption rates [272] and declining satisfaction with modelling tools reported by Badreddin *et al* [19].

2.1.2 Literature mapping

Mind-mapping was used on topics for literature search, focusing on user and designer behaviours, to look broader and deeper than those suggested by the question breakdown and as a sense-making activity to understand the coverage achieved. For example, linking search “persona design” with “persona stories” and “user stories” and contrasting with “job stories”. In this way, searches built incrementally into a body of relevant literature.

2.1.3 Search tactics and issues

The research questions are focussed on the practice of software design. The context of the research and the method used are key features of the prior literature, and the most relevant studies will feature active involvement of practitioners in [user experience](#) design and ideally be drawn from identified [communities of practice](#). Initial searches based on keyword patterns were found to be largely ineffective at identifying the cross-domain and cross-functional literature that was needed, so a series of targeted literature searches were used.

Search engines based on a citation index, such as *Web of Science*, do not index the full text of the paper. For a study cutting across domains that was unhelpful, for example design [discovery](#) might not be the nominal subject of the paper and so would not be present in the title or metadata, but might still be what the paper substantially described. The *Google Scholar* engine does index the full text, and was found to be more efficient and effective at identifying relevant work, but although it indexes a wide range of sources, it is not comprehensive, so manual browsing of *ACM Digital Library* and *eWiC* entries for recent [Human Computer Interaction \(HCI\)](#) conferences was used to supplement the search.

2.2 Social context

2.2.1 Challenges of ubiquity

Software is now ubiquitous in everyday life [383, 267]. Public services in the UK follow the ‘digital by default’ policy first announced in 2012 [153, p42]. This includes challenging sectors such as health and social care [249]. Some commercial services require customers to provide their digital address as well as the physical one, so for example, many banks require customers to have an email address and a mobile phone number. Recognising a desire for change after the coronavirus pandemic, several large IT companies announced in May 2020 that they were moving to remote working by default, with Tobi Lutke

of *Shopify* saying “Office centrality is over” [215], so workplace digitisation is likely to accelerate.

User experience as described by Norman [255, p233] is a response to the design, and people respond differently, so the more ubiquitous the product is the greater the variety of responses it will encounter. Some people will respond in a way that interacts badly with the product and has undesirable outcomes for themselves or others. Usability testing may identify these cases, but there is a problem of scale, as it may be impractical to recruit enough participants to be confident of covering all the interactions likely to be seen in use.

2.2.2 Cultural dependencies

People have differing sensitivities toward problems, reflecting their expertise and experience. Comparing alternative theories of usability, Clemmensen [67] suggested their effectiveness in explaining usability outcomes depended on the cultural background of the participants and their attitude to task performance versus aesthetic preferences. This is consistent with a survey by Lee *et al* [200], which found different attitudes toward quality and productivity as performance goals amongst different software engineering communities of practice, but they noted that it might be premature to ascribe these differences to underlying national attitudes and culture, and more research was needed. In a study of cross-cultural software teams, Barrett and Oborn [23] found that knowledge sharing may be inhibited and cultural boundaries reinforced if design artefacts are exchanged in a way that redistributes authority over the design. This has implications for how information is gathered about user needs, and the methods used by the project team to achieve a shared understanding of what they should design and develop to meet those needs, in addition to the challenges of delivering products for culturally diverse users. As a result, design discovery practices that work well in one cultural context may require local modifications to be effective elsewhere, and direct read-across of results from academic studies in other countries should not be assumed.

2.2.3 Attitudes to risk

Codes of conduct

When its use is no longer discretionary, there is an ethical and social duty on those that design software to ensure that it respects the dignity and autonomy of the people using it, and that its use does not place a burden on them that is out of proportion to the value it provides. This is reflected in the codes of conduct of the Engineering Council and professional bodies involved in software [351, 350, 107]. It is not sufficient for what it does to be correct, achieving its [functional requirements](#), it is also important that the way it does it is acceptable, so meeting its [non-functional requirements](#).

Managing risks

One of these requirements is that it should be safe, and there are rigorous methods for ensuring that software risks are appropriately managed when the consequences of failure might be dangerous [206, 379]. Risk assessments typically [256] have three key components:

- Risk identification — what risks are there in this design?
- Risk analysis — what impact and frequency might they have?
- Risk evaluation — how do we get to an acceptable level of risk?

Risk analysis and evaluation are normally quantitative in nature, so require a sufficient through-life history of the system components to estimate their failure rates and calculate event probabilities. That would be generally unhelpful for discovery activity where the problem is not yet fully understood and the relevant component choices have yet to be made. The initial identification step does not require a deep understanding of the system or need to be informed by past problems, as infeasible scenarios can be filtered out during analysis and evaluation, but it does require creativity and imagination. Risk assessment is preceded, at some point, by a risk framing activity to establish what level of risk is tolerable and what priorities and trade-offs the organisation is able to make

within their operating constraints. It is followed by ongoing risk monitoring and review, and communication of the risks and their mitigation measures.

The harms caused by software that is stressful or ineffective or an unpleasant experience to *use* are not considered with the same rigour. A recent taxonomy by Sedano *et al* of types of ‘waste’ in software development [317] only identified the distress of software developers, not the distress of those using their output.

2.3 Practice context

Design practices may be tailored for the context of the product (see 2.2.2), but few studies directly involve the UX industry, so practitioners were an important focus of my research.

2.3.1 Importance of User Research

Experience cannot be designed as such [145], but can be designed *for* in the same way that the punchline of a joke can be designed *for* amusement: whether a particular individual is amused depends on them. Recognising that change is possible and desirable allows a team to prepare practically and psychologically to address it. This *mobilisation* is an important decision point. Having decided to act, the key questions are then

- who the problem should be solved for
- in what circumstances it should work, and
- what part it should play in those lives

These questions are addressed by *user research* within the wider practice of UX. Various definitions of *user experience* are in use [197, 198] but they broadly agree with the ISO standard for Human Centred Design 9241-210:2019, which defines it as:

user’s perceptions and responses that result from the use and/or anticipated use of a system, product or service

Hence, user research is the process of determining what those perceptions and responses are in a given context, and may support a refinement of the problem into hypotheses to be tested.

Software engineering practice has been slow to recognise the importance of UX, with undergraduate text books [330] still making no mention of it, and practitioners in Human-Computer Interaction (HCI) do not always acknowledge the full scope of user research, some even equating it with usability testing [199, p263]. Recognition of its breadth has come more from the design community. The importance of context is particularly highlighted by Holtzblatt and Beyer [155] in their principles of contextual enquiry.

Over time, any repeated activity will tend to create boundaries between those who have participated and gained specific knowledge and competence from their participation, and those who have not. The specialisation of user research as a distinct activity will therefore tend to give user researchers a **boundary role** as gatekeepers to the understanding of user needs and a buffer to the uncertainty around them, as suggested by Tushman[369].

Appreciating the position of the user requires imagination, which necessarily introduces divergence in understanding across the team, so continual alignment and re-alignment with an agreed interpretation is required. With each iteration of the design, and any associated usability testing, there will be a deepening of their understanding and new opportunities for divergence until resolved by alignment. The process of exploring the problem, interpreting the findings, and translating them into project objectives is inherently a negotiation [101]. That boundary process of negotiation between user researchers and the wider team is a key part of the overall process of **discovery**.

In the context of frequent delivery, it is unhelpful to refer to a discovery phase, rather it is a continuous process that adds to the depth and scope of understanding as the product is developed, as illustrated in Figure 2.2. This figure is an application to UX work of the engagement, imagination, and alignment “modes of belonging” to a community of practice described by Wenger [384, p173]. To these I have added the practical step of mobilising a team, on recognition of an opportunity to pursue, and wrapped the whole in

its iterative context. The work involved may be concentrated during the early life of the product, and diffuse as it matures, but is not considered complete while the software and its context continue to co-evolve [202]. The alignment of individual and collective understanding will tend to increase over time as it becomes part of the team identity [384, p195] but may retreat and advance as new information is discovered.

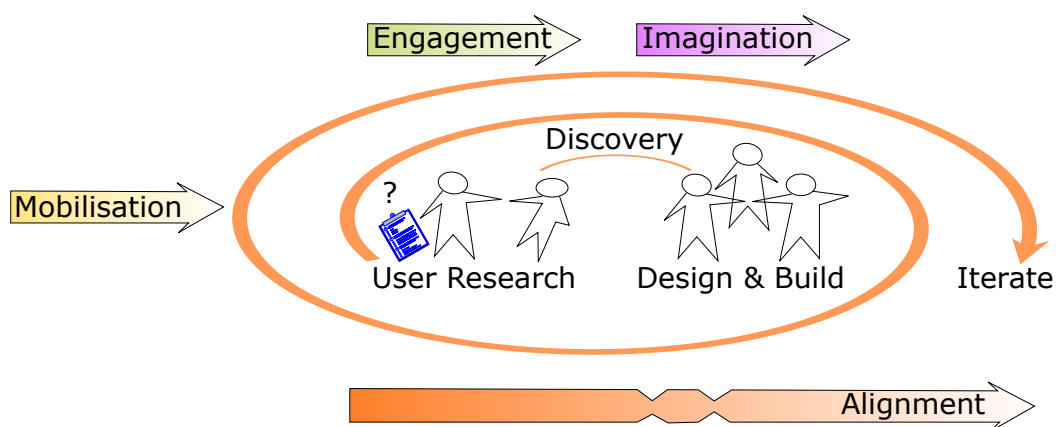


Figure 2.2: Discovery as a boundary process [290]

The UX practitioner’s interest in interactions is for their consequences rather than their mechanisms, so anything that changes the mental state or behaviour of a user is regarded as an interaction, whether it involves a change in state in the computer system or not. For example, a pop-up that obscures something in their field of attention has already interacted with the user whether or not they outwardly respond to it, so there is no requirement for an interaction to involve a two-way transaction.

Not all interactions are intended or desirable. Some interactions create false expectations when the system has been given the data but other people who needed it have not [14]. Lack of interaction may also be a problem, such as when the operators of autonomous aircraft lack the situational awareness to respond to unusual events [158]. Potentially traumatic interactions can be avoided by careful design. Avoiding those particularly related to death and

bereavement is referred to by Massimi as thanatosensitive design [226]

2.3.2 Agile development

If adoption rates are as high as claimed [335], Agile software development methods provide the context for a significant proportion of future UX work. The ‘Build’ component of Figure 2.2 hides potentially significant complexity. For example, does the use of a Test Driven Development approach, and its tendency to make coders focus on more local and testable behaviour [364], alter the way the design is interpreted? Such questions are outside the scope of this study but could be important to its conclusions.

Scope and Hand-off

While human-centred design has developed into a broader consideration of [user experience](#), development approaches have evolved from process-led ‘waterfall’ models to continuous delivery approaches such as that described by Gothelf and Seiden [129], where iteration is used to constantly refine the design. The changed relationship between scope and time, as illustrated in Figure 2.3 and 2.4, is the key feature of this evolution. Rather than planning, requirements elicitation, design, development, testing, and deployment covering the whole scope of the initial vision for the product, with detailed hand-off documents between them, successive development iterations include only as much of these activities as required for that increment in functionality and hand-off may be less formal.

The change in the means of hand-off has important consequences for user experience practice. When Takeuchi and Nonaka first used a rugby metaphor to describe development [345], they contrasted the linear hand-off of the baton between runners in a relay race and the more dynamic and integrated flow of the ball on a rugby pitch. One of the features of this metaphor, possibly missed by writers unfamiliar with the game, is that a scrummage is what happens *between* sprints. It is a point at which everyone is brought back together, the

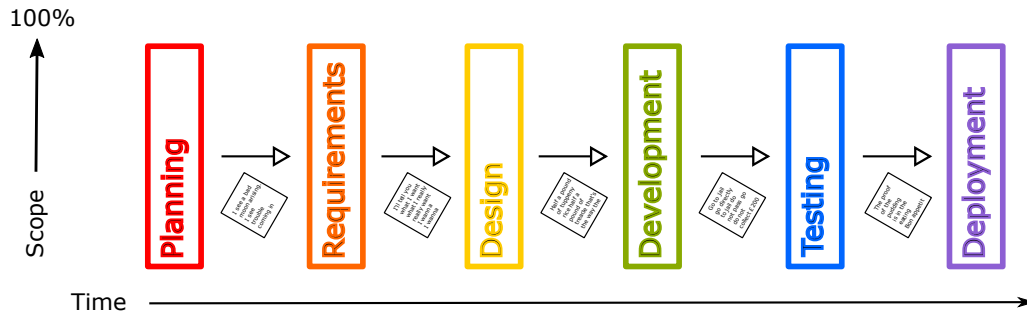


Figure 2.3: Scope over time in 'waterfall' development

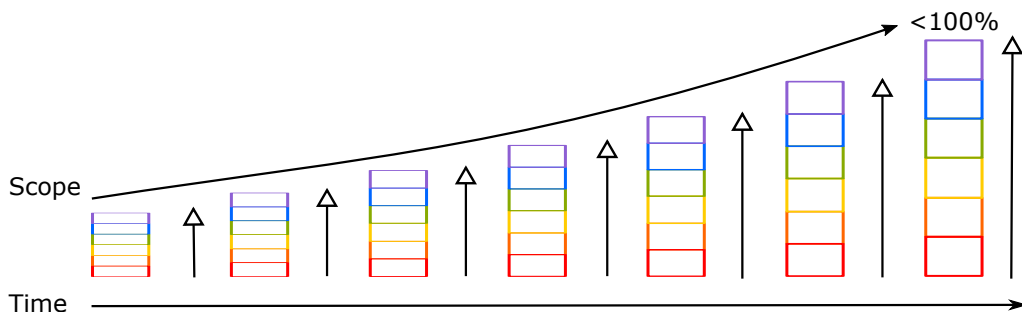


Figure 2.4: Scope over time in Agile development

game is brought under control, and then play moves on. Sometimes it moves in a new direction.

In his initial description of the Scrum framework Sutherland [343] said little about the time between sprints and only indirectly distinguished the *Product Backlog* of stories to be considered over the product life-time, embodying the Product Owner’s vision for the product, from the subset of these stories to be addressed by the next sprint. This subset is called the *Sprint Backlog* in later work [342]. The recognition of distinct backlogs can contribute to the integration of UX with Scrum.

UX in Agile development

A review of approaches to UX integration by Kikitamara and Noviyanti [185] identified three broad categories: parallel working, working within a sprint, and Lean UX.

In a parallel working approach, or dual-track Agile, as described originally by Lynn Miller [239] and advocated by Marty Cagan [52, 53], the UX practitioners and the development team work in distinct discovery and delivery tracks and synchronise their activities through the progression of validated ideas from a discovery backlog into the delivery backlog. The shared understanding that would have been gained from a single cross-functional team may be lost by this approach, but it can allow more time for user research activity. A possible course structure for teaching this approach is discussed by Péraire [270], using project-based learning.

Some organisations initially integrated UX design by adding an additional ‘Sprint Zero’ for discovery activities and then staggered the UX activity to be a sprint ahead of development, with a hand-off from the UX practitioners to the developers. In a case study at *VeriSign*, Najafi and Toyoshiba [247] describe a project taking this approach and contrast it with a later one where a more integrated cross-functional team was used. The staggering allowed feedback from usability testing and the resulting refinements to the design to be addressed in the remaining sprints.

People who identify as designers can be very protective of the title and can be reluctant to accept that design happens at every stage of development [331, 110] or Don Norman’s observation that “we are all designers” [254]. In an analysis of UX roles in Agile teams, da Silva *et al* argue that integration of UX design into development requires a culture in which designers and developers both understand what the other is doing, and why they need to be part of the process [80], supporting earlier work by Ferreira *et al* that identified the need for mutual awareness and negotiation of progress [112]. They do not always realise the need for communication, or that the power balance between them may evolve during the project [274]. As UX work tends to be spread across the whole development process there is a need for continuous user research, design, and evaluation [81].

Unlike manufactured physical objects, the cost of replicating a software product is essentially zero. Existing code that already does what is required need only be distributed and installed. It follows that software development consists of building something new, either new to the world or at least new to the developers, and so involves some element of learning and discovery. The Lean UX approach described by Gothelf and Seiden [129] places discovery at the heart of development. In their experience UX outcomes are improved if design sprints produce a backlog of hypotheses about features that contribute to achieving the desired business outcomes, given current assumptions about the users to be served and the outcomes that motivate them. They then define the content of the next development sprint and the Minimum Viable Product (MVP) that it will produce in terms of the most important question to be answered next.

Uncertainty

A failure to engage with uncertainty contributed to some high profile project failures. One of the key findings of the National Audit Office (NAO) report into the £100m failure of the BBC Digital Media Initiative [122] was a lack of assurance that its design was technically sound. In a study commissioned by the BBC Trust [278], it was also reported that management were more

focussed on technical delivery than business outcomes, so failed to identify key dependencies. A more iterative approach would have exposed the inherent complexity and risk in what they were doing, as described by Marton and Mariátegui [225], at a much earlier stage.

The Cynefin sense-making framework [328] is helpful in understanding how different levels of uncertainty demand different approaches to problem solving.

For problems in the *Simple* domain, the relationship between cause and effect is clear and discernible. If the situation can be categorised, then best-practice responses for each category can be determined or may be self-evident. The premise of standards like WCAG [55] is that accessibility falls in this domain, but Power *et al* [276] found that only half of the problems encountered by blind users were covered by the standard, and recommended taking a design principle approach rather than focusing on the problems. In similar research, Tixier *et al* suggested that approaching accessibility from the ethics of care rather than the ethics of justice may be more effective [359], so we should prioritise meeting needs and avoiding harm over compliance with rules and standards.

The *Complicated* domain has clear cause and effect relations but they are discernible only by those with appropriate expertise, and expert analysis may be needed to select a response from a number of equally viable options. Data protection, security and safety issues are typically in this domain [127, 280], although preventative good practice can reduce the risk and the consequences.

The *Complex* domain is characterised by cause and effect relations that are unclear until viewed in retrospect, when patterns may emerge that could not be predicted, so providing what Snowden refers to as *retrospective coherence*. The recommended approach to problems in this domain is to make sense of the situation by conducting safe-to-fail *probe* experiments to uncover patterns that may then inform the response.

The availability of affordably ubiquitous networks has first enabled and then accelerated an important paradigm shift in software development. Previously software was just an artefact, that we interacted with as we would with any other tool, but we are increasingly building systems that are a platform for us to

interact with each other. In these systems, the artefact is no longer the product, the *interaction* is. This shift in what we value creates unknown unknowns, and places social media and online workspaces in the *Complex* domain where we may only understand how harm has been done after the event. Nevertheless it should be possible to anticipate undesirable features inherent in the design, such as the imbalances of power described by Curchod [78], and from these and similar characteristics identify potential problems, even if the mechanisms are unclear, by probing the team's understanding of the problem in a safe-to-fail way.

In the *Chaotic* domain cause and effect are unclear and confusing. Action is needed to establish an island of stability [205] from which the situation can be sensed and understood before responding. A chaotic situation can result when an unintended consequence of the design causes a surprising problem for significant numbers of users, or becomes a high profile failure due to social media engagement with those affected, such that action needs to be taken urgently whether the cause is properly understood or not. The likelihood of acting swiftly in the right direction might be improved if the possibility had at least been considered sufficiently to recognise the symptoms and make a reasonable initial diagnosis.

Decision making and information

Information from 'better' questions does not necessarily improve the decisions made. Jacoby argued that 'better' can only be reasonably defined with respect to the information available [168]. Mennecke and Valaccich found decision quality to be related to group cohesion. Less cohesive *ad hoc* groups are less inclined to discuss minority information, challenging availability [233]. Using theory and simulation models of decision making, Raghunathan [283] found the quality of the decisions made only improved with better information if the decision makers understood the relationships between the decision variables. A study by Brodbeck *et al* [43] into group decision making, where members of the group had additional unshared information pertinent to the decision, found that minority dissent within the group was helpful in bringing the additional

information into play but only if the degree of dissent was sufficient to overcome the natural tendency to align with perceived group preferences. Similar work by Scholten *et al* [315] indicated that decision making processes that motivated higher levels of evidence and raised doubts about the sufficiency of the available information were effective in using unshared information but not necessarily in bringing it out in open discussion.

Geographical variations in practice

Currently there is only sparse literature on UX practice specific to the United Kingdom. It may be like that in North America as described, for example, by Gray [132, 133], or more like that in Nordic countries as described by Bruun *et al* [46], but the commercial culture and context are different, which may result in different outcomes. The UK Government Digital Service was included in an international study of digital service teams by Mergel [234], who noted their role as innovators and catalysts of change, but concentrated on their emergence rather than actual practice. This study addresses some of the design discovery aspects of that gap.

2.4 Theoretical context

The motivating question (MQ) must address two interwoven and dependent questions: how do groups of people work together to arrive at a design that achieves the desired outcomes, and how do individuals within these groups make the choices that enable desired outcomes to be delivered. These questions are informed by the social learning theory of Communities of Practice, and by the cognitive theories underlying Choice Architectures.

2.4.1 Communities of Practice

Teams engaging with uncertainty participate in a form of social learning, but may not recognise it or have sufficient awareness to reflect on it. Developing

the concept of a community of practice [384], Wenger introduces the idea as “a community created over time by the sustained pursuit of a shared enterprise.” and stresses the need for a balance between the shared understanding achieved by participation and that gained by projecting abstractions onto more concrete forms, termed *reification*.

The negotiation of meaning that occurs in participation involves an exchange of assumptions, but not all the abstract ideas are likely to be captured in full in any objects created, so some assumptions will remain implicit and understood only in the context of the community. The resulting ambiguity provides flexibility needed to maintain the community by allowing any misalignment in interpretations to be resolved by discussion. Similarly, any inconsistencies in practice can be identified and repaired by reference to a more concrete form of the shared understanding, and Wenger describes the latter reification of meaning as having a close interplay with participation.

The Agile manifesto [27] prioritises participation over objectification, to the extent that it prioritises delivery over documentation, but that is not the same as giving lower priority to reification. Daily stand-up meetings with their verbal reports and updates to the progress board, usability tests, and stakeholder demonstrations of prototypes are all forms of reification. They make abstract notions of progress and design more concrete and further negotiate meaning by the participation of the team.

Leaving some information to the collective understanding of the team, rather than documentation, reduces the inertia of revising details, and functional changes can be contemplated that might otherwise have a disproportionate cost. Making small, frequent changes affordable enables continuous deployment [217, 333] and rapid iteration. The penalty for this implicit knowledge is the impact it has on the management of competence within the team.

Members of a community of practice will have a changing relationship with it over time. Wenger refers to these relationships as trajectories. Some never fully participate and have a *peripheral* trajectory, and may find it difficult to maintain alignment of their understanding. New members are on an *inbound* trajectory, where their participation is expected to grow. Their induction into

the shared understanding places a burden on existing members if answers are not available independently. External changes create a need for members to refresh and extend their knowledge, so their *insider* trajectories may include excursions for professional development. Any additional *boundary* trajectories linking their work to other communities or other aspects of their personal or professional identity enrich their understanding but constrain their available time. Career changes will place some on an *outbound* trajectory. Capturing their contribution to the shared understanding within the institutional memory before they go may be limited by collective awareness of that contribution.

At its most abstract, alignment of practice is an alignment of mindset and its associated norms and values. Studies by Töytäri *et al* and Huikkola *et al* found mindset to be particularly relevant to products with communication capabilities [365, 156]. In an immature discipline, mindset may be all that practitioners agree upon, and Gray suggests this may still be the case for UX activities [133].

Over time, as details of practice become standardised by regular engagement with other practitioners, the agreed practice may be refined from an informal understanding by increasingly concrete descriptions and codified into a more formal idea of how activities should be conducted. If this process continued without the enrichment provided by boundary trajectories, a mechanistic rote procedure might be arrived at that required no interpretative imagination in its application but which might become ‘brittle’ and too inflexible to cope with external demands. Wenger identifies the cause of such brittleness as alignment that depends on the absence of unforeseen situations, and a lack of what he refers to as *negotiability*.

The importance of that enrichment can be seen when a practice is adopted mechanistically from another organisation without learning and adapting it to the local context. Pyle and Liker described the introduction of lean methods into General Motors [282]. This was intended to avoid problems in production by anticipating their occurrence at the product development stage and taking countermeasures to prevent them. They concluded that problem solving across organisational boundaries required adaptive organisational learning not just a

rote copying of processes, building on Pyle's suggestion in earlier work [281] that when a process requires both explicit and tacit knowledge then more sophisticated methods of knowledge transfer are needed.

Learning is a response to the design process, not a designed output, but its context can be designed [384, p225]. New information requires the team's active participation in the negotiation of its meaning before it can be usefully exploited as new knowledge in the next iteration. The *negotiability* of this information is a reflection of how much opportunity the individual members of the team have to discuss and internally translate it into something relatable and meaningful to each of them. If they are reliant on an imposed encoding of it then their own understanding will be brittle, and vulnerable to the failure of embedded but unchallenged assumptions if applied to a new situation. If the initial design thinking lacks important considerations then the corresponding voices are likely to be missing from the negotiation, and conflicting interests may not be addressed, as discussed further in section 3.2.3.

Choice Architectures

Companies in what Dahlström describes as the *experience economy* [82] aim to create not just a product but a curated experience of using it. By enrolling potential customers into these purposeful stories they differentiate themselves from competitors, and nudge us toward a more favourable opinion of their product. Thaler and Sunstein introduce the idea of a *choice architect* as someone with responsibility for organising “the context in which people make decisions” [349, p3]. How designers act as choice architects for the users of their products, as applied to human-computer interaction for example by Jameson *et al* [170] and reviewed more generally by Szaszi *et al* [344], is well described but there is little recognition of the choices that designers themselves make and of their own entanglement in the stories that they construct.

The review by Szaszi *et al* [344] recommended that, as the cognitive processes involved are complex and poorly understood, choice architecture interventions (‘nudges’) could be more reliably characterised and described if the techniques applied were used as a structuring principle. The *ARCADE* model described by Jameson *et al* [170] describes strategies for supporting choices, including:

- Provide access to relevant information or experience
- Represent the choice to assist judgement
- Provide a systematic argument structure

Lloyd identified storytelling as central to shared understanding in design teams, and an important means of linking events to the people needed to enable or prevent them [213]. If the *ARCADE* strategies were applied to design activities involving important choices, such as identifying user interactions that should be prioritised or prevented, then a storytelling approach would suggest the following tactics:

- Distilling relevant information and experience into scenarios
- Visualising choices around an associated event
- Structuring an argument around user outcome goals

These are applied in my method design, in Chapter 6.

2.4.2 UX process models

In a process reference model for UX [184], Kieffer *et al* divided methods into those eliciting and capturing knowledge, with or without involving users, and those facilitating communication by the creation of artefacts. They make no mention of [user research](#), and do not distinguish it from UX design. The artefact mediated methods they considered are not listed, but they assume artefact creation is their purpose and only necessary distinguishing feature. They do not consider the boundary-object role that design artefacts play in comprehensive approaches such as Goal Directed Design [71]. The elicitation methods they focused on aim to capture attitudes, feelings and opinions on user interactions with the system, or to observe and understand user behaviour. They acknowledge the gap between research and practice, but mention no practitioner involvement in their study. The life-cycle models referenced are more than ten years old so have not benefited from more recent attempts to integrate Agile and UX.

In an effort to integrate UX with the [Unified Process](#) [13], Nasiri and Sadler proposed a ‘UXUP’ [248] life-cycle which was then evaluated by practitioners in Queensland, Australia. Feedback was collected by interviews, questionnaires and group workshops, and was positive toward its user orientation but indicated a lack of clarity in the process. In line with ISO standards [166], [discovery](#) was treated as a distinct stage but they acknowledged its role in modelling and risk management throughout the life-cycle. The [user research](#) role was not distinct in their model, but listed as a sub-discipline of UX modelling and covered by the UX designer role.

Following integration of IT operations with development [333] to support continuous delivery, and in response to the difficulty of aligning design studio culture with Agile development [217], practitioners in the design community have been sharing ideas on how to define a discipline of [Design Operations](#), to enable efficient design practice at larger scale and complexity. Some companies are sharing their experience in informal handbooks [220] and ‘playbooks’ [84]. Within it the [user research](#) activity and its organisation belong to the [Research Operations](#) discipline, as shown in Figure 2.5.

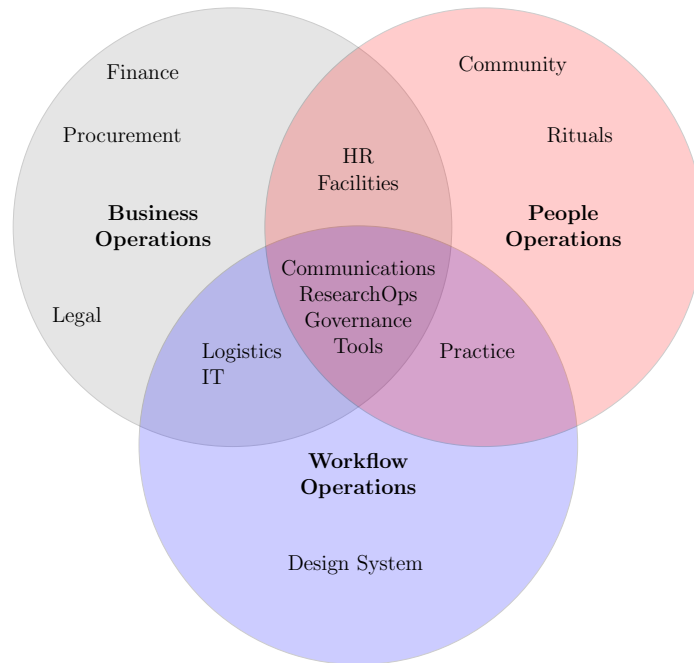


Figure 2.5: Components of DesignOps [220]

2.5 Design ethics

2.5.1 Ethics in practice

Ethics in software development

Bowles suggests that when making choices a designer is making a claim about “what should be”, bringing design into the realm of ethics [38]. The role of ethics in design has previously been under-taught in business generally [214] and in computing [222], but historically the software profession has perceived a failure to meet customer expectations as a failure, regardless of whether cost and time objectives have been met [210]. Analysis by Luz *et al* suggests a collaborative culture that avoids unfair blame assists innovation [216]. An acceptance of moral responsibility and consideration of ethical issues has not been an explicit part of the software engineering process, but Barbosa *et al* suggest this might be assisted by capturing and acknowledging our intent [22].

Learning from adjacent disciplines

Working across disciplines can help understanding of complex issues, as found by Hall *et al* when using artworks in security awareness [142]. The distinction between safety, security, and usability can be somewhat arbitrary, and this thesis later considers whether ethics can provide a unifying theme for their design, in section 8.3. In the military aviation context, effectiveness and safety are closely linked. Consideration of safety issues during the earlier design stages was found by Hewitt and Foito to increase the effectiveness of mitigations and allowed them to be more fully integrated into the design [150]. This is referred to as moving up the order of design precedence [206, p154]: firstly eliminating it by design, reducing the risk of occurrence, adding barriers that interrupt the mishap sequence, incorporating equipment to protect people from the consequences, providing a warning of their occurrence, or lastly developing procedures and training to avoid triggering it.

Safety and usability are linked, as incidents result from confusing interfaces or assumptions about how people will respond [340]. User information distilled into personas has been adopted from usability by security analysts wanting to understand threat actors [108]. Formal analysis of non-interference conditions, that was developed for understanding security constraints [297], has also been applied to transport safety [325] and drug interactions [59].

Excluded and unwanted interactions

The extent of the fully considered interactions in a design, compared to those actually possible, can be visualised with a panda diagram such as that shown in Figure 2.6. This is based on the ‘Inclusive Panda’ diagram proposed by Per Axbom and used in his *design ethics* workshops [17]. The distinction is made between ‘excluded’ and ‘unwanted’. Interactions that are fully considered and included in the design are a subset of those that are actually possible, but some of these may be broken in some way. Of the interactions that are possible, some may be an inadvertently useful ‘Undesigned Good’ to people we wanted to design for but were excluded in some way, who will be disadvantaged if they

disappear. Other interactions may inadvertently enable an ‘Undesigned Harm’ to people we never wanted to use our product, who could exploit them to harm themselves or others.

There is a direct link between the people considered and the interactions designed: if we exclude interactions we exclude the people who need them, and if we exclude people from participation in the design process then we orphan the interactions that supported them. These orphaned interactions, and their code, are a triple threat to the product: they may have latent bugs that are no longer getting usability testing as we have excluded the stakeholders, they may provide exploitation routes for cyber attack, and they may be an obstacle to refactoring and other architectural improvements needed to support wanted improvements.

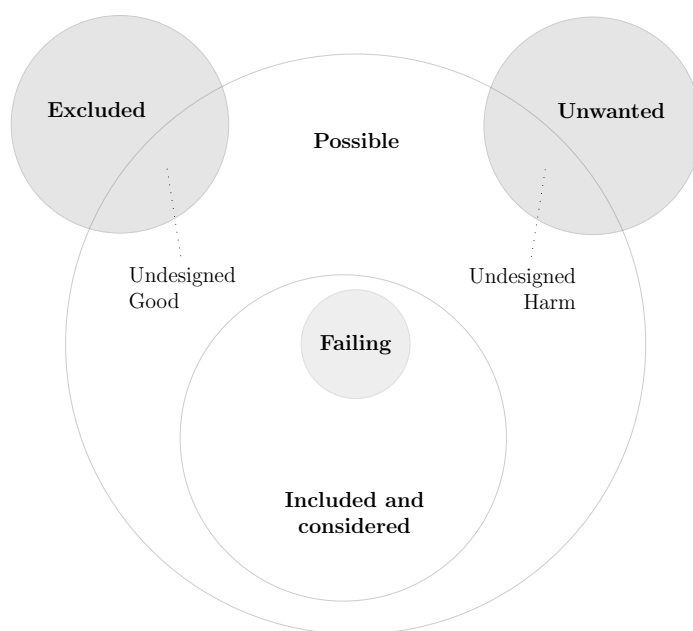


Figure 2.6: Interactions excluded or unwanted in design, after Axbom [17]

Avoiding harm

PenzyMoog focussed on the problem of how to design products in ways that avoid deliberate harm [269]. An outline for ‘Inclusive Safety’ is described that primarily addresses the ‘unwanted’ side of the problem (2.5.1), to assess how technology will be used for harm and empowering vulnerable users to prevent that harm. Harms specifically covered are [Technology Facilitated Domestic Violence \(TFDV\)](#) and coercive control. The process described has five steps: conducting research to surface misuse cases, constructing abuser and survivor archetypes, brainstorming problems, designing solutions, and testing for safety. The focus of this process is distinct, but the method itself is essentially that already used in design sprint [189] and creative sprint approaches [121]. The focus is on how things go wrong rather than what we want to go right, which has a tendency to robust hindsight rather than resilient foresight [89], and there is only limited additional abstraction of the problem that might help with creativity and imagination [397]. So, while a welcome addition to practice in a specific area, it does not address the broader aims of this research.

Bowles is concerned about the use of “vehemently empirical” methods that are outcome agnostic and treat unintended consequences as externalities that are outside the scope of the design [39]. He makes some general suggestions: rather than prohibitions define positive heuristics and codify virtues, bring ethics specialists into the company to facilitate the design conversation, and slow down and challenge. As an aid to challenging assumptions, he provides a long list of ‘virtue prompts’ that serve a similar purpose to guide words in the [HAZOP](#) method. One of the criticisms that can be made of this approach [26], is that indiscriminate additions to the list of prompts can cause confusion and do not necessarily identify the system property that you are trying to preserve, so fewer and better understood prompts may be more effective.

2.5.2 Academic analysis of design ethics

Expert practitioners

Practice-led research by Gray and Chivukula [135] looked at case studies of design from an ethical perspective to identify individual and organisational practices and how these were mediated by ethics. Their findings were a rich narrative description of those cases, including the impact of legal frameworks and a contractual mindset, and the ability of individuals to uphold personal value systems. They recommended future work should engage at both the individual and organisational levels, to understand how organisational practices constrain, fragment, and subsume individual practice.

Student practitioners

In a related paper, Chivukula *et al* [63] explored how UX students interacted with each other while solving either altruistic or commercially focused tasks, using a Value Sensitive Design (VSD) approach [119]. Values that the students considered were identified, but were found to be inconsistently engaged and decisions were made that were not ethically focused, despite the value-related training in their design curriculum. The authors recognised that further work would be needed in professional practice settings, but the findings suggest that practitioners using an unfamiliar or novel method might similarly struggle to be consistent and might benefit from active facilitation.

Ethics focused design methods

In a pre-print paper, Chivukula *et al* [64] report the results of a survey of 89 methods, tools, and approaches that have a stated intention of supporting ethical design. These were characterised by which design phase they supported, whether they were aimed at teams or individuals, and what artefacts or other outputs were produced. Only nine of the methods addressed *discovery* activity. Of these nine, only three were applicable to the whole life-cycle through to deployment and maintenance. These were ‘Design Fiction Memos’ [389], and

the ‘Inverted Behaviour Model’ and ‘360 Review’ from the [Design Ethically Toolkit](#), all of which took the form of a document or guidebook rather than worksheets, cards, or other media that designers could creatively engage with. The ‘Inverted Behaviour Model’ is a form of anticipation based on Fogg’s work linking motivation and user behaviour [114], and might be a useful starting point for more general anticipation.

The [Value Sensitive Design \(VSD\)](#) approach has been criticised by Reijers and Gordijn [289] for being too general, in the sense that its notion of value is whatever the stakeholders consider important at the time of asking [119], rather than any fundamental property of the design that will be persistent over time. They argue that this makes it essentially a form of participatory design, with an ethical flavour but lacking in moral substance. The capture of values onto ‘envisioning cards’ [118] might address this criticism by embedding values regularly identified as important into organisational practice. The questions that accompany envisioning cards are a weak form of anticipation, being based on problems seen before or assumptions previously challenged.

Discovery activities may not consider a sufficiently wide range of human and system behaviours to identify problems arising from the interactions between them. Reliance on previous solutions may result in ‘design fixation’ [376, 75] prioritising some aspects but overlooking others. Designers may believe they have a thorough understanding of the context without adequately considering what has changed, so the role of [UX](#) practitioners in constructing design stories, and the relationship between them and outcomes, is relevant [261, 213, 265]. Stories are not generally discussed in the context of anticipating problems, though Dahlström does include the topic of antagonists [82, p185].

2.6 Knowledge gap

An analysis of requirements engineering papers by Curcio *et al* [79] still found specific gaps in research on the management of requirement sources at the elicitation stage, despite Gotel and Finkelstein having raised the issue in the mid 1990's [128]. A review of the application of Agile methods by Dikert *et al* [96] collated challenges and success factors reported by practitioners, but found that there was “a lack of sound academic research on the topic”. Wahlström *et al* [380] described methods of modelling user activity intended to facilitate radical design ideas, which may be applicable to interaction discovery. These were further developed by Varsaluoma *et al* [375], but with inconclusive results, so they identified a need to repeat their study with practitioners from industry rather than participants from academia. Gaps in current literature were identified by Ogunyemi *et al* in knowledge creation and sharing [257], reporting of the working context in Agile studies by Vallon *et al* [374], and relevance to practice by Jurca *et al* [175]. By focusing on *discovery*, I aimed to address those gaps in a coherent and practice-centred way.

Recognising a social context in which the ubiquity of software makes it use non-discretionary, the topic of design ethics was identified as important to the study. Within the wider practice of *UX*, the central role of *user research* in ethical design practice was identified. A strong theme of knowledge sharing in Agile practice [195, 263] led to the adoption of Wenger's work on *communities of practice* [384] as a useful basis for understanding the relationships between the roles in a multi-disciplinary team. The role of designers as *choice architects* was noted. Studies involving practitioners were identified, but few were focussed on *discovery* or described current practice within the UK.

Chapter 3

Challenges of discovery

3.1 Characterising the problem

The review of recent publications in Chapter 2 concluded that current [discovery](#) practice and the nature and scope of the problem I wish to address are not adequately described in the literature. In this chapter, examples from daily life are used to illustrate why I believe there is a problem that originates in design and might be resolved by it. Some of the categories that these issues may fall into are identified, and the consequences for [user experience](#) are set out.

3.1.1 Scope

The most readily encountered examples of poor user experience are websites. Sometimes it is a deliberate choice by the designer, a ‘dark pattern’ applying their understanding of psychology to further a goal that is contrary to the best interests of the user, by deception and misdirection [137]. This thesis does not address ‘asshole designers’, as Gray calls them [136], because new discovery methods cannot prevent wilful harm. My concern is the accidental reliance on a flawed assumption or incomplete analysis. The examples below follow from inadvertent flaws that might be avoided by a willing designer if a different approach were taken.

3.1.2 Public confidence

In their final digital attitudes publication [238], the Doteveryone think-tank reported that nearly half (45%) of those surveyed felt that there was no point reading product terms and conditions because companies do what they want anyway, and only a fifth (19%) believed that digital products and services were designed with their best interests in mind. A quarter (26%) said that no action was taken when they reported experiencing a problem online. Despite this, most people (81%) thought the Internet had made life better for them and the majority (58%) that it had a positive impact on society. The contrast between these positive and negative sentiments suggests a potential for sudden and significant swings in public confidence. Public trust and confidence in complex systems is important because it facilitates innovation [61] by reducing aversion to new approaches and ideas and by making the interactions between the participants more predictable to each other [207].

In November 2013, Adrian Wooldridge predicted we would see a “growing peasants’ revolt against the sovereigns of cyberspace” [391] and described it as a *techlash*. The prediction may have been a little premature, but by November 2017 congressional hearings into the role of social media platforms in the 2016 presidential elections [320] and later in 2018 into the use and abuse of data [319] demonstrated that law makers were taking the growing power of Silicon Valley seriously. Self-regulation mechanisms have been proposed [147] but change at the organisational level can only be effective if it is based on a change in the disposition of engineers to the things they are being asked to do and the reaction of wider society [338].

3.1.3 Technical debt

Analysis of the trend in software project outcomes published by the Standish Group in their regular CHAOS reports, as illustrated in Figure 3.1, shows that outright success and failure rates significantly improved in the period 1994 to 2014 coinciding with the introduction of Agile methods. However, the likelihood of the project being delivered with at least some significant shortfalls,

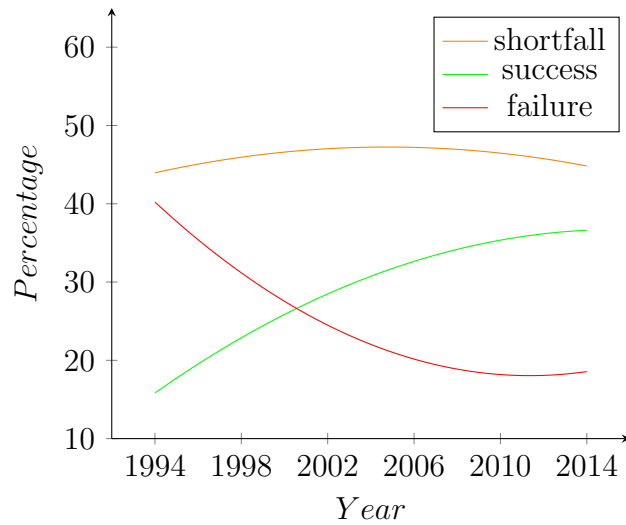


Figure 3.1: Software project outcomes. (Source: CHAOS Reports)

compared to the intended scope, remained largely unchanged. The criteria for success used from 2015 onward [353] is based on customer satisfaction, regardless of the initial scope, so is a better reflection of outcome but makes comparison with earlier studies more complex [352].

Whether shortfalls are strategic **technical debt**, for example incurred in the rush to be first to market, or tactical debt resulting from limited understanding or implementation challenges [360], they are a form of unfulfilled obligation. They might result in correspondingly unfulfilled usability, security, or safety obligations that need to be carefully managed. When considering the notion of safety debt, Cleland-Huang and Vierhauser [66] suggest additional ‘hardening’ sprints to address any safety concerns identified by analysis at the end of the sprint. These are a more analytical counterpart to the **spike** tasks commonly used to address issues found in usability testing or gaps in understanding [3].

In addition to the technical consequences of unfulfilled obligations, **technical debt** can also impact team motivation and undermine its effectiveness [292]. By reducing self-efficacy, the ability of team members to cope with stress resulting from ambiguous performance expectations or uncertainty in how to perform a task may also be reduced [354].

3.1.4 Human performance

Design is recognised as a wicked problem [293, 47] where our understanding of the problem is entangled with our conception of possible solutions. Each design problem is essentially unique and not solvable by applying a general technique. However, the goal of efficiency [279] is still pursued by organisations wanting to reduce commercial risks, make their processes more predictable, and scale their activities to larger teams dealing with more complex problems. The [Design Operations](#) movement attempts to do this in a sustainable way, by focusing on collaboration and communication to improve workflow [220].

The combination of behavioural design [60] and lean startup methods [36] is criticised by Bowles for its reliance on narrow business metrics as the driver for its empirical iterations [39, p40], without proper consideration of the user impact, as characterised in the phrase “Anything that moves the needle is fair game” [37]. Their application to public service design, in conjunction with [Scaled Agile Framework \(SAFe®\)](#) [201] ideas of value streams, has had significant impact on the working environment. Analysis of lean working in [His Majesty’s Revenue and Customs \(HMRC\)](#) and [Department of Work and Pensions \(DWP\)](#) by Martin [223] found that it resulted in deskilling, echoing what had been found in earlier studies by Carter *et al* [58] that also commented on an intensification of the pace of work, and that the focus on performance targets also impaired the quality of decision making and reduced the scope for professional judgement.

There is a dynamic relationship between the complexity of a system, the work involved in understanding its behaviour, and how quickly this can happen [88]. There is a risk, when pushing teams to the limit of how quickly they can work, that individual professionals can be so constrained that they have no space to manoeuvre. If they slow down, the whole project stalls waiting for them, if they speed up then important questions might be overlooked and the downstream consequences could be disruptive. Rasmussen described these kinds of situation using a dynamic safety model [285], typically illustrated with a three boundary diagram such as [Figure 3.2](#). Given boundaries set by the ‘worst’ tolerable efficiency of resource use, quality of output or outcome, and

workload on the team, a business will try to find an optimum operating point somewhere between those boundaries by improving efficiency and reducing the effort required, but in doing so may reduce the safety margin unless there is also a countering drive to improve quality.

Using an analogy from aviation gives an alternative presentation of dynamic safety in terms of the operating envelope available between working too slowly and ‘stalling’ the project, impacting efficiency, or ‘skimming’ complex material too quickly, impacting quality, then suffering disruption when problems surface later. I used this in discussions with practitioners, as stalling and skimming were easier to communicate, and these informal terms did seem to be intuitively understood without making references to safety that might have confused their understanding of the research aims. The expression “flattening the curve” was in widespread use at the time to describe the public health response to coronavirus, so was helpful in describing the aim of reducing complexity to a level that could be coped with at pace without being limited to trivial problems, as illustrated in Figure 3.3. The analogy and figure should not be taken too literally, as it is not based on empirical evidence of work rates at different levels of complexity, but it reflects my experience as an analyst.

Reducing complexity, and providing tool support to sustain high work rates, was the approach we took in the 1990’s to increase air traffic system capacity and reduce delays [180, 314]. Structuring the problem to reduce the complexity of design challenges [25] felt a natural candidate approach to scaling up software design activity while still anticipating potential harms and avoiding them.

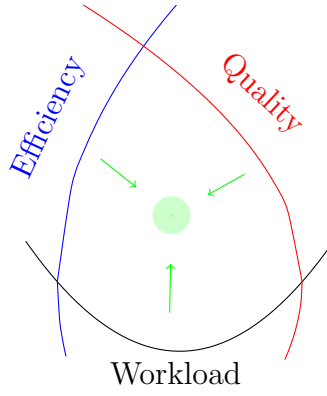


Figure 3.2: Dynamic safety model, after Rasmussen [285]

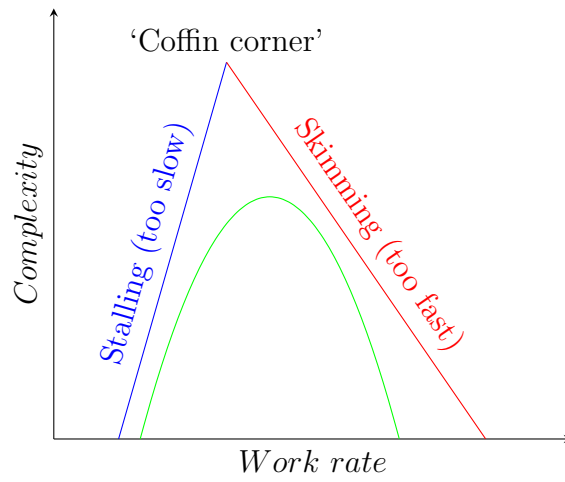


Figure 3.3: Understanding complexity versus work-rate

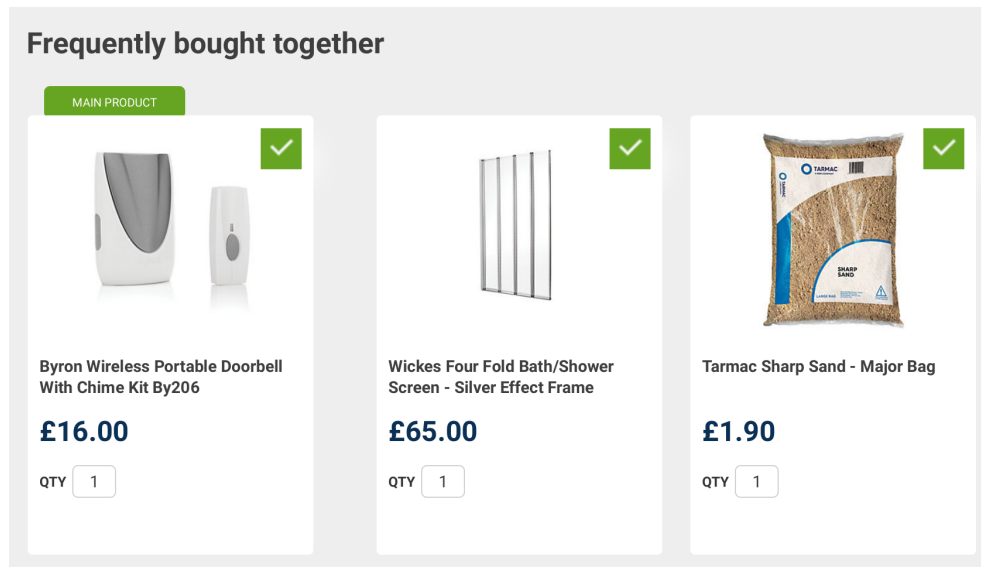
3.2 Poor outcomes

Quality of experience can be impacted in ways that usability tests miss due to over reliance on ‘typical’ cases.

3.2.1 Poor quality advice

Recommendation systems using machine learning [109] are widely used in on-line retailing. They can be very helpful in exploring an otherwise daunting array of choices, but our trust in the recommendations may be misplaced [21] or the results may occasionally be so strange that we withhold our trust in future, as illustrated in Example 3.1. Integration of algorithmically driven social media with online retail to give social commerce platforms [310] may create a situation where it is not clear what the biases might be or even whether the apparent recommender is human. A lack of trust and transparency detracts from the user experience and may infringe legal rights [218], but also complicates the work of designers and analysts in understanding user behaviour and motivations.

Example 3.1 *Advice on door bell purchasing patterns*



3.2.2 Unwanted memories

In 2014, designer Eric Meyer wrote in his blog [236, 271] about the inadvertent cruelty he had suffered as the result of the *Facebook* ‘Year in Review’ feature. His daughter Rebecca had died earlier that year, and he had not expected to suddenly be shown a picture of her face with a jarringly thoughtless caption. Other companies have learnt from his sad experience [167], and now offer to filter out sensitive pictures from algorithmically generated content, as shown in Example 3.2, but *Facebook* still has work to do. As one user commented recently, on receiving a notification about their recently dead husband, we need to “design for bereavement because it is a normal part of life” [231].

3.2.3 Conflicting interests

Conflicting interests can be seen when popular products are modified in ways that their users dislike. For example, the need to attract and retain advertisers to fund freely provided services can conflict with the needs of those using it.

Example 3.2 *Protection from algorithmic content*

Memories

Show memories
Above all your photos

On Android devices the ‘Memories’ gallery excludes people and pets from lists of previous pictures.

HIDE FROM MEMORIES

 People and pets

One company that suffered from this was *Snapchat*. The changes would have made it a friendlier platform for advertisers by giving greater prominence to their content, however there was an immediate outcry and a significant drop in its popularity [116]. Analysis by Jeong and Lee [171], identifying possible reasons for its popularity, could have provided a warning against the changes. Users felt a meaningful connection with the people they communicated with. This feeling of [social presence](#) was lost when the narrative was disrupted, and some celebrities complained of feeling estranged from their followers. Failure to recognise the reasons for the product’s popularity indicated a brittle design process in which users were insufficiently represented and engaged, with the result that key assumptions were unchallenged and later found to be wrong, with the impact summarised in [Example 3.3](#).

Example 3.3 *Snapchat user revolt*

In 2018, the social media platform *Snapchat* pushed out an update to all users. This changed the way that they experienced the application [116], and resulted in a substantial backlash, to the extent that a celebrity comment on the change was reported by The Guardian newspaper to have cut more than one billion dollars from the company’s stock market value [148, 385]. A petition asking for the change to be reversed gained one and a quarter million supporters and was ultimately successful [301].

3.2.4 Feature interaction

Unwanted interactions do not have to be with the user or between users. Poor outcomes can result from internal system interactions that are unseen at the time but impact customer experience later. In Example 3.4, a well intentioned facility to link customer accounts had the unintended consequence that the wrong address was acted on. In this case a feature that was a genuinely useful convenience for a retail customer made it impossible for customer service staff to do their job effectively. An interaction designed for one primary user caused unforeseen but mission critical problems for another.

Example 3.4 *Unwanted feature interactions in a telephone billing system*

While working away from home, I had two phone and broadband contracts with the same company. This company allowed customers to link multiple accounts within a single profile, from which any of the accounts could be accessed. One of these was taken to be the ‘primary’ account. Whichever number you supplied, or the address details you provided, the customer details displayed in the call centre were those of the primary account. When I signed up with a cable company at one address and called the phone company to close that account, it was the details of the other address that were selected, and the wrong line was disconnected.

3.2.5 Different motivations

Customers do not necessarily buy a product for the reason that it is sold, as in Example 3.5. The crunchy almond cookies were attractive and nice to eat, but one of the reasons for their popularity was what you could do with the wrapper. This interaction is one the makers never intended, but was popular with consumers and a positive part of their experience of the product. Sadly, Lazzaroni appear not to have understood this, and they changed the wrapper to a plasticised paper that burnt differently, and lost the unintended but valued feature.

Example 3.5 *What the heck did they do to the wrappers?*

The Amaretti di Saronno cookies made by Lazzaroni were individually wrapped in a thin waxy paper. Furled into a cylinder, placed on an outstretched hand, and ignited at the top, the wrapper would burn slowly toward your palm until, just at the last moment, the paper would lift into the air and spiral up on the column of warm air created by its own immolation. Creating these ‘Amaretti angels’ was a popular ritual for families [8] and restaurant diners [209]. When the paper was changed to plastic, this no longer worked, and prompted an anguished Christmas day review from one Amazon customer [181] describing how his family had been disappointed by the refusal of the wrapper to fly.

3.3 Summary

Challenges for discovery practice can stem from the inadvertent reliance on flawed assumptions or incomplete analyses. In fast-paced development where teams are already under strain, this technical debt can be hard to recover, so projects are failing completely less often but are still disappointing customers as much as they ever did. This may not result in unintended consequences, but a large number of unfulfilled expectations may weaken the link between the design intention and the delivered product sufficiently to undermine attempts to anticipate problems, or make compliance arguments, based on that design. The public are suspicious of the software industry’s motives. Misunderstood needs can result in untrustworthy advice, jarring and upsetting interactions, conflicting demands from different stakeholders, unhelpful interactions between the system’s own internal features, and a failure to understand the source of current successes.

This exploratory study aims to enrich understanding of the problem and provide insights into current [discovery](#) practices by engaging with practitioners, and involving public sector designers who may influence the wider community of practice, as discussed in section 2.3.2.

Chapter 4

Research design and methods

4.1 Introduction

Chapter 2 discussed the need to better understand the current practice of design discovery, and Chapter 3 identified the challenges that practitioners themselves have in conducting discovery activities and what that means for design outcomes and user experiences. This study aims to contribute a richer understanding of current practice, and evaluates a novel means of integrating ethical considerations into discovery to address some of those challenges. This chapter explains how the research design addresses those aims and why this approach has been chosen.

4.2 Researcher perspective

4.2.1 Professional background

After graduating with an Engineering degree in Computing, I was accepted into the Civil Service at a research establishment. A new air traffic control centre was being built, and we were tasked with prototyping controller assistance tools for use on the new high-resolution colour displays. That provided an introduction to algorithm design and usability and performance assessment in

human computer interaction [180].

Recognising improvement in altimetry allowed aircraft separation standards to be revised, and I worked on a supporting safety study based on fast-time simulation of air-miss events [11]. That led to further fast-time simulation work on airspace designs, and to modelling the performance of the mission system in a fighter jet that was then in development. When it entered service, I joined the [Release to Service \(RTS\)](#) team to conduct [Independent Technical Evaluation \(ITE\)](#) of the airworthiness evidence, including assessing cockpit video from test flights and interviewing pilots in flight debriefs.

4.2.2 Philosophical standpoint

This study is fundamentally concerned with how people behave. They cannot be studied in the same way that physical sciences observe phenomena because the assumptions that underlie the use of scientific apparatus do not apply. The epistemic feature of counterfactual dependence [157, p243], that observations are sensitive to changes in the reality, does not necessarily hold as the difference might be internalised or deliberately withheld by the participants. The idea of refinement, that observing more closely yields more information, might not hold because participants might respond to a more invasive approach by being less forthcoming. A more flexible approach to knowledge than the traditional epistemology of “justified true belief” is required, that recognises observation as an active process of interaction with the world and accepts things identified as existing within it as an analytical output. The epistemological and ontological positions appropriate to this study are described below.

Epistemological position

A characteristic of design practice, as described by Stolterman [337], is that its complexity is not objectively measurable but is rooted in the subjective experience of the designer. This is reflected in work by Watkins *et al* [381], which identified tensions in the adoption of a design philosophy within an organisation. These resulted from the need to negotiate a shared position

because team members perceive different levels of complexity. This potential diversity of interpretation with no objective best practice, arising from social interactions and sense-making, naturally lends itself to a transactional relativist position in researching practice. What occurs within practitioners minds is both unknowable and key to the design outcome, so a subjectivist impression of the mental process is the most we can hope for. My epistemological position is therefore that of a pragmatic **social constructionist**, namely that knowledge is socially constructed by debate and negotiation of meaning, and that all necessary approaches should be used to understand the problem.

Ontological position

My ontological assumption is that the data collected describes only how things seem to be and conclusions drawn from this study may only be applicable to the communities of practice that participated in it, and as such I take a bounded descriptive **relativist** position. Only when discussing ethical jeopardy do I take a more normative standpoint. It is in the nature of **UX** to be an individual response to a design, which can only be designed *for* not itself designed. Any analysis of **UX** will therefore tend to a **constructivist** theoretical perspective when discussing the actual experience, and to **interpretivist** for the practices involved [243]. The reflexivity of the thematic analysis method, where findings are constructed as the research progresses, blurs the usual distinction between ontological and epistemological positions.

Methodological position

The approach is generally **inductive** [196], but tending toward **deductive** when evaluating the participants' use of the novel method proposed in chapter 6. The methodological questions specifically applicable to thematic analysis are addressed in section 4.5.

4.3 Research approaches

4.3.1 Approaches compared

The first question (RQ1) explored current practice:

What methods are applied in current software design practice to identify interactions with the user that the intended users will consider undesirable (RQ1)

The options considered were a systematic literature review, and some form of empirical study with practitioners. The second question (RQ2) explored how practitioners can be supported in improving outcomes:

How can designers be helped to maintain a structure for their work that assists identification of undesirable interactions (RQ2)

The options considered were a quantitative or a qualitative empirical approach. An experiment could, in principle, be designed to compare a standard approach to design with the novel approach and measure key outcomes. The key features of literature review and empirical study are compared in Table 4.1.

Selection of approach for RQ1

A Systematic Literature Review has few dependencies, is cheap, and takes a predictable course so could be a low risk option, but it assumes the phenomena of interest are well described, and I knew from the literature review (2.6) that discovery practice was under-researched. Papers reviewed were often vague about the backgrounds of participants, making it hard to identify the relevant community of practice, and identifying suitable search terms in advance that adequately addressed RQ1 would have required insights unavailable at that point [35]. An empirical approach was judged to be more appropriate, and took the form of Ketso workshops to understand practitioner goals (Study 1) and interviews to explore detailed practice (Study 2).

Table 4.1: *Systematic Literature Review vs Empirical study*

Feature	SLR	Empirical study
Time taken	Depends on depth	Time consuming
Costs	Minimal	Travel, premises, equipment
Scope	Potentially global	Limited
Dependencies	Access to literature	Recruitment of participants Availability of venues Ethical approval required
Clarity	Well defined and standard	Loosely defined and multiple
Process	Summarises what is known	Asks current practitioners
Participation	If reported in previous study	All details available
Useful for	Widely researched topics	Under-researched topics

Selection of approach for RQ2

Measuring the current level of undesirable software outcomes and tracking any reduction or increase would be difficult without detailed information on current outcomes at a population level. A long-term case study might yield useful data but in the timescales of this study any method I designed was unlikely to reach a level of maturity to measure product-level impact, even supposing I could persuade a business to adopt it and gather the necessary data. Small scale controlled experiments could inform an understanding of how practitioners use a method, but any measurements would be specific to the scenario and participants. For these reasons, any quantitative empirical approach was inappropriate. There was a need to first understand the key factors and mechanisms at play, and for this a qualitative empirical approach was better suited. In Study 3, a jeopardy analysis method was designed and evaluated.

Qualitative approach taken

Iivari and Iivari [160] suggested that organisational cultures affect working practices. My own experience of large European projects supported that and further suggested that funding arrangements might be significant, so I did not assume that British companies operating on a tight budget would have the

same practices as found and promoted in Silicon Valley.

My aim in designing the study was to capture rich data from a coherent segment of current practice, and ideally from a distinct community of practice, so that any cultural differences that could be attributed to the community would not be silently averaged out. The approach chosen was therefore one of immersion in community activity and active engagement with key organisations through workshops and interviews.

Framing the study as design innovation

In his 2015 paper, Dorst [97] discussed how design practices spread in society, and described a nine step process of design innovation practice that he calls frame creation. It begins with an ‘Archaeology’ step analysing the history of the problem owner and the initial formulation of the problem to investigate the apparent problem in depth, as well as any earlier attempts to solve it. Next there is a ‘Paradox’ step that examines why the problem is hard to solve. This is followed by a ‘Context’ step looking at current practice, and a ‘Field’ step exploring the deeper values underpinning it, then a ‘Themes’ step to identify any universal features the class of problems has. He describes a new approach to a problem as a ‘Frame’ that identifies possible patterns for action. Having created frames, the ‘Futures’ that the approach might enable can be explored. These futures might need stakeholders to change their working practices and strategies to bring about the ‘Transformation’ required to implement them. Finally he considers the new opportunities that ‘Integration’ of the innovation into practice creates and any lessons learnt by applying it.

As the eventual aim of this study is to design a better way of designing software, it can be considered as a form of design innovation and the approach taken and described in this thesis maps onto the nine steps of frame creation, as shown in Table 4.2.

Table 4.2: *Mapping onto Dorst Frame Creation process [97]*

Step name	Activity	Chapter
1. Archaeology	Literature review	2
2. Paradox	Identify challenges	3
3. Context	Understand practice	5
4. Field	Identify deeper values	5
5. Themes	Understand universals	5
6. Frames	Patterns for action	6
7. Futures	Possible outcomes	7
8. Transformation	Road-map to use	8
9. Integration	Lessons from use	9

4.3.2 Adjustments for pandemic conditions

Participant impact

The target participant group of practising user researchers and designers was significantly impacted by infection control measures introduced in early 2020 to manage the spread of the SARS-Cov-2 coronavirus. Many of them were already accustomed to a certain amount of remote working, but the urgent need of their business to pivot retail activity from high street stores to online shopping, or public service provision to online services, created a demand for design changes whose usability could only be assessed remotely rather than in person. The resulting peak in workload made any discretionary activity, such as participation in academic research, difficult to accommodate.

Researcher impact

Moving off campus slowed progress while a suitable desk, video camera, and microphone equipment were obtained. Anticipated follow-up work with the retail company involved in the initial workshop was lost, and recruitment via professional networking events became impossible.

Adjustments made

To respond to the participant and researcher impacts, the data collection was refocused on remote structured interviews to interrogate current practice, and on remote workshops to evaluate alternative approaches. Recruitment was moved from social events to social media and existing personal connections.

4.4 Data collection and ethics

4.4.1 Participant recruitment

In conducting this research, I was a peripheral member [100] of the group being studied, having relevant knowledge but no personal experience of professional UX practice. To build a network of potential participants I actively sought out meetups in Manchester and attended 21 face-to-face events (see Table C.1). Through direct personal contacts and social media connections I was able to reach approximately 500 relevant professionals via either *Twitter* or *LinkedIn* without knowing any contact addresses. Building a social network on the free tier of *LinkedIn* resembles snowball recruitment [306], as a mutual connection is required before messages can be sent. In the early stages, this activity was time consuming, but was preferable to the data protection obstacles and known challenges of email recruitment [191].

4.4.2 Participant briefing and consent

For [Study 1: Ketso workshops](#), information was sent by email to participants a week in advance. A briefing was given at the start of the session, and paper consent forms completed. For [Study 2: Practitioner interviews](#), contact was made via social media, and email or online messages exchanged to organise the interview time. Participants were referred to background information on the [project website](#), and given opportunities to ask further questions during the interview. Verbal consent to record was obtained at the start of the interview.

For [Study 3: Jeopardy workshops](#), initial contact was made with a point of contact at the organisation who then approached other members of their team. Information was provided via the [website](#), and this included *YouTube* videos explaining the idea and giving a worked example with the *Equity* property. Verbal consent to record was obtained at the start of the session, and the participants reminded that they were free to turn off their cameras if they wished to, as I would only be analysing the audio.

4.4.3 Data protection and information governance

For [Study 1: Ketso workshops](#), the only personal data captured was the consent form itself and a simple participant questionnaire asking participants how they would describe their role, level of experience and the size of their organisation. As the workshops were held in their workplace, no audio or video recordings were taken. Video might have enabled a broader analysis, but would have increased the setup time and been an obstacle to participation.

For [Study 2: Practitioner interviews](#), audio recordings were taken on a digital voice recorder. The data was then uploaded to the university network for transcription, with access restricted to the researcher. No video recording was taken, as it was not needed and participants were working from home with a reasonable expectation of privacy. Transcripts were anonymised before use.

For [Study 3: Jeopardy workshops](#), it was expected that video recording might be needed so advice was sought from the university's information governance team on the data protection aspects of potential online platforms *Microsoft Teams* and *Miro*. After the pilot session, it was clear that the conversation was the important part, so *Teams* was used to record the session, including video, but audio-only participation was offered. Recordings were held on *Microsoft* servers and their automatically generated captions used as the basis of the transcript. Transcripts were anonymised before analysis.

4.4.4 Workshops

Workshops were used as a time efficient means of gathering data from groups of practitioners. Two formats were used: face-to-face sessions at the workplace of the participants, using the Ketso method [358], and online sessions where all the participants were joining from their own homes. The largest Ketso session was with a retail organisation, at their offices, in January 2020. Further sessions were planned, with other Communities of Practice within the organisation, but were overtaken by events.

The target groups considered for the workshops were design practitioners working in higher education, working in retail, and working in information and the media. The organisations approached were chosen for diversity of the goals that designers might have, while being substantial enough to accommodate the time needed for a session, and in the case of the face-to-face sessions having the space to host it. Recruitment was by personal contact (see 4.4.1).

4.4.5 Structured interviews

The data collection approach chosen for [Study 2: Practitioner interviews](#) on current practice was semi-structured interviews [94] using open-ended questions derived from the results of [Study 1: Ketso workshops](#). The interviews were all conducted online, and pandemic conditions made it a necessity, but I may have chosen to do so anyway as it was less disruptive for the participants and most would have been accustomed to the technology from their own practice. The interview sessions were scheduled in advance with a nominal duration of 30 minutes, and none of the participants was known to the researcher prior to the study, so one of the challenges was to develop a positive working relationship and rapport quickly during the initial part of the interview.

Three target groups were considered for the interviews: practitioners working in or for the public sector, working for physical or online retail, and working in finance and banking. These were chosen to give a cross-section of practice and a reasonable likelihood of participation. Recruitment for the public sector group was successful, but the other two were not. Retail practitioners were interested

but too busy with the urgent pivot to online trading forced by the response to the pandemic. Initially positive feedback from practitioners in banking did not lead to participation. One concern voiced was the regulatory regime and the authorisation needed to discuss their practices, but workload created by rapid uptake in online banking was also a factor. Working from home unexpectedly while schools were closed will not have helped the situation.

4.5 Thematic analysis approach

Thematic analysis was used on textual data from [Study 1: Ketso workshops](#) and [Study 2: Practitioner interviews](#). Adjustments to the general method described, to reflect the nature of the source text, are described in section 4.5.2. A form of thematic analysis was used to apply the marking scheme for the evaluation of [Study 3: Jeopardy workshops](#), this is described in section 4.6.6. The reflexive thematic analysis approach suggested by Braun and Clarke was followed [40, 42]. They set out a number of methodological questions to be addressed before beginning analysis, and these are answered here.

What counts as a theme

The key aspects of the first research question (RQ1) that were approached through thematic analysis of structured interviews were

- What is done in practice
- How is that rationalised
- What attitudes are evident that might impact its outcomes

So any extract relevant to these questions was considered for coding, and any pattern of response in the transcribed interviews and workshops that address these questions was taken as a candidate theme.

A rich description of the whole or a detailed account of one aspect

The aim in addressing [RQ1](#) is a rich description of the practices described, while avoiding pre-conceived ideas of how standard design texts are applied. For the more specific question of how teams might be helped to anticipate undesirable behaviours ([RQ2](#)), the relevant themes in the user jeopardy workshops were those that informed my understanding of how practitioners responded to the ideas and their feedback on the overall approach and their initial feelings about its utility.

Inductive or Theoretical

This study does not construct a theoretical model of practice. The themes identified for [RQ1](#) were linked closely to the data extracts from which they were constructed by data-driven [inductive](#) analysis.

Semantic or latent

The data corpus for this study implicitly included the many conversations I had with practitioners at professional meetups and in online fora outside the formally recorded interviews and workshops. These conversations influenced my understanding of the vocabulary used and the underlying ideas and doctrine that have shaped current practice. Therefore, although extracts for coding were identified at the explicit semantic level in the transcript, their coding and the themes under which they were grouped were necessarily based on my interpretative understanding of their latent meaning.

Epistemology

The background to this study is software design and creation in a practical workplace setting. In the workplace, it is not individual understandings and actions that matter so much as their impact within the social framework of the team, where meaning is negotiated within a sociocultural context. Therefore

the natural epistemology for the thematic analysis is a social constructionist perspective focussed on interactions, rather than individual experience. Depth and insight are more important than coverage or completeness, and I have no expectation of crisp definitions or sharp boundaries. The philosophical position adopted is described more fully in 4.2.2.

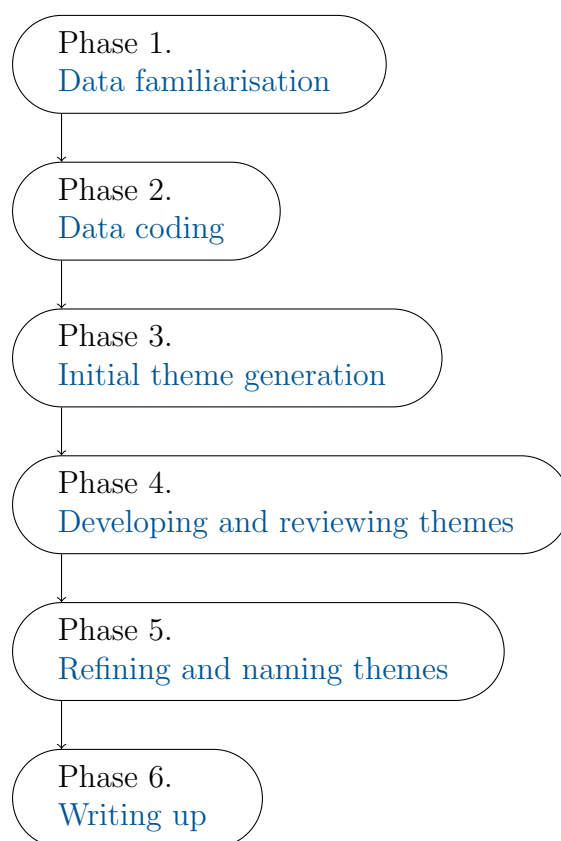


Figure 4.1: Reflexive TA process [40, 42]

4.5.1 Reflexive TA process

The Reflexive Thematic Analysis process described by Braun and Clarke [40, 42] has a six phase process of data familiarisation, coding, theme generation, development and review, refinement, and writing up as illustrated in Figure 4.1 and summarised in this section, using Study 2 interview data for examples.

Phase 1 — Data familiarisation

Data familiarisation for the interviews began with listening to the recordings again then preparing an initial raw transcript by providing the audio as input to the dictation facility of Microsoft Word. Correction of these automatically generated transcripts, and speaker attribution to separate the participant's words from my questions, then provided further familiarisation. Some initial analytic notes could have been added at this point, as comment call-outs in Word, but would have disrupted the formatting of the document produced so were not. This was perhaps a missed opportunity but made it easier to use the transcript as a source document, particularly in the tool used to record the thematic coding, and also left the margins clear for later annotation. Before finalising the transcript, any redaction required to anonymise the text was done, and single-sided hard-copy versions printed. These printed sheets were attached to thin plywood boards, one for each interview, so that I could stand in front of the board and do the initial coding manually with a highlighter pen and pencil, as shown in Figure 4.2. Once I had done enough to be comfortable with my approach the remaining interview data was coded with *NVivo*.

Phase 2 — Data coding

The purpose of the coding phase is to identify extracts that are potentially interesting, relevant, or meaningful. The focus is specific and detailed, with the aim of each coding being to capture a single concept within the data and label it with a succinct phrase that evokes the content. Extracts to be coded were chosen because they captured analytically interesting ideas that were judged to be of relevance to the research question. As such, codes are an output of an active analytic process, not a latent “truth” awaiting discovery. Extracts were on occasion coded multiple times with different codes if they had multiple meanings within the context of the question.

Within the broader thematic analysis method, the researcher's orientation to the data can range from an [inductive](#) orientation driven by the data to a [deductive](#) orientation that constructs meaning on the basis of existing theory

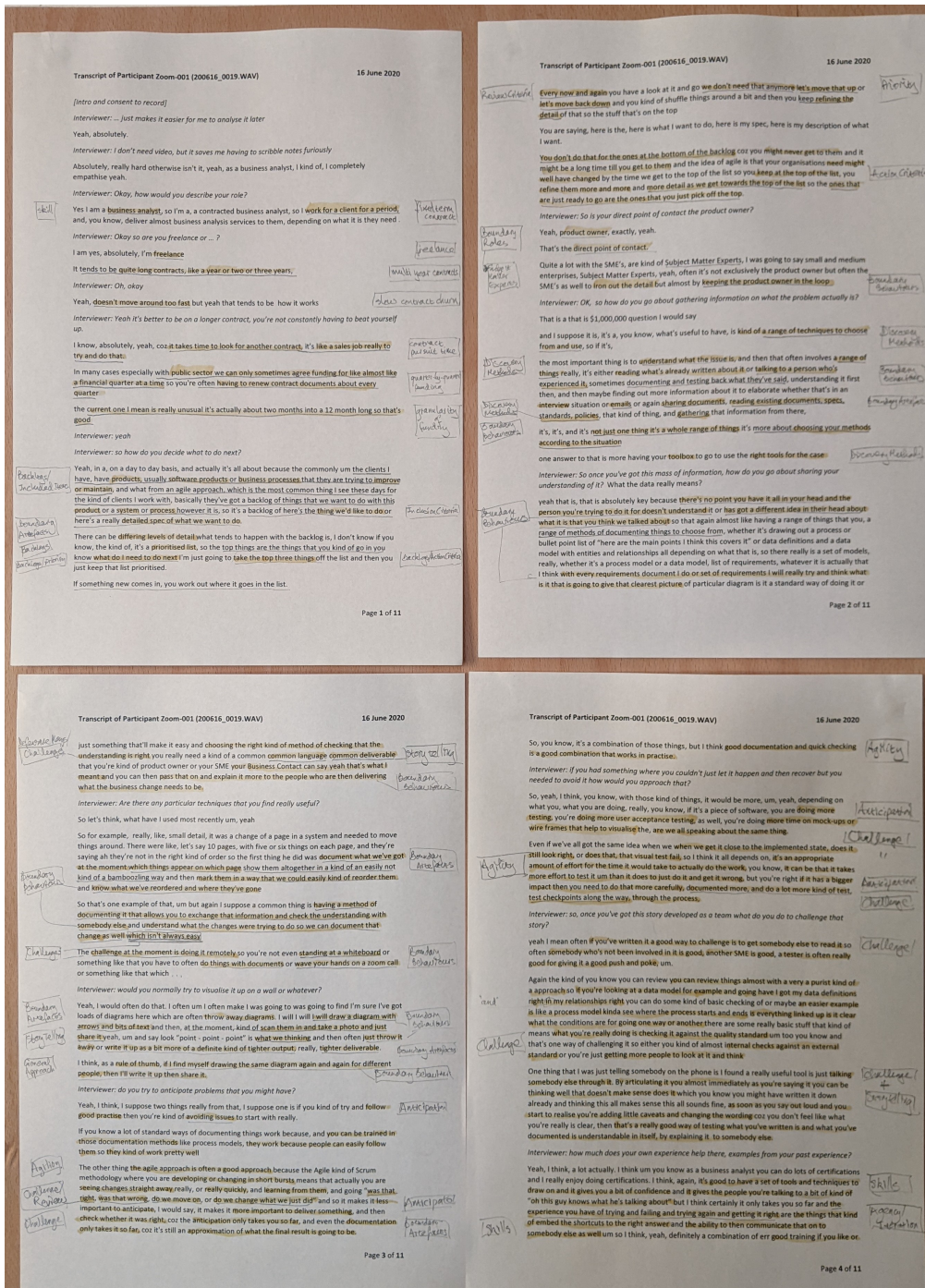


Figure 4.2: Initial pen-and-paper coding of interviews

and frameworks. Bringing ourselves and our perspectives into the analysis is unavoidable so engagement with the data is never purely inductive. My orientation was not intentionally deductive as I was not actively applying prior theory to make sense of the data, but I recognise the role of my own conceptual models of discovery activity in shaping my analysis. For example, Figure 2.2 was based on my initial understanding from engagement with the literature and conversations with practitioners.

The researcher's focus of meaning can range from the manifest semantics of the participant's words to the latent underlying meaning within its cultural context. My understanding was underpinned by many hours of conversations with practitioners. In having these conversations I had the deliberate intention of learning the vocabulary used in that community of practice and what it is typically understood to mean within that peer group, rather than the meaning the individual practitioner assigned. The coding reflects my understanding of the latent meaning of any specialist vocabulary used, a meaning that we negotiated during those conversations as we co-translated across our respective boundaries. My orientation and focus with reflexive TA therefore sit within a generally inductive orientation to the data and a focus on latent meaning as it would typically be understood.

Phase 3 — Initial theme generation

The purpose of the initial theme generation phase is to identify candidate themes. These are an initial clustering of codes that may be a potential theme but require further exploration. A theme is a multi-faceted manifestation of one central concept from the dataset. The **central organising concept** of each theme is the essence of what it is about, is the common feature of the codes clustered around it, and separates it from other themes in the analysis. Any sub-themes focus on one particular aspect of a theme but share the same central organising concept. Braun and Clarke recommend that sub-themes should only be used when that allows a stronger story to be told about the data [42, p87–88]. If a number of themes are anchored by a broader conceptual idea then this may be identified as an over-arching theme to give the analysis structure.

Table 4.3: *Extract coding examples from an interview transcript*

Extract	Codes
work for a client for a period	fixed term contract
deliver almost business analysis services	service delivery model
quite long contracts, like a year or two or three years	multi-year contracts
doesn't move around too fast	slow contract churn
takes time to look for another contract	contract pursuit takes time
like a sales job really to try and do that	contract capture is a sales effort
can only sometimes agree funding for	fragmented funding
like almost a financial quarter at a time	
having to renew contract documents	quarterly renewal pursuits
about every quarter	
current one is really unusual it's actually	fragmented funding
about two months into a 12 month long	
so that's good	

Table 4.4: *Candidate theme organising concepts*

Codes	Central organising concept
Mobilisation is client request driven	
Plans can be overtaken by external events	
Driven by most senior stakeholder	Mobilisation is externally driven
Driven by technology availability changes	
Driven by top level goal changes	

Phase 4 — Developing and reviewing themes

Reflexive thematic analysis is not a linear step-wise method. It is recognised that earlier phases may need to be revisited and some of the analysis may have a somewhat recursive feel. The theme development and review phase re-engages with the coded extracts across the whole dataset to ask if there might be an alternative structure that better reflects the patterns, whether it is clear what is included and excluded from each theme, and whether it conveys something that is important to the wider context and the research question. The cluster of codes should be coherent, having a clear connection through a shared meaning, and not contradictory. The overall analysis might identify contradiction between themes but avoids constructing it within a single theme, unless the theme is actually about tension or contradiction.

Phase 5 — Refining and naming themes

After reviewing the themes generated, it should be possible to define the theme and give it a scope, identify boundaries relevant to the core concept, and identify what is specific to each theme and what it therefore contributes to the overall analysis. By this point the working name for the theme should be settled, and be a concise signal of its meaning and analytic direction.

Phase 6 — Writing up

Starting from what is currently understood in existing literature, the aim in writing up the analysis is to provide an enriched narrative using contextualised and situated knowledge, that contributes more to the collective understanding than filling a notional “gap” as that would imply a positivist stance that is inconsistent with reflexive thematic analysis.

4.5.2 Application of the TA method

Ketso leaves

The leaf shapes in the [Ketso](#) toolkit are relatively small, with a writing area similar to that of a typical business card. Because of that, participants limit themselves to succinct statements that evoke an idea rather than providing a richer narrative. This changes the nature of selection and coding of relevant text, effectively involving the *participant* in it. A schematic version of the workshop output was created, and this was used as the source text for thematic analysis of the leaves, marking up the coding and organising the constructed themes in *NVivo*. The organising concepts that I constructed were short and simple, and the theme hierarchy was used to distinguish short codes. I found this unhelpful when referring back later, so used longer more self-sufficient names with the interview analysis. Examples of the [Ketso](#) leaf coding are given in [Table 4.5](#), and the corresponding organising concepts in [Table 4.6](#).

Table 4.5: *Extract coding examples from Ketso leaves*

Extract	Codes
confidence in how to progress	Confident
the team understand the audience	Understood
deadlines and limited time in the team	Time
lack of budget to start or continue	Funding

Table 4.6: *Organising concepts for the Ketso leaves*

Codes	Organising concept
Confident	Operational goals – Mindset
Understood	Operational goals – Outcomes
Time	Organisational Obstacles – Constrained resources
Funding	

Interview transcripts

In all three studies, the *NVivo* tool was used to mark up a PDF version of the source data during coding. For Study 1 and Study 3 it was also used to organise the codes. For the volume of material in the Study 2 interviews this was found to be impractical, because the interface makes navigation of the existing code list too slow and laborious. Instead the codes were exported to a spreadsheet and paper slips generated which could be organised by hand on a large board. Examples of the coding and organisation of themes in the interview data were given in Table 4.3 and Table 4.4.

Evaluation transcripts

The evaluation transcripts were coded by selecting responses to any of the framing questions asked by the facilitator, or points relevant to them. I had written model answers for each session before doing the analysis, so already had key points in mind before doing it. The data was coded inductively from the transcript to ensure that any additional points identified by the participants were fairly reflected, but I also noted the absence of key points by adding unused codes as a reminder. The thematic organisation I needed for the marking scheme was which part of the jeopardy analysis the comment logically belonged to, namely which of the four ethical properties the scenarios addressed were being discussed, so codes were allocated to these, skipping the theme generation steps of Braun and Clarke's method. Feedback on the jeopardy analysis method was captured directly from the transcript, without any formal coding of the sentiments expressed. Coding examples are given in Table 4.7. These were the four most used codes allocated to the *Equity*, *Agency*, *Proportionality*, and *Accountability* themes respectively.

Reflection on use of the *NVivo* tool

NVivo has the advantage that coding can be added to a text very quickly, and it makes it particularly easy to use the words of the text as their own code

Table 4.7: *Extract coding examples from evaluation transcript*

Extract	Codes
the hourly paid and part time might end up out of pocket	Contract
If you're managing your own hours, why do you need to clock in your hours?	Responsibility
Is it making a measured impact on your ability to run this company if you know this data	Who benefits
Is it the choice of the personnel director or the employee?	Whose choice

label using *in vivo* coding. This is consistent with an inductive orientation, and makes it more obvious if participants used different words, so challenging the researcher to think about whether the latent meaning had the same intention in each case. However, it will tend to create duplication, and may be less useful as a label as it is unlikely to evoke the meaning that is relevant to the research question or be sufficiently specific. It may also result in codes that are too fine grained, tending to produce fragmentation rather than assisting identification of patterns.

The user interface has features that may distort coding. Shortcuts make it much easier to repeat a recently used code than create a new code or use one less recently used. Navigation of the existing code list is slow and laborious. In general, the user interface is poorly suited to managing large numbers of initial codes.

4.6 Jeopardy Analysis Method evaluation

There is limited literature providing guidelines for the evaluation of design methods using workshops. A recent paper, pulling together related design science research guidance, by Thoring *et al* [356] identifies seven useful aspects of workshop evaluation, listed in Table 4.8.

They identify the importance of being clear about the goals of the workshop when preparing it, and distinguish the artefacts that are to be tested or developed during the workshop from those that are needed to facilitate the

session, whether these artefacts are software or services or processes. They recognise that evaluation of the workshop procedures, the roles taken by the participants and the facilitator, and the actions taken is potentially separate from and secondary to the goal of the session, and may be addressed by pilot sessions ahead of the main workshop to refine the format of the session and the timing of each part. They also consider perception and opinions to be secondary, but for my purposes gathering these was an important part of the workshop outcome as the sessions had an Expert Evaluation aspect to them.

Table 4.8: *Aspects of evaluation by workshop [356]*

A.	Goals	Purpose of the workshop
B.	Introduced Artefacts	Product or process under test
C.	Facilitation Artefacts	Workshop space itself
D.	Procedure	Workshop agenda and timing
E.	Roles and Actions	Facilitator and participant roles
F.	Interactions	Response to and use of artefact
G.	Outcomes	Co-created artefact or evaluation of one

For [Study 3: Jeopardy workshops](#) the workshop Facilitation, Procedure, Roles and Interactions aspects (C – F) were piloted with colleagues within the university before organising external workshops. The sections that follow describe the method used with external participants, and any changes made as a result of lessons learnt from the pilot.

4.6.1 Goals

For [Study 3: Jeopardy workshops](#), the pandemic conditions prevailing at the time made it impossible to be co-located with the participants for a face-to-face workshop. Two slightly different remote workshop formats were used, in order to explore the method in both a fully researcher controlled session, where the scenario was written in advance, and a more loosely controlled session where the participants brought along a scenario relevant to their own work. The aim in doing so was to enrich the understanding gained of how practitioners might apply the method using their normal toolset and working environment, so far

as that was possible while they were working from home rather than their office.

The fully controlled session, [Evaluation 1: Pre-scripted scenario](#), used video-conference conversation only. The participants had access to a summary of the scenario on the project website in advance of the session. Visual reminders of the aspects to consider were also provided in advance and at the start of the session but not during it.

The loosely controlled session, [Evaluation 2: Work-based scenario](#), combined conversation with the use of an online whiteboard tool that the participants were familiar with and used in their normal practice. Visual reminders of the aspects to consider were provided in advance on the project website and during the session on the online whiteboard.

4.6.2 Introduced artefacts

Templates for jeopardy analysis worksheets were produced and made available via the project website. They made sense for face-to-face use or personal use by remote participants, but were not really needed online and participants would only have been able to use them when working from home if they happened to have a suitable printer (see [Figure A.4](#), etc).

A further step was considered in the pilot session, of creating an extended Bowtie [68] diagram using the jeopardies identified with their consequences and mitigations, but was dropped from the final workshops as it was found to be too much for participants to digest on their first use of the method.

4.6.3 Facilitation artefacts

For [Evaluation 1: Pre-scripted scenario](#) using *Microsoft Teams* only, a task sheet was made available on the website, that summarised the scenario and broke the analysis process down into simple steps and suggested questions the participants might like to consider. For [Evaluation 2: Work-based scenario](#) using *Miro* as well, a similar scenario and task sheet page was provided on

the website, and a *Miro* board was also setup for the participants to use if they wished that included similar content to the paper worksheets produced for face-to-face use (see Figure [A.12](#)).

4.6.4 Procedure

The agenda followed the task sheet provided, after a short introduction and obtaining recording consent, and was followed by a debriefing discussion to ask how it went and get feedback on the method.

4.6.5 Roles and Actions

The researcher acted as the facilitator for the workshops, with participants following the steps on the task sheet collaboratively as a group while discussing the problem via *Microsoft Teams*, and in the case of [Evaluation 2: Work-based scenario](#) also sharing ideas on the *Miro* board.

4.6.6 Interactions

It was found to be quite difficult to follow what was happening on the *Miro* board as it provides only a per-participant view not a Gods-eye view of the whole space. The evaluation therefore relied on the audio transcript of their discussions, and thematic analysis of it as discussed in section [4.5.2](#).

Remarks by the participants that related to the jeopardy analysis were coded to identify what aspect of the problem they related to, and these codes were then allocated to the appropriate section of the analysis to judge how well covered each key point was. As an initial benchmark for the scenarios explored in the evaluation workshops, a model answer was prepared for each based on the researcher's own understanding of the latent problems that might be discovered by applying the method. Coverage of each point was assessed by comparison with this model answer.

4.6.7 Outcomes

The final state of the *Miro* board was downloaded but was not found to be very informative. Participant feedback on their first experience of the jeopardy analysis method was requested, and captured as part of the session transcript.

4.6.8 Mitigation of evaluation limitations

Homeworking

The study was conducted during the coronavirus pandemic that began in late 2019. The resulting move to working from home might have influenced the evaluation workshops if participants were unfamiliar with working together remotely. Holding the evaluation workshops in mid-2021, much later than originally planned, meant that the participants had been working remotely for most of the previous year so were aware of the possible technical problems and unperturbed by their occurrence, and had also had time to find cameras and microphone equipment that they were comfortable using and of sufficient quality to support effective remote working.

The *Microsoft Teams* platform was chosen to host the video conferences as it was readily available to the participants, how the session recordings would be stored and accessed was known to meet the ethics and information governance requirements of the University, and it supported data protection practices that the participants could have confidence in.

Conversation only

At the time of the workshops, all the participants and the researcher were working from their own homes, so it was not assumed that all would be willing to share video or that it would necessarily be of a suitable quality for analysis. The primary artefact for analysis was therefore an anonymised transcript of the conversation between the participants during the session.

Limiting the analysis to the conversation only was a necessary simplification

for remote working. Capturing video of participant interactions with online data on a virtual whiteboard was considered, but was found to be impractical. Integration of the whiteboard app into *Teams* was generally poor and the app itself would not open for participants outside the University. The participants in [Evaluation 2: Work-based scenario](#) used a separate virtual whiteboard, but as they were each able to move around it independently there was not a single viewpoint that would have captured every action, as there would have been with a camera mounted over a table, and also it was not practical for a lone facilitator to pan around the workspace while giving adequate attention to the dialogue. The basis of analysis would also have been problematic, as I would have had no comparable activity to use as a baseline. I have experience of video analysis of aircraft cockpit activity for operational safety purposes, so knew how time consuming that can be, and also how hard it is to draw a useful conclusion from it unless you have prior experience of “normal” versus “significant” behaviour in that space.

Why not Delphi?

A widely used means of Expert Evaluation is the Delphi method, originally developed by the Rand Corporation during the Cold War to provide a consensus estimate of numerical parameters related to a possible Soviet attack [83]. The method involves issuing repeated rounds of questionnaires to a panel of experts, some rounds supported with follow-up interviews, and with controlled feedback used to refine the questions used in each round until a consensus answer is achieved. A later review by the Rand Corporation of the way the method was being used cited a number of problems with it, including uncontrolled halo effects in the use of the questionnaires, and recommended that a more rigorous bespoke application of social science techniques be used instead [304].

The Delphi method requires a level of repeated participation and engagement with the participants that I could not reasonably expect from practitioners that I knew to be generally very busy and particularly busy at the time of the study as a result of their organisations response to the pandemic. Its focus on aggregated opinion and consensus was also not necessarily helpful to my

research questions. At this early stage of my development of the notion of user jeopardy (see 6.2.1), there was potentially more value in minority dissent than consensus. When evaluating a new method, my aim was to understand not just whether practitioners would be able to apply it to real problems, but whether they identified any types of problems that it would be particularly good for or problems that it would be unsuitable for. In a study of teams performing complex ill-defined tasks, as design tasks often are, De Dreu found that minority dissent aided creativity provided that the teams were able to openly reflect on their objectives for the activity [85]. In a study of development funding, Criscuolo *et al* found that panels were less averse to novelty when the proposer was present [76]. These findings suggested that active facilitation in a workshop would be more appropriate than indirect contact via questionnaires.

Avoidance of halo effects

Halo effects, where the perception of one aspect of something is biased by the positive or negative perception of an unrelated aspect [4], could distort the evaluation outcomes of the workshops. Ethically informed methods might be particularly vulnerable to this effect, as addressing ethical concerns might be seen as inherently a good thing, whether the approach was practicable or not. To mitigate this effect, the tactics adopted were to use multiple evaluators in multiple sessions, to use small groups of participants who already work together and might therefore be expected to be more comfortable with challenging each other, and to draw participants from organisations with a reputation for an open and cooperative work environment. Care was taken not to over emphasise the concern for ethics, but rather to treat each aspect as an important system property that could inform design choices.

4.7 Summary

The experiential nature of the research questions determined a pragmatic social constructionist epistemological position. The reflexive nature of the thematic analysis method followed, and an inductive methodological approach, support a constructivist and interpretivist ontological position.

Use of a Systematic Literature Review to understand current practice was rejected in favour of an empirical approach, as there was a desire for clarity in what community of practice was described and a practitioner view of their own practices was prioritised over an academic view from sparse literature. Active engagement with a specific community of practice was chosen to capture rich data from a coherent segment of practice.

Viewing the user jeopardy analysis method as a form of design innovation, the structure of the thesis is mapped onto Dorst's [97] frame creation process in Table 4.2. Data collection and ethics considerations are described in section 4.4 and the thematic analysis approach described in section 4.5. The approach to evaluating the user jeopardy method is described and mapped onto the design research guidance provided by Thoring *et al* [356] in section 4.6.

Chapter 5

Current UX practice

5.1 Introduction

Informed by literature (Chapter 2), and examples of poor [user experience](#) in software products (Chapter 3), this chapter describes the conduct and results of two studies into current [UX](#) practice in the UK. The research questions are first refined for each study, to focus on the aspect best covered by that study method, and sub-questions defined to inform the study design and assist the subsequent analysis. The studies are then described and their findings presented.

5.2 Refinement of research question

Choices made in the early stages of design may be based on an incomplete understanding of the problem, but can still shape the design in ways that will be apparent in the product or service that is delivered to customers. Some choices are conscious decisions, others may be unchallenged assumptions. To have confidence in their delivery processes, practitioners need to have confidence in how they decided what to build. Teams formulate their design objectives, and their understanding of the problem they intend to solve, by establishing that there is a need to be met, that they know how to build it, that potential

users will want it, and that stakeholders will support it. The data required for this comes from [user research](#) and business analysis confirming the viability of a product. These activities are collectively termed ‘design discovery’ [44] or ‘product discovery’ [53] or most commonly in the UX practitioner community simply ‘discovery’ [129, 131]. Use of the term [discovery](#) in academic literature is more limited, typically it is used to refer to business models, as in ‘discovery driven’ [227], or when discussing Lean start-up approaches [322].

Literature describing discovery practices in the UK software industry is sparse and not specific to an identified community of practice, so may miss relevant cultural factors. Most papers focus on segments of the client community rather than the practitioner community, such as addressing particular issues for [UX](#) with children [324], or are concerned with its integration with development rather than design itself, for example Salah *et al* examined the relationship with Agile [307] and Gregory *et al* analysed the resulting challenges [138] from the perspective of Agile practitioners.

To address research question [RQ1](#), two studies into current practice were conducted. The overall question asks what methods are used:

What methods are applied in current software design practice to identify interactions with the user that the intended users will consider undesirable (RQ1)

The question was refined for [Study 1: Ketso workshops](#) to focus on discovery:

How do practitioners approach and perform discovery (RQ1.1)

In order to gain insights into the reasons for practitioners method choices, this was split into three sub-questions aligned with the workshop design, as discussed in section [5.3.1](#).

What is done in practice (RQ1.1.1)

What would improve practice (RQ1.1.2)

What are the challenges (RQ1.1.3)

The question was refined for [Study 2: Practitioner interviews](#) to focus on shared understanding:

How do practitioners achieve a shared understanding of the problem (RQ1.2)

This was subdivided to cover different points of the process using the five key aspects of the discovery given in [Table 5.1](#). These were identified by a review of existing theory and literature, as discussed in [section 2.3.1](#). The [imagination](#) and [alignment](#) steps illustrated in [Figure 2.2](#) can be taken together as integral parts of [sharing](#) an understanding. The overall output of that process is captured, explicitly or implicitly, as the [choices](#) that are made at [mobilisation](#), to enable [engagement](#), and in each [iteration](#).

The structured interview questions are given in [section 5.4.1](#). Anticipation was covered as part of understanding the meaning and implications of the research data, under both the [imagination](#) and [alignment](#) parts of sharing.

Table 5.1: *Five aspects of UX practice explored in this study*

Mobilisation	Deciding what the next piece of work is
Engagement	Gathering information about the problem
Sharing	Sharing an understanding of the findings
Iteration	How much discovery is enough
Choices	Making and recognising early design choices

The resulting five sub-questions were

How does the team decide the next task (RQ1.2.1)

How does the team inform their understanding (RQ1.2.2)

How is understanding shared and challenged (RQ1.2.3)

How deep an understanding is enough to proceed (RQ1.2.4)

How is understanding translated into design choices (RQ1.2.5)

In addition to addressing these questions, analysis of the interview transcripts provided insights into the approach needed to successfully anticipate problems.

5.3 Study 1: Ketso workshops

The purpose of conducting this study was to gather information on current design discovery practice, and to better understand its context by exploring the objectives that practitioners aim to satisfy. Face-to-face workshops were chosen as the means of data collection to allow a free exchange of ideas between the participants and gain richer information than might be obtained from a survey. A Ketso [358] workshop format, was chosen to facilitate this. Ketso is a technique for engaging communities in discussion around specific topics. A Ketso session builds up a picture of participants' ideas written onto 'leaves' that are placed on 'branches' on a felt background (see Figure 5.1). This picture emerges through a structured discussion about the topic, in this case practices used during design discovery. This approach also fosters a safe environment where all participants are able to contribute equally without any one individual dominating the discussion. Ketso achieves this by combining individual idea generation and group discussion, structured by the workshop materials and by the guiding questions asked by the facilitator.

5.3.1 Procedure

Ketso general details

Participants were asked a guiding question, and asked to write their own ideas onto leaf shapes. The Ketso leaves are colour coded to represent the kinds of ideas that were wanted at that stage, and have a letter in the corner of the leaf for those without full colour vision. Only one kind of leaf was provided for each question. The standard Ketso conventions were used:

- goals or next steps – yellow (Y)
- what works well – brown (B)
- creative new ideas – green (G)
- challenges or barriers – grey (-)

Taking turns, they introduced and explained their ideas to the group, and

the leaves were then placed on to a felt workspace. The felt has a space at the centre, from which narrow coloured strips radiate out, representing branches. Oval label shapes were used for a reminder of the overall question, placed in the centre of the felt, and for labelling the branches. Each leaf was placed either onto a new branch or onto an existing branch that it seemed related to. After introducing their individual ideas, the group discussed them, and were able to add more ideas or move them around if they saw more relevant connections. The facilitator then asked the next question. At any stage, a collectively agreed label could be written and added to a branch. Part of the workspace from the first session is shown in Figure 5.1.



Figure 5.1: Ketso felt workspace from the first session

Recruitment

Recruitment was by internal communication within the organisations involved once initial contact had been made. In the case of the large retail organisation, this was based around their internal community of practice and the workshop took place in one of their regular meeting slots, at which they were accustomed to trying out new methods.

Completion

Participants were briefed on the format of the workshop and the Ketso materials. Guidance on the use of the materials was given as each guiding question was introduced. Three participants sat around each Ketso workspace. There was sufficient room for all to have spare leaves and writing space, without viewing the text from an uncomfortable angle. Five minutes were allocated for idea generation, and 10 minutes for group discussion, of each question. Each guiding question was supported with prompts for the kinds of things we would like them to consider, and written up on a poster in the bullet list form shown in Figure 5.2.

Two workshops were held. The first on university premises in June 2019 with three participants, the second with a large retailer was held in their offices in January 2020, with nine participants in three groups of three. Both took about 90 minutes including set-up, briefing, and clear-up. Participant characteristics are listed in Table 5.2. None had used Ketso before. No personal demographic data was collected.

Table 5.2: *Ketso workshop participant characteristics*

Id	Domain	Role or specialisms
1	HCI research	Rapid prototyping
2	HCI research	Assistive technologies
3	Manufacturing	Design
4	Retail	User research
5	Retail	User research, Management
6	Retail	Design, Development
7	Retail	Design
8	Retail	User research
9	Retail	User research
10	Retail	Design
11	Retail	Design
12	Retail	Design, Management

Transcription

The Ketso leaves have adhesive on the back so the whole felt workspace can be folded up and packed away, keeping them in position. Photographs of each workspace were taken. Each leaf was transcribed into a spreadsheet to capture the raw textual content before preparing a document for analysis, using a template from the ketso.com website. This was shared with the participants within 24 hours of the workshop. The spreadsheet also captured which felt each idea was from, which branch it appeared on, and what type of leaf had been used. The transcription was checked against the photograph.

Guiding questions

Question 1 (Yellow) asked about success criteria. They were asked how they would recognise a ‘good’ discovery session, what it should look like and feel like, and what it should produce as an outcome or output.

Question 2 (Brown) asked what worked well. Using Gray’s findings about mindset [133], it was included as one of the things to consider, in addition to methods and materials.

Question 3 (Green) asked what they would like to do differently. Time was allowed for reflection on which things mattered most, and how the ideas were related to each other.

Question 4 (Grey) asked what obstacles and challenges they had.

Question 5 (Green) asked how they might solve them.

Question 6 (Yellow) asked again about success criteria, and whether they had changed during the discussion.

5.3.2 Data analysis

Artefacts generated

To provide a permanent copy of each workspace, a digital version was created and checked against the photographs, with the exact text and the same relative

1. What does successful discovery

- look like?
- feel like?
- produce?

2. What works for you now

- mindsets?
- methods?
- materials?

3. What would you try with

- more time / people?
- more space?
- permission to fail?

4. What are the challenges

- behaviour?
- surprises?
- technology?

5. How might you solve them

- mindsets?
- methods?
- materials?

6. How is our vision of success

- any new goals?
- any new criteria?
- any new priorities?

Figure 5.2: Guiding questions used in the Ketso sessions

positions of the leaves on each branch. A copy of this was provided back to the participants for their own use, accompanied by a reminder of the questions they had been asked, in a summary legend sheet. The Portable Document Format (PDF) copy of each workspace was used as the input document for coding and thematic analysis using *NVivo*.

Thematic analysis

The ideas gathered at the workshops were analysed from the perspective of the framing questions, using a thematic analysis approach based on Braun and Clarke [41]. Only the text was used in the analysis, not information on which felt it came from, or the branch label that participants had applied to it. All leaves were treated equally, and themes constructed from the text as a whole rather than from any structure imposed by the participants or implied by the guiding questions. The kind of leaf used was not generally taken as significant unless it helped distinguish a goal from a challenge. Codes were gathered into sub-themes covering distinct aspects then grouped into themes sharing a common organising concept, resulting in a hierarchical structure.

Representative labels for the ideas were chosen by *in vivo* coding from the words used by the participants, or synthesised from the underlying concepts if their words were not sufficiently general, and then relabelled or merged as broader themes were constructed. Ranking of the themes, by the number of contributing participant groups and the number of textual references, was used to identify the most prominent ideas for the purposes of consistent presentation and communication. No other significance should be attributed to the ordering.

Coding examples

Phrases used by the participants were preferred as the initial coding of that idea. These were progressively merged until the differences in their meanings had sufficient significance to keep them distinct. Examples of the approach to coding are given in Table 5.3.

The codes ‘Enabling others’ and ‘Empowering teams’ were grouped with seven others into theme ‘Empowering’. Ideas about high quality artefacts to capture learning, research libraries, and sharing insights with other teams were coded as ‘Exchanging knowledge’, which was grouped with code ‘User led’ and four others into theme ‘Knowledge led’. The ‘Empowering’ theme was grouped with ‘Curiosity’ and ‘Knowledge led’ themes under the theme of ‘Organisational aspirations’, as shown in Table 5.7.

Table 5.3: *Examples of coding*

Leaf text	Code
Training others how to do discovery	Enabling others
Help more people design and build for themselves	Enabling others
Empowered to say no	Empowering teams
Time and autonomy to get clear outcomes with team	Empowering teams
Produce lovely artefacts to show and save learnings	Exchanging knowledge
Research library	Exchanging knowledge
Share insights with other teams that may benefit	Exchanging knowledge
User led product direction	User led
Users being listened to	User led

5.3.3 Themes identified

A total of 250 Ketso ‘leaves’ were completed by 12 workshop participants, of which nine were UX practitioners from a large retail organisation, and three were university staff with a background in product design or in HCI research. These provided a total of 74 statements of current practice that participants considered to work well, 61 statements of aspirational practice, 64 statements of challenges or obstacles to successful discovery, and 51 statements of what

constitutes successful discovery. Four themes were constructed, with a total of 13 sub-themes.

Participants characterised successful discovery. The analysis identified the terms they used for challenges, constrained resources, attributes of success, and means of successful discovery. These were organised by underlying concept into key aspects of practice associated with discovery goals (Table 5.5), and their means of success (Table 5.6), aspirations (Table 5.7), and obstacles (Table 5.8).

Discovery goals were separated from their means of success to distinguish what practitioners thought about successful discovery in general, that could be generalised to other organisations, from the specific things that they felt their own organisations were doing well. In many cases the same text was coded under both themes. A mapping of all the themes and sub-themes identified is given in Figure 5.3, as summarised in Table 5.4.

Table 5.4: *Themes and sub-themes identified in workshop data*

Theme	Sub-themes
Discovery goals	Methods Mindsets Outcomes
Means of success	Empowering Knowledge led
Aspirations	Curiosity Empowering Knowledge
Challenges and Obstacles	Communication Constrained resources (human) Constrained resources (material) Behavioural obstacles Process

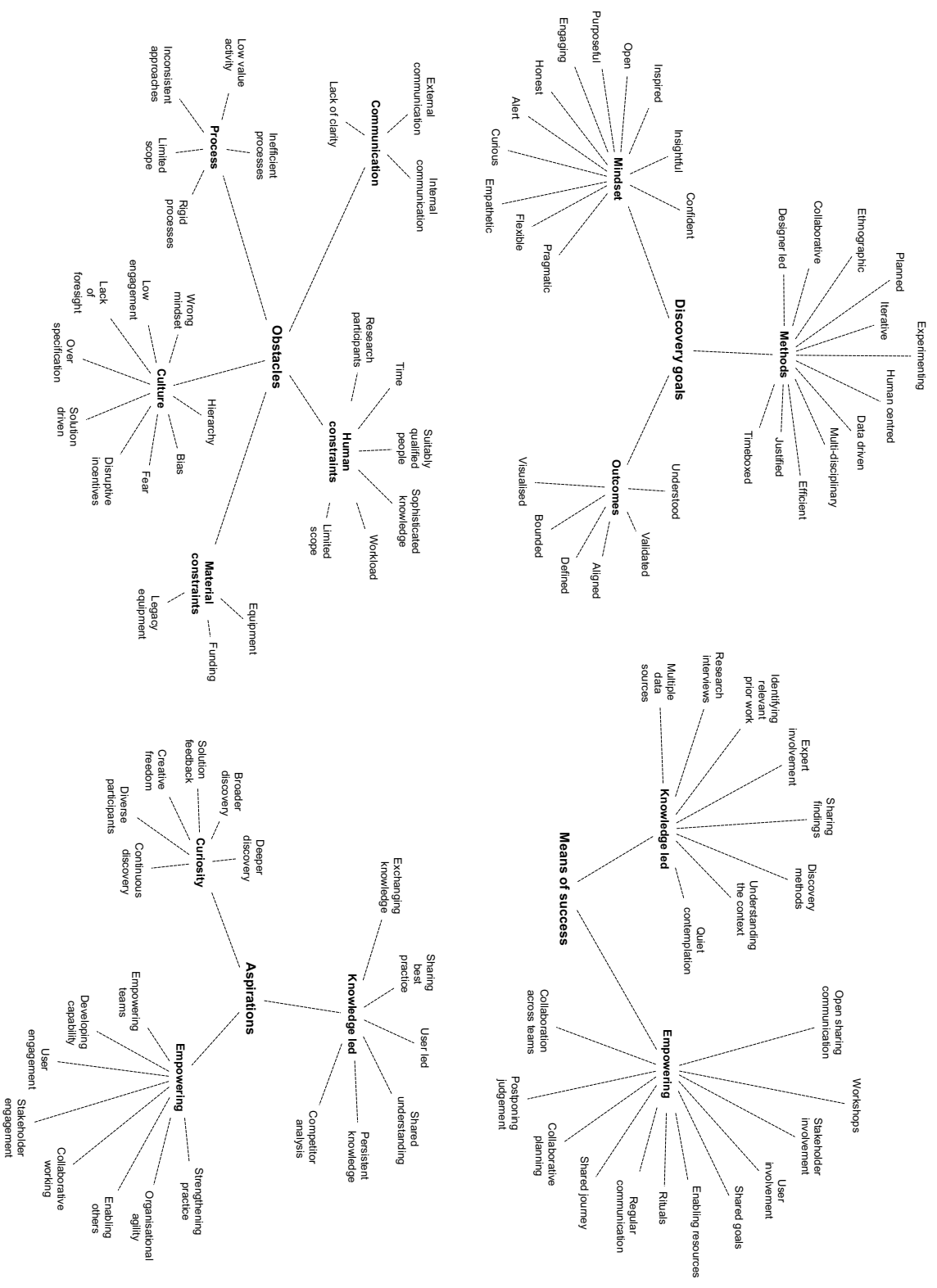


Figure 5.3: Visual mapping of themes identified in Ketso workshop data

Discovery goals

Key aspects of practice categorised under the top level theme of discovery goals are listed in Table 5.5, most prominent first. They were grouped under three sub-themes: what they considered important in the methods that they used, what mindsets produced positive outcomes, and what constituted a positive outcome.

Methods The methods sub-theme identified that what practitioners valued in discovery methods were support for experimenting, certainty in what to do next, data-driven evidence, ethnographic observation of people in context, efficient use of time and resources, evidence to justify continuing or knowing when to stop, led by designers, human centred, trying things quickly and then iterating, involving a multi-disciplinary team, and working on a clearly time-boxed activity.

Mindsets The mindset sub-theme identified a desire to feel confident, be insightful, inspired, and open minded, be purposeful and prioritise action, be engaging and involve others, be collaborative, honest, alert, and curious, show empathy, and flexibility, and be pragmatic in choosing appropriate methods.

Outcomes The outcomes sub-theme identified an expectation of positive outcomes if the problem and users are understood, ideas are validated, the scope is clearly bounded, everyone's goals are aligned, their roles and processes are defined, their ideas can be visualised, and their information is detailed.

No specific design discovery method was named on the [Ketso](#) leaves, and the approach was “using methods and tactics but not being a slave to them.” The tactics mentioned included using workshops to generate ideas and prioritise work to be done, prototyping, exploring assumptions using [sacrificial concepts](#) [159], in-depth and guerrilla interviews [126], surveys, user observation, visualising solutions by sketching or coding, and participant generated drawings.

A preference for prototypes and experiments “allowing for randomness and

unpredictability” was present in both sessions, but more pronounced in the academic setting. The retail organisation emphasised being certain “what to do next” and being able to assess whether to continue or stop. Being data driven by “using data to identify customer problems” and if necessary having “evidence to stop further progress” was as prominent as the use of “observation of users in real-world settings”. Goals of “having enough time” and making “efficient use of what you have available to you” were taken as a desire to be efficient, and the leaf type was used in that case to distinguish time as a goal from time as a challenge.

A practitioner’s mindset may affect the efficacy of the discovery activities. The mindsets mentioned most included having “confidence in how to progress”, and “thinking laterally” to gain insights, and being inspired so that “there is a buzz around the success of the discovery”. Open attitudes to “advertising challenges/progress” and “open sharing communication” were recognised as things that worked well, as was a purposeful mindset with an “emphasis on action/doing above all else” and a “strong process”. Engaging and “involving others” and “sharing”, and a “collaborative mindset” where “the whole team has a shared understanding and has participated” were both identified as things that worked well.

Understanding the problem was a valued outcome, expressed for example as “the team understand the audience”, as was aligning this understanding across the team so that the “team is on the same page regarding outcomes”, and having a problem that was defined and bounded so that they have a “clear scope for the next stage” and validated by “asking the right questions”. They wanted a detailed understanding that was “in-depth, not vague”, and some expressed a desire for data that could be visualised, for example by “displaying our work within our workspaces”.

Table 5.5: *Discovery goals*

Methods	Experimenting, Certain, Data driven, Ethnographic, Efficient, Justified, Designer led, Human-centred, Iterative, Multi-disciplinary, Time-boxed
Mindsets	Confident, Insightful, Inspired, Open, Purposeful, Engaging, Collaborative, Honest, Alert, Curious, Empathetic, Flexible, Pragmatic
Outcomes	Understood, Validated, Aligned, Defined, Bounded, Visualised, Detailed

Means of success

The specific things that participants felt their own organisations were doing well were gathered under a top level theme of means of success. The two sub-themes constructed from these achievements were things they found empowering and contributions to a knowledge led approach. These and their constituent codes are shown in Table 5.6.

Empowering The empowering sub-theme identified that the participating practitioners felt their organisations benefited by openly sharing information, having clear communication of goals, enabling participation of users, keeping stakeholders involved and engaged, sharing knowledge, having shared resources and tools that enabled their work, making good use of agile rituals such as stand-up meetings, having regular communications, sharing the journey as well as the destination, collaborating with other teams, and avoiding premature judgements.

Knowledge-led The knowledge-led sub-theme captured the feeling that they were good at understanding the problem context, had effective discovery methods, regularly shared findings, were able to call on needed expertise, had access to relevant prior work, were able to conduct in depth interviews, and had access to multiple sources of data.

The team rituals that were mentioned were “stand-ups”, “show and tells”, and having a kick-off meeting. The shared journey code could have been merged with shared goals, but I felt it useful to capture the metaphor from “bring people on the journey” as a distinct theme including “bringing different people together across the business” and “whole team should take part”.

Table 5.6: *Means of success*

Empowering	Open communication, Shared goals User involvement, Stakeholder involvement, Knowledge sharing Enabling resources Rituals Regular communication, Shared journey Collaborative planning Postponing judgement
Knowledge led	Understanding the context, Discovery methods, Sharing findings, Expert involvement, Identifying prior work, Research interviews, Multiple data sources

Aspirations

Participants were asked what they would do if they were not constrained by the challenges they identified, the aspirational sub-themes constructed from their responses are given in Table 5.7.

Curiosity The curiosity sub-theme identified a desire to conduct a deeper and more detailed discovery, more creative freedom, a broader discovery that covered more of the ecosystem and potential competition, a rolling or more

continuous discovery process, more solution feedback from prototyping, and more diverse research participants.

Empowering The empowering sub-theme included having decision makers in the team to empower it, more collaborative working, in-house development of key skills, more mentoring of others to share skills, more time spent with users, faster routes to approval and more agility to ease constraints of up-front funding, more flexible schedules to allow thinking time, more involvement of stakeholders in research, and recruiting to strengthen practice.

Knowledge The knowledge sub-theme included a desire for more knowledge exchange through research libraries and professional networks, more analysis of competing products, more sharing practice experience, creating artefacts to preserve findings, more user input on the product direction, and more sharing of insights.

There was a strong theme of empowerment and autonomy, and both a desire to spend more time with stakeholders but also to “take stakeholder objectives out of the equation”. A desire to do more “in the wild” work and “have time to explore the whole ecosystem”. One participant expressed an interest in “rolling discovery to explore new areas”. Participants with a physical, rather than software, product background had aspirations to “trying lots of new technology to consider solutions” and “loads of money and people for prototypes”.

Table 5.7: *Aspirations*

Curiosity	Deeper discovery, Creative freedom, Broader discovery, Continuous discovery, Solution feedback, Diverse participants
Empowering	Empowering teams, Collaborative working, Developing capability, Enabling others, User engagement, Organisational agility, Flexible schedule, Stakeholder engagement, Strengthening practice
Knowledge	Exchanging knowledge, Competitor analysis, Sharing best practice, Persistent knowledge, User led, Sharing understanding

Organisational challenges and obstacles

The challenges and obstacles identified were wider ranging. Communication issues were prominent, as were constraints on time, inappropriate mindset, and inefficient processes, as shown in Table 5.8.

Communication The communication sub-theme identified problems with clarity, and both internal and external communication effectiveness in having visibility of other work or knowing who to contact.

Resources The constrained resources sub-themes included insufficient time, availability of suitably qualified people, lack of specific knowledge or sufficient sophistication, the difficulties of recruiting research participants, limited scope of analysis, lack of funding, access to latest technology, and dependencies on legacy equipment.

Behaviour The behavioural obstacles sub-theme included problems such as misalignment of the mindset in other parts of the business or in the stakeholder

community, disruption suffered due to a lack of foresight, attachment to pre-conceived solutions, disruptive incentives such as individual bonuses, fear and job insecurity, undue respect for hierarchy, bias against local expertise in favour of outside agencies, and over specification of required deliverables.

Process The process sub-theme included problems caused by inefficient or onerous processes, requirements for activities adding little value, inconsistent approaches across the business, and rigid processes constraining creativity.

Time pressure was associated not just with deadlines, but also having “no time to collaborate”. Recruitment of necessary expertise was noted as a problem for understanding complexity and a problem of timing as they could not “recruit fast enough”. References to unhelpful “solutionising” and “solution-led thinking” were common. Equally prominent were references to inefficient processes related to governance and sign-off.

Table 5.8: *Challenges and obstacles*

Communication	Lack of clarity, Internal communication, External communication
Constrained resources (human)	Time, Suitably qualified people, Sophisticated knowledge, Workload, Research participants, Limited scope
Constrained resources (material)	Funding, Equipment, Legacy equipment
Behavioural obstacles	Wrong mindset, Low engagement, Lack of foresight, Solution driven, Disruptive incentives, Fear, Hierarchy, Bias, Over-specification
Process	Inefficient processes, Low-value activity, Inconsistent approaches, Rigid processes

The solutions that the participants discussed for the challenges given in

Table 5.8 are reflected in the aspirational practices in Table 5.7, and in the discovery goals listed in Table 5.5.

5.4 Study 2: Practitioner interviews

The purpose of this study was to develop a rich description of discovery practice, building on the information gathered in [Study 1: Ketso workshops](#), and focussed on how practitioners achieve a shared understanding of the problem.

5.4.1 Procedure

General approach

Semi-structured interviews were conducted, as discussed in section [4.4.5](#).

Guiding questions

The guiding questions for the interviews explored the five aspects of [discovery](#) identified in section [5.2](#), and were made available in advance on the [project website](#). The additional prompts used by the interviewer, if required, are listed in [Table 5.9](#).

Recruitment

Participants were recruited via social media, as discussed in section [4.4.1](#).

Completion

Participants were provided with information in advance on the [project website](#), and briefed again at the start of the interview before obtaining verbal consent, as discussed in section [4.4.2](#). Interviews were conducted remotely using the participant's choice of online conferencing software, which was *Zoom* for four of them and *Google Meet* for the other two. Their role and organisation type are listed in [Table 5.10](#), with the interview duration.

Table 5.9: *Interview questions and prompts*

Aspect	Question and Prompts
Mobilisation	How does your team decide what the next piece of work is Do you respond to a request from elsewhere? Do you actively set goals of your own? Do you specialise in one thing, that you attract customers for?
Engagement	How do you gather information about the problem What user research techniques do you use? Who do you involve? What do you do with the data?
Sharing	How do you share your understanding of the research data How do you challenge stories? How much do you try to anticipate usability problems? If you spot a potential issue, what do you do?
Iteration	How much discovery is enough What limits the time spent? Do you have structured questions / hypotheses? How do you judge the risk of stopping?
Choices	How do you make your early design choices How aware are you that you are making a choice? How do you capture the decisions you make? Who contributes to those decisions?

Table 5.10: *Interview participant characteristics and duration*

Id	Domain	Role	Type	Duration
14	Public Sector	Business Analyst	Freelance	00:42:15
15	Digital Media	Designer	Design Studio	00:38:57
16	Public Sector	Interaction Designer	Civil Service	00:37:59
17	"	User Researcher	UX Agency	01:06:17
18	"	Service Designer	Civil Service	00:36:46
19	"	Visual Designer	System Supplier	01:02:02

Transcription

Audio records of the interviews were transcribed using the dictation facility in *Microsoft Word* to prepare an initial script which was then corrected by hand, speaker attribution added, and the content anonymised before analysis.

5.4.2 Data analysis

Approach

The thematic analysis approach outlined in 4.5 was applied to the interview transcripts.

5.4.3 Themes identified

Primary themes

Analysis of the interview transcripts generated 492 codes, of which 33 were topic summary codes to aid navigation of the code-book within *NVivo* and 455 were coded statements relevant to the research question. From these coded statements, 36 candidate themes were identified. These were developed into six primary themes, with sub-themes adding detail within the same organising concept. These are summarised in Table 5.11. The organising concepts used are shown in Figure 5.4. Where participant statements are quoted below as a boxed Extract, the caption used is the code. I have left themes with an organising concept and a simple tag rather than assigning an evocative name as well. Having both organising concepts and names for so many themes and sub-themes would have been confusing.

Table 5.11: *Themes developed from interview transcripts*

Tag	Concept	Characteristics and scope
T1	Discovery should build shared understanding	Indications of a desire to share understanding, in a traceable way, supported by prototyping and Agile methods, and aspiring to share more insights, but weakened by contractual mindset and stereotypical perceptions.
T2	Discovery is a mindset not a fixed process	Narrative of mindset over process, diverse artefacts, and discovery as an activity not a phase.
T3	Assumptions need to be challenged	Indications of a desire to challenge assumptions, recognition that equity is not uniformity, and resistance to abstractions like personas but found useful in understanding user friction
T4	Better time management enables better outcomes	Recognition of time as a significant challenge, with reviews too limited to be effective, and agility limited by funding mechanisms, but prioritisation of backlogs used to optimise effort.
T5	Anticipation requires a different mindset	Indications of a growing awareness of the need to anticipate, current use of passive pattern reuse where significance of user impact is not appreciated, a preference for agile repair and a belief that anticipation is impractical, and a conflict between the desire for empirical evidence and the impact this has on design due to externally driven mobilisation and design reduced to a multivariate test.
T6	Ethical safety requires a multidisciplinary approach	Recognition that recruitment choices impact design, that solutions can be locked in too early if financial objectives trump usability, or if choices are not recorded or recognised as such, and evidence that remote working is established and understood, enabling diverse routes into UX roles.

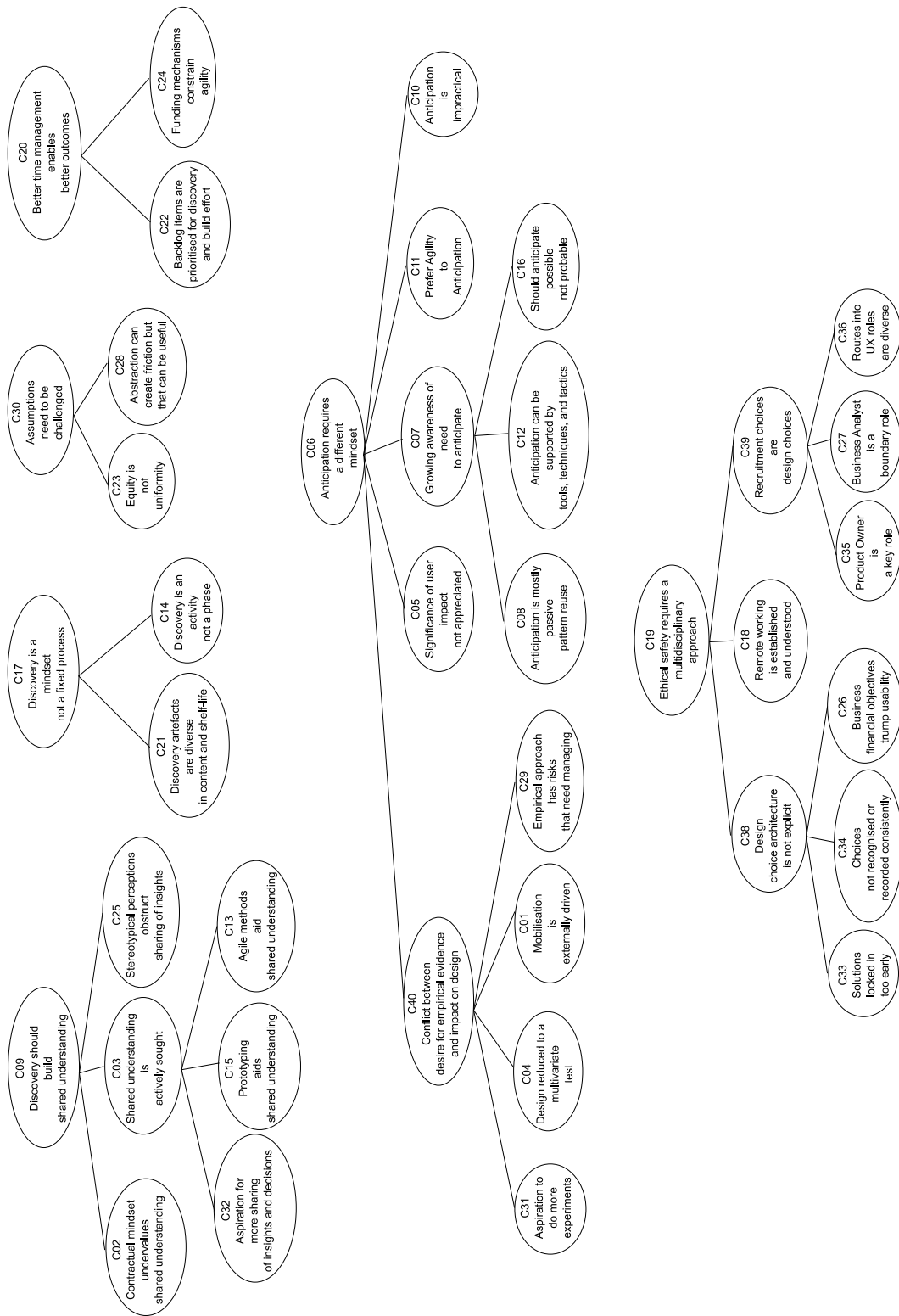


Figure 5.4: Interview theme and sub-theme organising concepts

Theme T1: Discovery should build shared understanding

The importance of shared understanding, aligning designers with the rest of the project team and their end-users, was repeated across the dataset. While a mindset focused on the contract (T1.1) and stereotyped perceptions of their colleagues (T1.3) might work against this, shared understanding was actively sought (T1.2), there were aspirations to share more (T1.2.1), and prototyping (T1.2.2) and Agile rituals (T1.2.3) played a role in effective sharing. These sub-themes are summarised in Table 5.12, and examples are given in Extract 5.1 and 5.2.

Extract 5.1 *Designers need to see the lived experience of users*

“I would love every designer in [location] to do a tour of duty within the user safety team ... once you’ve been exposed to some of how people are trying to use your platform for terrible things that doesn’t leave you”

Extract 5.2 *Design sessions need to involve researchers to uphold findings*

“I would be looking for researchers to sit in on design critique sessions so that essentially they can stop some downstream leaks ... where the designers are designing in a way that contravenes what they put in the research”

Table 5.12: *Sub-themes developed within theme T1*

Tag	Concept	Characteristics and scope
T1	Discovery should build shared understanding	Use of artefacts to communicate understanding, the need to see lived experience, and documenting the current state as well as providing traceability of changes.
T1.1	Contractual mindset undervalues shared understanding	Valuing delivery over understanding, sign-off over satisfaction, and contracts over consensus.
T1.2	Shared understanding is actively sought	Active involvement of whole team, sharing insights in presentations and displays, and role of product owner in ensuring alignment of understanding.
T1.3	Stereotypical perceptions obstruct sharing of insights	Obstacles to understanding from stereotypical views of other disciplines and stove-piping based on techniques used rather than combining insights.
T1.2.1	Aspiration for more sharing of insights and decisions	Aspirations for more sharing, more traceability, research libraries, and mobilisation driven by user research.
T1.2.2	Prototyping aids shared understanding	Use of prototypes to communicate understanding, capture decisions, and support cross-disciplinary engagement.
T1.2.3	Agile methods aid shared understanding	Role of stand-up meetings in aligning understanding, and cross-disciplinary work and mutual trust in making more intentional choices.

Theme T2: Discovery is a mindset not a fixed process

Practitioners say that work-as-imagined rarely reflects work-as-done [89, p86] and is tailored to the situation. Discovery artefacts are diverse (T2.1) and range from ephemeral sketches to high quality research outputs. While a notional ‘phase’ may complete, discovery activity is ongoing (T2.2), may involve short ‘spikes’ of effort, and there are aspirations to continue it after the system is deployed. These sub-themes are summarised in Table 5.13, and examples are given in Extract 5.4, 5.3, 5.5, and 5.6.

Extract 5.3 *Discovery methods are tailored to the situation*

“it’s not just one thing, it’s a whole range of things, it’s more about choosing your methods according to the situation”

Extract 5.4 *Discovery artefacts are often ephemeral*

“I will draw a diagram with arrows and bits of text and then, at the moment, kind of scan them in and take a photo and just share it, and say look ‘point - point - point’ is what we’re thinking and then often just throw it away ... if I find myself drawing the same diagram again and again for different people, then I’ll write it up”

Extract 5.5 *Discovery varies in intensity but never really stops*

“I don’t think it’s ever actually finished, like once the discovery phase stops and you move to Alpha, discovery just still kind of carries on in the background”

Extract 5.6 *Discovery spikes can be used to address surprises*

“if there is a problem we have to solve, we’ll do a spike on it for two or three days, and I think you have to be able go okay we need to drop out now and do a bit of discovery spike around this stuff”

Table 5.13: *Sub-themes developed within theme T2*

Tag	Concept	Characteristics and scope
T2	Discovery is a mindset not a fixed process	Tailoring methods to the situation, judging sufficient discovery, testing the concept not the solution, and understanding the problem not solving it.
T2.1	Discovery artefacts are diverse in content and shelf-life	Wide range of techniques and artefacts, and lifetimes from ephemeral to product-life.
T2.2	Discovery is an activity not a phase	Aspirations to move to continuous discovery, do more user research with live services, and the need for a continuous narrative of findings.

Table 5.14: *Sub-themes developed within theme T3*

Tag	Concept	Characteristics and scope
T3	Assumptions need to be challenged	Recognised need to challenge assumptions, and use of research findings to do so.
T3.1	Equity is not uniformity	Prioritising removal of barriers to use over efficiency, the need to focus on key groups, attempts to mitigate bad design through training, and belief that universal design disappoints everyone equally.
T3.2	Abstraction can create friction but that can be useful	Abstract nature of personas as a barrier, and use of that abstraction to voice inconvenient truths.

Theme T3: Assumptions need to be challenged

Practitioners say that it is important to challenge assumptions, and cite good stakeholder management and using design sessions to challenge the riskiest assumptions identified during discovery as ways of doing so. They recognise that equity does not mean uniformity (T3.1) and say they prioritise avoiding barriers to use over efficiency of use by expert users. Examples from lived experience are valued. Personas are sometimes considered too abstract, but can be a means of voicing inconvenient feedback from users (T3.2). These sub-themes are summarised in Table 5.14, and examples are given in Extract 5.7, 5.8, 5.9, and 5.10.

Extract 5.7 *Avoiding barriers to adoption prioritised*

“you need to make it very intuitive ... to get it right, because what you’re really trying to do as well is avoid barriers being put up”

Extract 5.8 *Designing for hard to reach users benefits from anticipation*

“they have to anticipate ... potentially having an awful Internet connection and ... as soon as [it] cuts out they lose everything”

Extract 5.9 *Personas may voice inconvenient truths*

“they thought we were just trying to be particularly difficult ... this is a real thing someone said, they’re just given a fake picture and a name but it’s basically a real feeling”

Extract 5.10 *Awkward behaviours can be captured in a persona*

“we had a sceptic persona ... that was just like it’ll never work, you can’t do this, it is not possible”

Theme T4: Better time management enables better outcomes

Time pressure was frequently cited as an issue, and reviews were sometimes too limited to be effective. Coping strategies included only refining the top priority backlog items (T4.1), and moving from large infrequent releases to smaller more frequent ones. Funding mechanisms can constrain agility (T4.2) and create staffing bottlenecks. These sub-themes are summarised in Table 5.15, and examples are given in Extract 5.11 and 5.12.

Extract 5.11 *Agile working hampered by fixed up-front funding*

“it’s weird because we have to estimate every project in a really water-fall way but we don’t actually work waterfall”

Extract 5.12 *Big infrequent releases are harder to manage*

“with the quarterly releases ... new stuff keeps coming in and its all [top] priority ... so then you’re constantly shuffling”

Table 5.15: *Sub-themes developed within theme T4*

Tag	Concept	Characteristics and scope
T4	Better time management enables better outcomes	Time pressure on reviews and retrospectives, movement away from scheduling of releases toward continuous process, and additional complexity of entrenched workarounds between releases.
T4.1	Backlog items are prioritised for discovery and build effort	Practice of refining backlog descriptions of highest priority items, leaving lower priority less detailed.
T4.2	Funding mechanisms constrain agility	Conflict between desire for agility and need to secure funding let for fixed periods, and difficulty of funding fixes for known issues versus support for future ones.

Theme T5: Anticipation requires a different mindset

The data provided a full spectrum of opinions on anticipation from advocacy to antagonism. This conflict between a concern about consequences but a reluctance to anticipate them (T5.1) is captured in a meta-theme, reflecting practitioners' opinions and their perception of others (Extract 5.16). Concern was expressed that the significance of user impacts was not appreciated (T5.2), feeling that the ease with which software can be changed leads to complacency and handling of harm as just another change request, without recognising the imbalance of responsibility and power between designers and users. Designers are increasingly aware of the consequences of their choices (T5.3) but some prefer to respond rather than anticipate (T5.4) while others believe anticipation is impractical (T5.5) or a waste of time. These sub-themes are summarised in Table 5.16, and examples given in Extract 5.13 to 5.28.

Extract 5.13 *Software people don't perceive risk in what they do*

“software people don't see risk in what they do, you know, they think software is soft, it's malleable, it could be remade at will”

Extract 5.14 *Designers are increasingly aware of their impact*

“increasingly aware, the landscape is shifting, ask me five years ago and, definitely not”

Extract 5.15 *General approach of probing what an outcome would mean*

“what would this mean if we have this ... a little bit of kind of envisaging what the future might look like in very broad terms”

Extract 5.16 *Lean advocates argue that anticipation is impractical*

“particularly the lean advocates, have convinced us that we live in a state of such flux ... that it's a waste of time to predict.”

Associated with this, is a conflict between the desire for empirical evidence and the perceived impact that an unconstrained empirical approach has on design outcomes (T5.1). There is an aspiration to do more experiments (T5.1.1) but concern that reducing design to a multivariate test is dangerous (T5.1.2) if taken too far.

Extract 5.17 *An expectation of trying some things that turn out to fail*

“we built ten things, five of them were completely wrong and off track, and so we had to redo some of the discovery stuff”

Extract 5.18 *Design reduced to a multivariate test*

“and so the entire world becomes a multivariate test, where you ship something, and if people die you change it”

Factors that work against anticipation include externally driven mobilisation to address a problem (T5.1.3) rather than an internal response to user research or business needs, and over reliance on an unconstrained build-measure-learn approach, that may risk disenfranchising design and deprioritising anticipation (T5.1.4) if user outcomes are not what is measured and the risks of undesirable consequences are not managed.

Extract 5.19 *Service mobilisation driven by user research*

“it’s like a completely different thing once you’re in a service, we would use a mixture of user research data and business requirements to try to work out what had the most value”

Extract 5.20 *Mobilisation is client request driven*

“it’s more a response to client requests and the client requirements in terms of projects that surface”

Extract 5.21 *Unconstrained empiricism deprioritises ethical safety*

“it also deprioritises any attempt of moral imagination or ethical anticipation of what might happen”

Growing awareness of the need to anticipate has resulted in new techniques being applied. Avoiding problems by pattern reuse (T5.3.1) such as web-page accessibility guidelines [55] is common but these miss important issues [276]. Some tactics support anticipation (T5.3.2) by using prompt words [163] or pictures [118]. These work passively or at a micro level, focussed on immediate responses rather than the system property that should be preserved [26]. An approach based on stepping through actions may find more issues (T5.3.3) than trying to work backwards from a known risk as that relies on categorisation.

Extract 5.22 *Social learning supports passive anticipation*

“We would definitely try to anticipate. For actual interface design we have [our] design system ... so you can avoid a lot of basic problems by using the patterns and by tapping into the knowledge across [our organisation]”

Extract 5.23 *Passive anticipation patterns validated by past experience*

“trying to draw on that community of knowledge ... can help you anticipate what the problems are going to be, and stop them from happening in the first place”

Extract 5.24 *Consequence scanning works at a micro level*

“this consequence scanning framework you may have come across, so you know things like that, but those are very micro exercises”

Extract 5.25 *Forward chaining from actions may find more problems*

“I also like to do it step by step: what could this cause, what could this cause, and then suddenly you’re in some pretty unanticipated territories”

Extract 5.26 *Backward chaining from a known risk uses categorisation*

“once you have those predefined categories, you can have a relatively fruitful conversation and say here’s the known risk, does this apply to us”

Practitioners generally accept a need for anticipation of undesirable outcomes, but believe they fulfil that need by usability testing after the design has been embodied, rather than before.

Extract 5.27 *Anticipation relies on testing*

“Definitely we would want to find out what the major problems are with going to be with the service before it goes live, and so that’s one of the main aims of having a phased approach to service delivery ... we sort of assess services before they are allowed to move on to the next phase of that life cycle, and part of that is to make sure that research is happening, that you know all the technical tests are happening that need to happen”

A champion within the organisation can help to drive the conversation on ethical design. Companies may have corporate social responsibility roles among their human resources professionals, but they may not feel able to engage in design discussions or empowered to challenge decisions [264].

Extract 5.28 *Ethical safety efforts require a champion*

“there has to be an appetite for it ... a designer, reasonably senior enough that they’re listened to, who starts to say hey we’ve got to start taking this stuff more seriously and then they convince the rest”

Table 5.16: *Sub-themes developed within theme T5*

Tag	Concept	Characteristics and scope
T5	Anticipation requires a different mindset	Immediate responses versus long term, reliance on quantified impact before action, need for context dependent strategies.
T5.1	Conflict between desire for empirical evidence and impact on design	Concerned about consequences but unwilling to change approach to avoid them.
T5.2	Significance of user impact not appreciated	Ease of change taken as low cost of failure, stronger evidence needed to stop than continue, with little recognition of imbalance of power.
T5.3	Growing awareness of need to anticipate	Awareness of value-driven tools and techniques, and existence of intolerable outcomes.
T5.4	Prefer Agility to Anticipation	Rather fix a known problem quickly than work to avoid a possibility.
T5.5	Anticipation is impractical	Belief anticipation is unscientific, and user research is observation.
T5.1.1	Aspiration to do more experiments	Desire to test multiple hypotheses, acceptance of failures.
T5.1.2	Design reduced to a multivariate test	Outcome agnostic experiments despite consequences, and reliance on testing finding problems.
T5.1.3	Mobilisation is externally driven	Stakeholder driven, delivery driven, and technology driven activity, and aspirations to centre the user.
T5.1.4	Empirical approach has risks that need managing	Unconstrained empiricism disenfranchises design and deprioritises safety.
T5.3.1	Anticipation is mostly passive pattern reuse	Passive use of perceived best practice without contextualising.
T5.3.2	Anticipation can be supported by tools techniques and tactics	Awareness of consequence scanning, futures toolkit, and need for ethical champion in organisation.
T5.3.3	Should anticipate possible not probable	Forward from actions versus backwards from known problems.

Theme T6: Ethical safety requires a multidisciplinary approach

Involving a wider set of people was felt to be important in establishing [ethical safety](#), as it helps cope with complexity. Other issues it was felt to address were a lack of explicit and traceable choices (T6.1), where solutions were locked in too early (T6.1.1) or simply not recognised as choices (T6.1.2), and usability being sacrificed to meet business financial objectives (T6.1.3) or to prioritise throughput.

The Product Owner role was felt to be key to success (T6.3.1), and Business Analyst was found to be an important [boundary role](#) (T6.3.2), which with the diversity of routes into [UX](#) work (T6.3.3) made recruitment choices important to outcomes (T6.3) and could impact the design itself. Remote working is now important to how understanding is shared and challenged ([RQ1.2.3](#)). As an emergency tactic [115] and a strategic choice [93], it was well established (T6.2) and the challenges well understood, and it was also felt to improve communication.

Extract 5.29 *Ethical safety requires a multidisciplinary approach*

“if you leave it just to the research function to be this sort of the arbiters of that ethical risk and ethical sort of anticipation, or that user safety risk, then I don’t think it’s going to work as well as if you involve a wider set of people”

Extract 5.30 *Can cope with complexity if actively negotiate understanding*

“it’s not saying I’m going into this perfectly understanding the world, I’m going to go into this with a real shonky understanding of it, and by getting people involved and communicating with them and getting them interacting with designs, and stuff like that, we will work out a best fit thing, that most of the time deals with this complex weirdness of the human being”

Extract 5.31 *Remote working got us out of our bubbles*

“I was in my little analyst bubble, whereas now we’ll talk to each other, and have open conversations about things that are going on”

Table 5.17: *Sub-themes developed within theme T6*

Tag	Concept	Characteristics and scope
T6	Ethical safety requires a multidisciplinary approach	Involving other disciplines, and coping with uncertainty by negotiating understanding.
T6.1	Design choice architecture is not explicit	Reasons for choices not always clear or led by the user research.
T6.2	Remote working is established and understood	Indications that practitioners are comfortable with remote working, and understand its limitations.
T6.3	Recruitment choices are design choices	Small number of roles have disproportionate impact on outcomes
T6.1.1	Solutions locked in too early	Preference for road-map over research, emotional investment in solution, but aspiration to be more user centred.
T6.1.2	Choices not recognised or recorded consistently	Decisions recorded but method varies, and choices not recognised as such.
T6.1.3	Business financial objectives trump usability	At scale, throughput and removing obstacles to job to be done valued over usability.
T6.3.1	Product Owner is a key role	Product Owner hold the design rationale and narrative, understanding why, what, and who, while managing stakeholder expectations.
T6.3.2	Business Analyst is a boundary role	People skills and analysis bridge between Product Owner, Subject Matter Experts, and developers.
T6.3.3	Routes into UX roles are diverse	UX too broad to describe a role and all roles impact design, some approaching by self-taught progression in E-Commerce roles.

5.5 Current practice findings

5.5.1 Answers to research question RQ1

How do practitioners approach and perform discovery

Practitioners approached [discovery](#) with the declared aim of building a [shared understanding](#). The process and methods used were varied and tailored to the circumstances. The required mindset was confident, insightful, collaborative, curious, and pragmatic ([RQ1.1](#))

What is done in practice

Discovery activities generated a range of artefacts, from ephemeral sketches to high quality research outputs. Methods used include experimenting, were data driven, used ethnographic techniques, and aimed to be multi-disciplinary and human centred. Prototyping and Agile methods were said to aid [shared understanding](#) ([RQ1.1.1](#))

What would improve practice

Outcomes were said to be improved by better time management, such as the prioritisation of discovery effort, and enriching practice by supporting curiosity, more team empowerment, and better knowledge management. Practitioners aspired to deeper and broader discovery with more diverse participants, more collaborative working and stakeholder engagement, and persistent knowledge through wider sharing and the use of research libraries ([RQ1.1.2](#))

What are the challenges

Shared understanding was found to be obstructed by a contractual mindset and stereotyped perceptions of other disciplines, and agility was constrained by funding mechanisms. Lack of clarity in communication was a challenge, as

were constraints on time, peaks in workload, recruitment of suitable research participants, solutions being locked-in too early, and the relative priorities of business objectives and usability (RQ1.1.3)

How do practitioners achieve a shared understanding of the problem

Prototyping, expert involvement, and collaboration across teams were used, and regular presentations of findings and stand-up meetings with the team were found to be helpful. Research interviews and direct observation of user activity in its normal context were identified as favoured [user research](#) techniques for data gathering (RQ1.2)

How does the team decide the next task

Mobilisation of the team to begin a new piece of work was generally externally driven, by changes in stakeholder needs or focus, new technology, or changed legal requirements. Practitioner influence on the choice and content of future work was generally limited to those with a choice to participate by bidding for the work, and then there was an aspiration to be involved earlier in order to have more influence over the shaping of the project (RQ1.2.1)

How does the team inform their understanding

Immersion in the problem context was common, with direct observation of people experiencing it, where that was practicable. Structured interviews were the main form of direct interaction with users prior to prototyping (RQ1.2.2)

How is understanding shared and challenged

Presentations of findings to stakeholders and colleagues were common. Once available, prototypes were used to explain and capture design decisions. In organisations acting as suppliers to the public sector, prototypes were also used to share the designer and analyst understanding of the solution with sales

professionals who were then better able to communicate it to the customer. Presentations and prototypes were a means of challenging assumptions, but that was not necessarily their stated purpose, and constructive challenge of the data was generally *ad hoc* rather than explicitly planned. (RQ1.2.3)

How deep an understanding is enough to proceed

Having enough information to make the next decision, or know what the next question should be, were common statements of how much discovery activity was required at that point. It was acknowledged as a good question, but a difficult one to answer. (RQ1.2.4)

How is understanding translated into design choices

Design choices were not always recognised as such, or consistently recorded to provide traceability. Prototypes were sometimes viewed as an embodiment of design decisions, because of their role in briefing stakeholders, as were the briefings used to explain them and auxiliary information such as change logs and tasking. The early influence of stakeholders through their ideas about the shape of the solution were felt to sometimes lock in poor choices which were then hard to challenge or change (RQ1.2.5)

Chapter 6

Jeopardy Analysis

6.1 Introduction

Informed by literature (Chapter 2) and analysis of current practice (Chapter 5), this chapter constructs an [interaction discovery](#) method that addresses the identified challenges of anticipating harmful interactions. Details of its use are outlined, which are then applied in the workshops described in the following chapter (Chapter 7).

Study 2 found that current practice relies on building something and testing that embodiment of the design, rather than examining the design itself. Any choices made while rendering the design intent [332] depend on the information that informed them, so questions asked during discovery and the way they are framed may be important to the design outcome. The method described in this chapter embeds key questions in a way that helps a team to anticipate problems, by systematically identifying them so that they can be mitigated, and capturing information that will assist recognition and rapid response to the problem if it occurs after the software is deployed.

This chapter explains the method's design criteria (6.1.1) relating them to the literature review and findings from Study 1 and Study 2, describes the Jeopardy Analysis method (6.2), gives examples of [ethical properties](#) and how they might be vulnerable (6.3), and provides illustrative examples (6.4).

6.1.1 Design criteria for interaction discovery methods

Group decision making

Literature on group decision making, as summarised in 2.3.2, suggests that what is needed is a process and mindset that is evidence hungry but also sceptical and ready to challenge the group's interpretation of the evidence, and that any priming of the questions should be done in a way that assists greater understanding of the answers, not just a broadening of their scope and detail. These are characteristics of risk assessment. Comparing risk identification in safety analysis and similar processes in security analysis, Raspotnig and Opdahl [286] suggested that well defined worksheets and guide words help safety analysis to achieve a balance between creativity and formalism, while the sharing of models between risk identification and software development helped security analysis scale up to more complex problems.

Combining creativity and a formal structure might also benefit assessment of usability concerns, and would support the desire for methods that provide a clear evidence base for decision making, as found in the analysis of the workshop data (p95), and the desire for traceability identified in the interviews (p109).

- D1 Assists understanding of the answers, not just their capture
- D2 Fosters a mindset that is evidence hungry but also sceptical

Avoiding bias in anticipation

Interview participants said they uncovered problems through testing rather than anticipating them. This has the advantage that it avoids pre-judging the user research or introducing stakeholder-led bias, one of the behavioural obstacles identified (p100). Recent work by Schweickart *et al* [316] found that automatic mental processes play only a minor role in anchoring bias, provided that participants actively evaluate the quality of any information given. If the process were consistently managed and sessions facilitated with this in mind, it should be possible to structure the analysis without inadvertently narrowing the possibilities to ones already considered.

D3 Uses consistently facilitated sessions

D4 Actively evaluates the quality of prior assumptions

Repetitive priming and jeopardies

Normal design practice is focussed on a positive outcome, albeit sometimes for the company rather than the user, and UX practice is increasingly focussed on positive emotions [393], so it might be easier to integrate anticipation into the process if the starting point were something positive. If a discussion begins with what ‘good’ looks like from the viewpoint of a particular user then the ways in which those positive properties of the design may be lost will, to a degree, be primed by what was valued and why it matters. If the anticipation activity were regularly applied, as you would expect in any practical use by a team addressing a backlog of changes and improvements, then there might also be a repetitive priming benefit [77] in how quickly a problem is recognised when it starts to occur.

Capturing the problem as a **jeopardy**, identifying what desirable property has been lost and what might happen as a result, and capturing any repeated patterns in a **jeopardy model**, should assist that process, and support the desire expressed in the interviews to apply user research findings to challenge assumptions (p111).

D5 Enables the recognition benefits of repetitive priming

D6 Uses well defined worksheets and guide words

Problems with guide words and checklists

Verbal reasoning and a procedural understanding of the mechanisms can be used with standardised guide words in a ‘HAZOP’ analysis [74] to identify and understand the ways that a design may fail, and as part of a wider analysis of effects [288]. Performing these kinds of analysis requires a detailed design to be available, so is helpful in understanding how the solution will behave but not in understanding the problem during discovery, and the way that they are

structured does not help a team to understand changes or new features [26] because additional scenarios of use often sit in different parts of the assessment and fragment the team’s thinking, so may not be best suited to Agile development approaches that are driven by change.

Some consequence scanning methods, as developed by Doteveryone [45] or suggested by Bowles [39], take a very similar approach of using extensive lists of prompt words, so may suffer from the same drawbacks. I suggest that this could be addressed by digging deeper into assumptions and involving team members who understand their consequences. Focusing on a smaller number of key concepts tied to the design would also address the issue, identified in the interviews, that current approaches to anticipation rely too much on reapplying a known pattern, without sufficient contextualisation (p118).

D7 Shares its models with software developers

D8 Targets conceptual shortfalls more than implementation

D9 Supports planning and scoping activity

Capturing ethical properties

To target conceptual problems, I chose to consider the [ethical properties](#) of the design, namely properties that distinguish a “good” design that provides a trusted transparent collaboration with the user that focuses on their needs from a “bad” design that exploits or deceives or unfairly discriminates against them. As discussed in [3.1.1](#), I do not address deliberate harm as that cannot be prevented by discretionary means.

My hypothesis is that consideration of ethical properties provides a stable basis of analysis that can be applied before discovery is complete and re-applied consistently through the product life-cycle, and that thinking about usability issues as the loss of an ethical property may help practitioners to challenge their assumptions and anticipate harmful interactions. This is used in [Chapter 7](#) to refine [RQ2](#) for the evaluation of the method.

Use of abstract ideas was found by Zhou *et al* to help break down fixations and promote creativity [397]. The practice of using abstract personas to

voice inconvenient truths, reported by interview participants (p111), suggests the use of ethical properties may also help to present anticipated problems to stakeholders in a more neutral way.

D10 Targets honest mistakes not deliberate evil

D11 Emphasises positive properties

D12 Centres the people impacted by problems

Three phases: framing, assessment, and review

By analogy with risk management processes [256], I propose three phases: framing, assessment, and review. In phase one, a framing activity for a product or a family of closely related products establishes what **ethical properties** are relevant to the design, how they are best represented within the language and conventions of the domain, and *qualitatively* what would be considered tolerable. In phase two, potential problems are assessed by identifying them, analysing how they might occur, and evaluating how they might be reduced to a tolerable level. In phase three, the information is visualised in a way that will support its ongoing communication and review. These support the discovery outcomes of having goals aligned across the business, ideas that are validated, and findings that can be visualised, as identified in the Ketso workshops (p95).

D13 Informs recognition and recovery from problems

D14 Persists for the life of the product

Practical priorities

To be a practical method, usable early in the life-cycle, the emphasis should be coping with problems rather than trying to eliminate them before they are properly understood. To better support Agile methods, it should provide a stable viewpoint that will support change rather than being invalidated by it. An ethical basis that avoids harm and centres care for human needs, rather than adherence to rules and standards would respond better to criticism of

current rule-based accessibility approaches [359]. Where the method design can influence it, providing a psychologically safe environment to explore and achieve a shared understanding has been shown to be important for team working [204, 176, 355].

These prioritisation choices align with professional codes of conduct [107] and with the belief expressed by practitioners that they succeed by empowering the team to have open communication, shared goals, and a shared journey with stakeholders and users (p97).

D15 Prioritises resilience over robustness

D16 Provides a stable viewpoint through change

D17 Embeds the ethics of care rather than justice

D18 Safely probes the team's understanding

These criteria are addressed by the design choices discussed below. How each of them is addressed in the method design is listed in Table 6.1.

6.2 Jeopardy analysis method

6.2.1 Introduction

This thesis is not concerned with safety, as that already has a well established legal framework and mature methods of analysis, prevention and mitigation. It addresses the harmful interactions, big and small, that may affect software users as a result of poorly designed software. Safety issues are an extreme outcome of the problems that are of interest, but may provide useful ways of thinking about them. In safety analysis, the distinction is made between an **accident** where the unwanted event has actually occurred, and a **hazard**. A hazard describes a precarious state in which an accident is feasible, though it has not yet occurred and might never occur, and is associated with one or more hazardous events denoting that an important barrier to an accident has been lost. The event name often reflects this idea of the loss of an important system safety property.

The word “hazard” has a very specific safety-related meaning. I have chosen the more general term [jeopardy](#) as “a danger of loss, harm or failure” to avoid those connotations, so a system state vulnerable to a shortfall in an important aspect of usability that results in users suffering an identifiable harm will be referred to as a [user jeopardy](#). A jeopardy is not a bad thing in itself, but is a precarious state, so it has been identified as a context for something we wish to prevent or mitigate. As this thesis is only concerned with usability, I will generally refer to these states simply as a [jeopardy](#). If this technique were applied more broadly then other kinds of jeopardy might be of interest.

The purpose of identifying vulnerable properties of the design and undesirable consequences that may follow from their loss is to provide direction, identify constraints, and understand the consequences of design choices. It is expected that, over time, teams working in a particular problem domain would develop a set of candidate properties that experience has shown to be regularly relevant to their work, from which to start their analysis.

To identify relevant properties and any precarious states associated with them, a step-wise jeopardy analysis method is proposed. This is described in section [6.2.2](#) and summarised in [Figure 6.1](#). To apply the method without domain experience, four generic properties are identified in [6.3](#) to provide a starting point.

6.2.2 Method steps

The steps are split into three phases. Phase one is a preparatory phase where the [ethical properties](#) that are relevant to the design are selected and decisions made about how to communicate them and provoke a creative response to them. In practice, that might be done once for a whole family of products. In phase two, the vulnerabilities of each potentially vulnerable property are considered in the context of the specific product under development. In phase three, the findings are visualised and communicated to the team.

Desirable properties

In preparation for jeopardy analysis, some thought needs to be given to what properties would be desirable. As this is an ethically focussed method, it is [ethical properties](#) that are of interest, namely those that distinguish a “good” design that provides a trusted transparent collaboration with the user, that gives priority to their needs, from a “bad” one that does not.

Eliciting the properties the design should have is equivalent, or at least closely related, to asking what ethical values are held by the stakeholders that should be embodied in the design. Suitable methods for exploring these values already exist, as part of [Value Sensitive Design \(VSD\)](#) [117, 119], such as [Envisioning Cards](#) [118] and [Scenario Co-Creation Cards](#) [6]. The values identified must be relevant to how the product or service is designed or built or used, and not just something the stakeholders care about. This is one of the reasons that I refer to [ethical properties](#) rather than values, but I also want to frame them as properties of the design to more closely link them with other non-functional properties and their corresponding requirements. This ‘step zero’ of the method is the overlap between [VSD](#) and jeopardy analysis.

Vulnerable properties

The first step in jeopardy analysis is to consider desirable properties that are relevant to the product or service under development, and identify those that

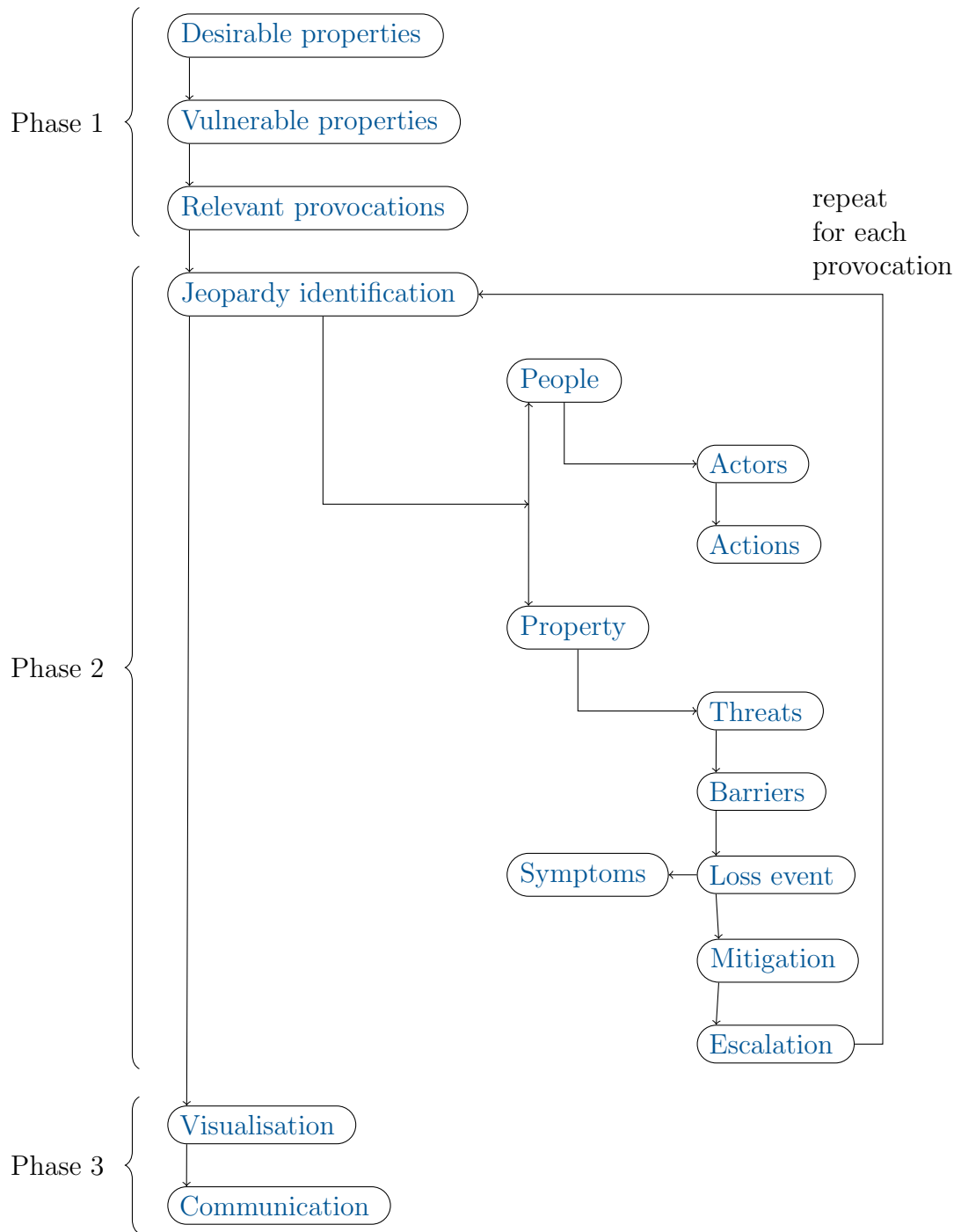


Figure 6.1: Key steps in the Jeopardy Analysis method

might be vulnerable in a way that creates a precarious situation for the user, namely a [jeopardy](#). The scope of the property should be within the influence of the design, but need not be contained by the system boundaries and need not be vulnerable in all circumstances or for all users.

The vulnerability of the property should be foreseeable given the known or suspected limitations of the user research and discovery activity so far, such as weakly justified assumptions, user groups that did not participate, or interactions with other people or systems that were not considered. The aim is a qualitative analysis to identify desirable properties that could be lost, not a detailed assessment of numbers of people harmed or tolerability of the harms caused. Assessment is a different matter, though it may be required, for example by the Online Safety Bill that passed second reading and began its committee stage in the UK Parliament in May 2022 [373].

Relevant provocations

The second step is to identify evocative words, phrases, images, or objects, from the vocabulary of the domain of the design, that provoke a creative response to each vulnerable property. It is these ‘provocations’ that will be used to communicate the property to the team. In a paper on future-focused thinking, Ozkaramanli and Desmet [262] gave the aim of a provocative design approach as challenging assumptions and stimulating discussion. Provocations were found by Raptis *et al* [284] to help participants engage with future scenarios and question existing practices, so this is intended to assist anticipation of problems. For example, an important property for a mobile app designed to support runners with their training programme might be ‘injury avoidance’, and a suitable provocation for that could be a picture or it could be a cuddly toy with a bandage around its leg.

Jeopardy identification

The third step is repeated for each of the provocations chosen in step two. Potential [issues](#) are raised, and discussed. If it is agreed that a precarious state

has been identified that is not already covered by an existing **jeopardy**, then it is noted. The focus of attention swaps between the people potentially affected by a loss of the property, and the reasons and mechanisms by which that property might be lost for each of the distinct groups of people identified, swapping as many times as the discussion needs to reach a shared understanding. Work by Baruah and Paulus [24] found that interactive groups given a few related matters to consider generated more ideas than groups given only one. By framing the question as having two kinds of things to think about the intention is to exploit that effect while giving the team ‘permission’ to follow the logic of their discussions as it flows from people to properties and back.

If an **issue** is identified that is potentially problematic then after further discussion it might be confirmed as a **threat** to a desirable property that needs to be captured as a new **jeopardy** to monitor and mitigate, it might be deemed to be covered by an existing **jeopardy**, or it could be discarded as a tolerable nuisance that requires no further action.

People focus

The aim of the People focus is to identify distinct groups who might be affected by unwanted interactions, and what they would be doing at the time. These groups are distinct human contexts for any loss event that occurs.

Actors

The actors involved in any unwanted interactions are the users affected, either interacting with the product or service under consideration or with each other. In some circumstances, other stakeholders may be involved if there is some means for them to disrupt the product in some way or obstruct its use.

Actions

Under the people focus, actions are only relevant as the context for the problem, so a high level notion of the job being done or the intended action should be

sufficient.

Property focus

Having established, perhaps somewhat vaguely initially, a human context and an activity or intention context under the people focus, a focus on the property that should be preserved aims to develop a more detailed understanding of how it might be lost or impaired, what could prevent that, what it would look like if it happened, and so on. Some [issues](#) might be noted at this point but discarded after further discussion if they are not considered a new [threat](#).

Threats

A threat is a recognised direct cause of one of the identified [ethical properties](#) being compromised in a loss event, after which event any systematic control has been lost so whether the associated harm then occurs or not is a matter of chance.

Barriers

A threat barrier is preventative measure, that if respected by the design would prevent the loss event linked to the threat from occurring. A mitigation or recovery barrier is a means of reducing the harmful consequences of one of the [ethical properties](#) being compromised, that could be applied after the loss event to regain some degree of control.

Symptoms

One of the potential benefits of conducting a jeopardy analysis is identifying what the symptoms of a threat would be, so that it can be recognised and acted upon quickly. Thinking about how the problem would manifest may also be helpful in understanding the impact.

Loss event

The idea of loss events is common to safety and security analysis, although the wording of the definitions varies from a loss of control over the hazard in the case of safety [206] to a successful breach or impairment in the case of security [56]. Applying the concept to usability, a system context and a human context are required. The system is in a state where the means designed to prevent the harm are absent or have failed, and a user is present who is vulnerable to that harm, so the circumstances for the harm to occur are present.

Mitigation

The fact that a loss event has occurred does not necessarily mean that the harm will occur at all, or in full. The user might have alternative options that allow them to avoid the unwanted interaction or ignore the failure to provide a service, by luck they may not see or hear the thing that would have distressed them, or there can be systematic means of mitigation to reduce the harm. This could be put in place permanently, be triggered automatically, or be invoked manually by the user affected or another user.

Escalation

Things that might reduce or remove the effectiveness of preventative measures before a loss event or recovery measures after it are referred to in safety analysis as escalation factors [87]. In security analysis the term refers to a threat that targets a barrier [232]. In the usability context, they correspond to anything that would make the risk or the consequences worse.

Visualisation

In a study of safe construction design, Edirisinghe *et al* [102] found that external visualisation of the design prompted participants to identify previously unconsidered risks and stimulated the discussion. In a study of information

based ideation, Webb and Kern [382] found that spatial arrangement of information to convey implicit relationships aided ideation when it was integrated into the authoring environment. Their results suggest that integration of jeopardy visualisation into design tools might be beneficial. Analysis by Cohen and Hegarty [69] of a cross-section drawing task suggested that how effectively people were able to use an external visualisation to support their own internal mental visualisation of a problem depended on their spatial reasoning ability, so the benefit of visualising jeopardies might differ significantly between individuals, and those least comfortable with a particular form of diagram might be the least able to make effective use of tool support for it, so a mix of approaches may be appropriate.

As a way of visualising the user jeopardy model as it grows and develops I suggest the use of a modified form of bowtie diagram [68]. These place the loss event at the centre, with associated contexts. To the left, the threats that might cause that event are shown, with any barriers that might prevent it and any escalation factors that would weaken the effectiveness of that barrier. On the right, the consequences are shown, with any mitigation barriers that might lessen the impact.

The main components of a bowtie diagram are shown in Figure 6.2. The colour scheme used is consistent with that used by the safety analysis tool BowTieXP [398]. Outlines have been added around the causes (left-hand) and consequences (right-hand) to make it more obvious why it has its name. The main difference from its safety form is the use of a jeopardy in the top context box rather than a hazard. Additionally, it also includes a context box for the group of people affected. Visualisation of jeopardy relationships with bowtie diagrams has the advantage that the format is simple enough to draw by hand.

Communication

Having identified potential problems, and visualised the relationships between causes and consequences, they will need to be communicated to the whole team in a form that allows them to use and update the information throughout the product life-cycle.

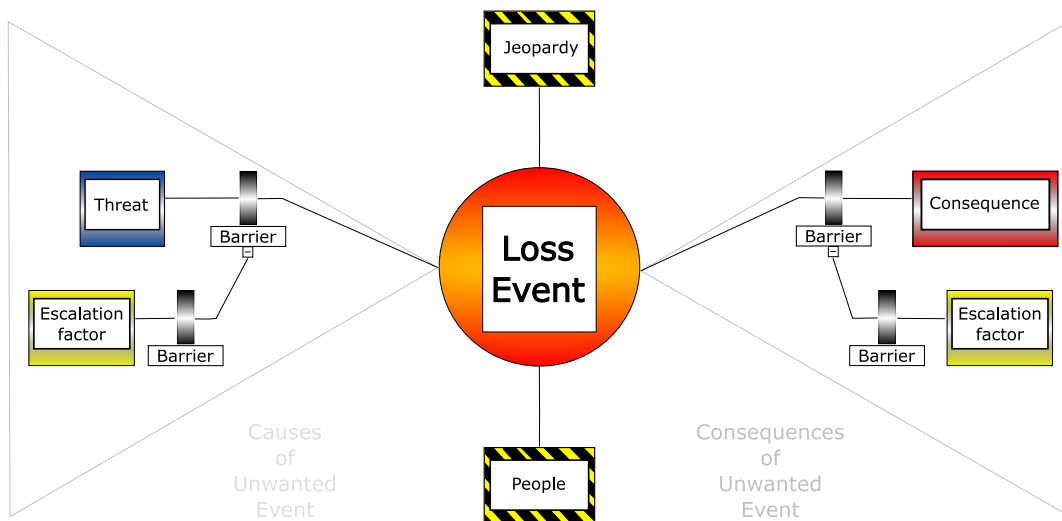


Figure 6.2: Bowtie diagram components

6.2.3 Method application

Meeting the Jeopardy Analysis criteria

The Jeopardy Analysis method can be applied in a workshop setting with active facilitation, where it is the responsibility of the facilitator to put the questions in a consistent way (D3, D6), and to constructively challenge the participants (D1, D2, D4) while providing a psychologically safe environment to explore and achieve a shared understanding (D18).

Structured worksheets alternating questions about people (D12) and ethical properties (D8, D11, D16, D17) do not assume a detailed design (D9) and are enough to prompt a discussion but not too onerous or time consuming (D5) and avoided judgemental language (D10).

Visualisation and communication with bowtie diagrams [68] linking causes through a loss event to the consequences and mitigations can be used as the basis of a persistent user jeopardy model (D14, D15) which could live alongside the development models and prototypes (D7) and act as a repository and map of possible problems (D13).

In their analysis of decision making, Scholten *et al* [315] found groups primed

to think about accountability were more evidence hungry (D2) and repeated shared information more often (D7), so its inclusion as a desirable system property might also benefit deeper discovery and foster a just culture [91] where learning is balanced with taking responsibility for consequences.

Summary

As part of a wider study into design methods, Gray analysed the language used to describe them [134]. The key aspects identified in that research note are tabulated in Table 6.2 to summarise the aims and intended operation of the Jeopardy Analysis method. I have also included some practical steps that might be part of the methods application. As part of the transition to using the method, mapping past issues onto the properties that were implicated in them would be a productive starting point and a useful form of local guidance. As part of communicating the analysis, I would expect project risk assessments to be updated and this might include creating a ‘jeopardy log’ to capture the findings.

Table 6.1: *How design criteria are addressed by method features*

Goal	Criteria	Addressed by
D1	Assists understanding of the answers, not just their capture	Ask what might prevent, mitigate, or worsen problem
D2	Fosters a mindset that is evidence hungry but also sceptical	Focus on identifying questions not answers
D3	Uses consistently facilitated sessions	Put key questions on a session worksheet or canvas
D4	Actively evaluates the quality of prior assumptions	Facilitate questioning of stakeholder assumptions
D5	Enables the recognition benefits of repetitive priming	Sessions of an hour or less so can repeat as needed
D6	Uses well defined worksheets and guide words	Provoke with ethics topic supported by visual mnemonic
D7	Shares its models with software developers	Cause/consequence model based on bowtie diagrams [68]
D8	Targets conceptual shortfalls more than implementation	Begin with abstract ethical properties
D9	Supports planning and scoping activity	Base on human needs independent of product details
D10	Targets honest mistakes not deliberate evil	Focus on ethics of care to shame the unscrupulous
D11	Emphasises positive properties	Focus on properties we want not problems we don't
D12	Centres the people impacted by problems	Alternate prompts between people and properties
D13	Informs recognition and recovery from problems	Ask "how would you know if it happened?"
D14	Persists for the life of the product	Capture in a visual model of causal relationships
D15	Prioritises resilience over robustness	Ask about mitigating consequences more than avoiding causes
D16	Provides a stable viewpoint through change	Base on ethical properties
D17	Embeds the ethics of care rather than justice	Focus on needs and avoidance of harm
D18	Safely probes the team's understanding	Apply early in life-cycle, well before deployment

Table 6.2: *Summary of Key Aspects of the Jeopardy Analysis Method*

Sensitising Concept	Ethical safety	Preserving desirable ethical properties of the design
Attribute	Jeopardy identification	Anticipating precarious states, properties lost, causes, contexts, people and impacts, identifying signals of occurrence
	Jeopardy management	Barriers to occurrence, any mitigations available, any shared causes or impacts
Core	Anticipating outcomes	Identifying possible impacts on users
	Managing risks	Knowing what to look for, and how to deal with it
Inputs	Vulnerabilities	Understanding weak points Seeing vulnerable people
Mechanics	Answering questions Mapping past issues Evoking themes	Considering key questions Known sources of jeopardy Provoking connections
Outputs	Problem markers Jeopardy models	Symptom and prognosis Extended design models
Publication format	Bowtie diagrams Jeopardy logs Risk assessments	Causes, barriers, impacts Locally relevant jeopardies Updated project risks
Type of Guidance	Ethical properties Provocations Mappings	Key user outcomes Key jeopardy themes Issues onto jeopardies
Medium	Worksheets Whiteboards	Questions and provocations Interactive online templates

6.3 Generic ethical properties

This section describes generic [ethical properties](#) that can be widely applied, sets out how they might be vulnerable, relates that vulnerability to a [loss event](#), then gives a real world example of the problem and suggests a suitable [provocation](#) that would evoke a creative response to it and how the problem might be captured as a [jeopardy](#).

Some ethical properties of a software design are sufficiently recognised by society that they are codified in legislation. Equitable treatment of users, not treating anyone less favourably on the basis of protected characteristics, is required by the Equality Act [370]. Respecting the reasoning behind a product purchase, to the extent of any intended use communicated to the vendor, is part of the Consumer Rights Act [371]. Proportionality to the stated purpose in the collection and processing of personal data is required by Data Protection regulations [372], and data controllers are held accountable by a requirement to demonstrate compliance.

The general properties of equity, agency, proportionality, and accountability provide a practical starting point for practitioners unfamiliar with the approach, so were developed for use in the evaluation of the method (see 7.3).

6.3.1 Property #1 — Equity

When a system behaves in a way that disproportionately disadvantages people in a particular identifiable group, but that group is not determined by their role in its use, then that behaviour may be considered a threat to [Equity](#). Design choices that make direct or indirect assumptions about group characteristics place *Equity* in jeopardy and the event of the jeopardy being realised would be a *Loss of Equity*.

Cultural equity

Around the world, different conventions are followed for the position in which the family name is given and how many such names an individual might have.

If name storage and lookup fails to recognise the diversity of forms used then immigrant populations can be disadvantaged. This presents as a usability issue for those involved in data entry and retrieval but may have more significant consequences for the subject of the data, as in Example 6.1, where it impaired democratic participation. A study by Atkeson *et al* [16], found Hispanic men were more likely to be asked for voter identification regardless of the ethnicity of the poll worker, and analysis by Ruiz-Pérez *et al* [300] found that 69% of authors in the Índice Medico Español (IME) biomedical research database appeared under more than one variant of their name. Similar assumptions cause problems for people with very short family names, that can be rejected as incomplete [15].

In early 2020, banks in the UK introduced ‘Confirmation of Payee’ checks comparing payee names with account holder names to combat fraud and avoid misdirected payments, resulting in incorrect decisions [357], despite readily available advice on how diverse name formats are [165, 228].

In Example 6.1, the user jeopardy could be captured as *Voter Registration* to reflect the risk of incorrect data entry, or *Voting* to reflect the resulting obstacles to their participation. A suitable provocation for protecting *Equity* when designing voter registration systems might be a picture of Colombian author Gabriel José García Márquez with the question “Surname?” under his name. The vulnerability of the *Equity* property arises in this case because of assumptions about name formats that are not true for all users and impact some ethnic groups more than others.

Example 6.1 *Name formats*

After elections in the United States, a volunteer poll worker commented [244] that surprising numbers of people with multi-part family names were referred to her for further voter verification. Some systems only allowed for one surname so voters might be registered with part of their family name listed as a forename, and the resulting mismatch caused confusion.

6.3.2 Property #2 — Agency

When a system behaves in a way that denies its users the necessary means, or situation awareness, or feeling of empowerment, to make the choices or take the actions they would wish to have made then that behaviour may be considered a threat to user *Agency*. Design choices that impose or constrain user choices place *Agency* in jeopardy and the event of the jeopardy being realised would be a *Loss of Agency*.

Relational agency

An aspect of usability is feeling in control, of having a sense of agency [268]. What this means in practice may be culturally determined [187], but users are likely to be accountable for, and may feel responsible for, the outcome of their software use. For design purposes, it is useful to think of agency in the relational or social agency form [169], emerging from situations of dynamic interaction rather than from actions with respect to a static structure. The key features of relational agency, as Burkitt defines it [50], that make it of interest to software design is that agents interact, are interdependent, and have capacities that are realised only in joint actions.

The dialogue in Example 6.2 offers no control over the data used or who it is shared with. The choice is irrelevant adverts, or opaquely targeted adverts, but neither may be what they actually wanted, as negative attitudes toward online advertising are well documented [73, 396].

Loss of agency can also occur when the user is invited to do something, or even instructed to do it, when it is not yet or never will be possible for them to do so.

In Example 6.2, the user jeopardy might be captured as *Personalisation* or just *Advertising* depending on what scope of analysis was intended. A suitable provocation for preserving *Agency* in website personalisation might be a tin of luncheon meat and a clip of the Monty Python sketch where the customer was only offered choices involving ‘Spam’ and wanted none of them. The vulnerability to the *Agency* property arises in this case because the choice the

user might really want, of no advertising at all, is not offered. The faulty assumption might be that all users are tolerant of advertising, or that they will not pay to avoid it.

Example 6.2 *Passive-aggressive advertising consent dialogue*

You're in control

Ads on Twitter are what keep our service free. To help improve which ones you see, without increasing the number of them, you can let Twitter use information from our partners to better tailor ads to you on Twitter as well as on other websites and apps.

Turn on personalized ads

Keep less relevant ads

6.3.3 Property #3 — Proportionality

When a system behaves in a way that causes the user to knowingly or unknowingly sacrifice more of their informational, intellectual, or emotional capital than the fair value of the service provided to them then that behaviour may be considered a threat to [Proportionality](#). Design choices that ignore the balance of power between designer and user place *Proportionality* in jeopardy and the event of the jeopardy being realised would be a *Loss of Proportionality*.

Proportionate means

The use of proportionate means is an important legal principle. It is one of the data protection principles [161, 372], and has been used as an argument against digital-only immigration status documents [361]. This applies even in the extreme circumstances of armed conflict [164], but concerns have been expressed about the ability of autonomous weapons systems to comply with rules on proportionality [318]. Similar legal principles apply to disproportionate consequences, so there are structural design rules to avoid disproportionate collapse of a building [303]. As design consequences can be disproportionate, Williams argues [388] that there is a basic duty to acknowledge the ways in which we may do more or less than intended and emphasises the collective nature of negligence.

Burdens placed on the user is recognised as an aspect of safety, security, and usability [62, 317, 336, 329]. Suh *et al* defined user burden as a negative impact placed on the user, and developed a user burden model including access, emotional, financial, mental, physical, privacy, social, and time burdens [339]. The cost to the user, whatever the form that takes, should be a reasonable and fair reflection of the value that the service has to them.

In Example 6.3, the user has used a facility to limit the network bandwidth taken by system updates when they are downloaded in the background but had no means of limiting disk traffic. This resulted in the work session being abandoned until the update was complete. Updating the system has benefits to the user in system security and usability, but the impact of the update

process is clearly not proportionate to the benefit when it makes the system unusable at a time not chosen by the user. Similarly, antivirus services can be problematic [392] because they place unexpected demands on system resources.

In Example 6.3, the jeopardy might be captured as *Background Updates* or the more general *Background Services*. A suitable provocation for background services that respect *Proportionality* might be to picture an elephant imposing itself in the background of a family portrait, or a brass band playing behind somebody sitting an exam. The vulnerability to the *Proportionality* property arises because of assumptions about how noticeable or tolerable the background processing will be.

Example 6.3 *Bandwidth limiting for system updates*

Absolute bandwidth

Limit how much bandwidth is used for downloading updates in the background

Mbps

Limit how much bandwidth is used for downloading updates in the foreground

Mbps

Name	18% CPU	54% Memory	50% Disk
Windows Modules Installer Worker	3.8%	250.4 MB	39.6 MB/s
Microsoft® Windows System Protection background tasks.	0.1%	28.2 MB	0.3 MB/s
System	12.1%	0.1 MB	0.2 MB/s
> Service Host: Local System (Network Restricted)	0%	13.3 MB	0.1 MB/s

6.3.4 Property #4 — Accountability

If the system behaviour has been detrimental to trust or contrary to a spirit of collaboration then that may be considered a threat to [Accountability](#). Design choices that frustrate transparency place *Accountability* in jeopardy and the event of the jeopardy being realised would be a *Loss of Accountability*.

If a user states a preference or changes an application setting to inhibit some particular functionality, but the application does it anyway, then accountability for that action is ambiguous. Read *et al* [287] define a disobedient interface as one where a valid non-ambiguous articulation of need by the user results in an unwanted outcome, and in the context of ethical properties of a design this would be a threat to accountability.

If a company informs a customer that they have had a data breach and they have been exposed, but they had no idea the data had been supplied, then that would similarly be a threat to accountability, and a breach of data protection principles [161], because the customer never chose to trust the company with that data or make it vulnerable.

Use of an automated system should be a trusted transparent collaboration where responsibility for outcomes is clear. In research on organisational misconduct, Roulet and Pichler [299] identified two types of ambiguity that lead to disputed responsibility: moral and attributional. The perspectives of user and designer may be so different that there is no shared vision of what is morally acceptable. In a complex system the cause and effect relationships may be difficult to determine even in retrospect, so attributing responsibility for a poor outcome may also be difficult.

Blame games

In Example 6.4, an information panel from an energy supplier’s website shows conflicting information. The customer is advised that their monthly payment is too little to cover the estimated use. They are also informed that their monthly payment will be automatically reduced. As the wording of the payment change does not emphasise the direction of change, and in the customer’s experience

changes are normally consistent, it would be easy to misread it as an automatic increase requiring no further action from them. If the customer trusts the advice, and takes action to increase the payment, they may be paying more than they really need to. If they trust the action, and ignore the advice, their balance will drift further into debt. The payment changes are small in this case, but a more severe discrepancy might leave the customer unable to pay an unexpectedly large bill while the supplier merely shrugs and points to their warning.

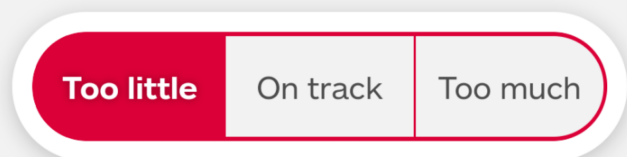
In a survey conducted by Opinium in early 2017, of 1783 adults in the UK with a driving license, 17% of participants said that their satellite navigation device had displayed the wrong speed limit for the road they were on whilst driving [173]. Legally the position is clear that it is the responsibility of the driver to observe and comply with speed limits, but if they become habituated to looking at a convenient display then they may feel understandably aggrieved if the information is wrong.

Media organisations like the BBC have a long history of aggregating publicly available official information to present it in a more convenient and digestible form. When the information is election results or high profile sports events then that may be entirely reasonable. When it has legal consequences, such as the regional application of health protection laws, there is an implied duty of care upon them to be accurate, and public sector broadcasters understand this [28]. Organisations without that heritage may take a different view, and for example Google has argued that it should not be legally responsible for the content of search results [295].

In Example 6.4, the jeopardy might be captured as *Payment Advice* or as *Scheduled Payments* or possibly both. A provocation for designing payment prompts to respect *Accountability* might be cartoon figures pointing fingers of blame at each other. The vulnerability to the *Accountability* property arises because of a failure to check new advice against automated actions already scheduled, that may be in conflict with it, perhaps because it was assumed this would never happen.

Example 6.4 *Action taken quietly contradicts advice given*

Your monthly payments and balance are: ?



Based on your estimated usage, **you may owe us £23.52** at your next annual Direct Debit reassessment. [See your options](#)

Your monthly payment will change from £32.00 to £29.00 from 07 December 2019
[Direct Debit explained](#)

6.3.5 Generic workshop tasks

Applying the method features listed in Table 6.1 to a discovery workshop, using the generic properties discussed, suggests the following generic task for participants:

- Q1 Discuss which distinct groups of users you might have.
- Q2 Discuss how fairness and equity might be lost.
 - What might happen? Who to? Could you prevent it?
 - If it happened how would you know?
 - What would make it less unfair? What might make it worse?
- Q3 Discuss what choices might need to be made, and who by.
- Q4 Discuss how agency might be lost if the choices are hard to make.
 - What might happen? Who to? Could you prevent it?
 - If it happened how would you know?
 - What might make the choices easier? What might make them harder?
- Q5 Discuss what data users might need to provide, and how often.
 - What other actions might be required of them?
- Q6 Discuss whether the benefit justifies the data and actions demanded.
 - Might it be disproportionate?
 - What questions would help you know?
 - Who should you be particularly careful to ask?
- Q7 Discuss who is responsible and what kind of consent needs to be given.
- Q8 Discuss how accountability might be lost, or mis-assigned.
 - What might happen?
 - If it happened how would you know?
 - What might make it more transparent?
 - What might make it worse or cause 'blame games'?

6.4 Illustrative examples

6.4.1 Example properties

In healthcare, the agency of the patient and proportionality of actions taken might more commonly refer to their ‘autonomy’ in personal hygiene and their possibly limited participation in decision making, their ‘privacy’ in intimate examinations, and their ‘dignity’ [203] as important properties that should be protected.

6.4.2 Example provocations

The generic properties described in section 6.3 were represented as simple icons in the evaluation sessions, shown in Figure 6.3. Equity was represented by three people reaching up to a common objective: one unaided, one standing on a box, and one standing on two boxes. Agency was illustrated by a three headed arrow representing freedom of choice. Proportionality was shown as the proverbial hammer being used to crack a nut. Accountability was evoked by same three figures used in equity, but this time with the smallest pointing a finger of blame at the middle one, who is pointing at the tallest, who has their hands raised in denial.

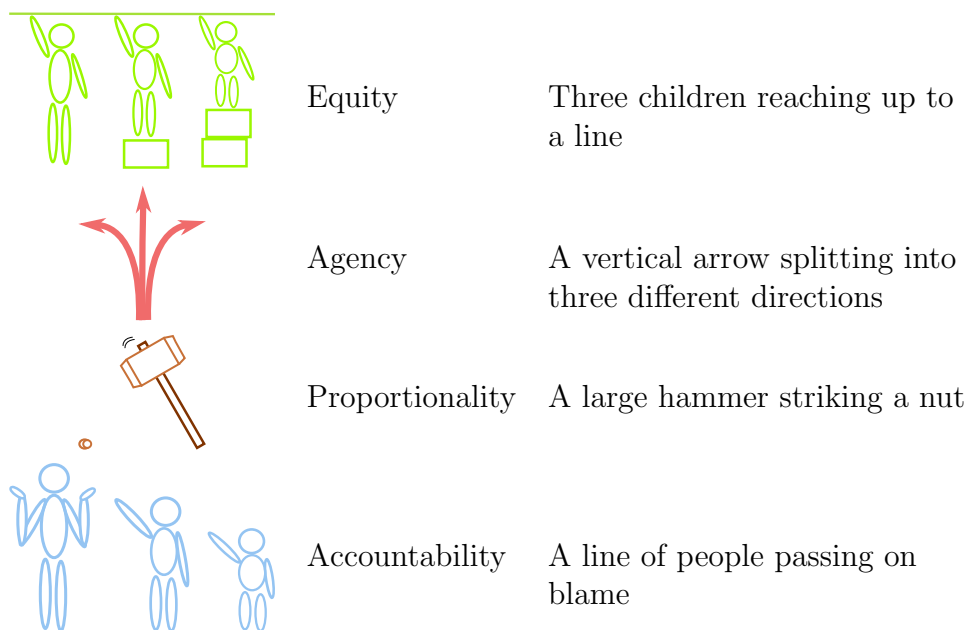


Figure 6.3: Illustrations used as provocations for each property

6.4.3 Visualisation of jeopardy with bowtie diagrams

Suppose that online training material has been produced that uses a legacy animation with no voice description and no alternative text for screen reading software. For partially sighted users the use of a screen reader can put them in a precarious state, namely a **jeopardy**, because screen readers are not properly supported by all applications, so this threatens a loss of equity if they are unable to follow the training. The incompatibility with screen readers might have been prevented by following the [Web Content Accessibility Guidelines \(WCAG\)](#) recommended practices, but the guidelines might only be effective if supported with appropriate training for the developer. If the animation remains incompatible with screen reader use, it might still be usable if audio description is provided outside it in the online material, so long as it is in a language the user understands.

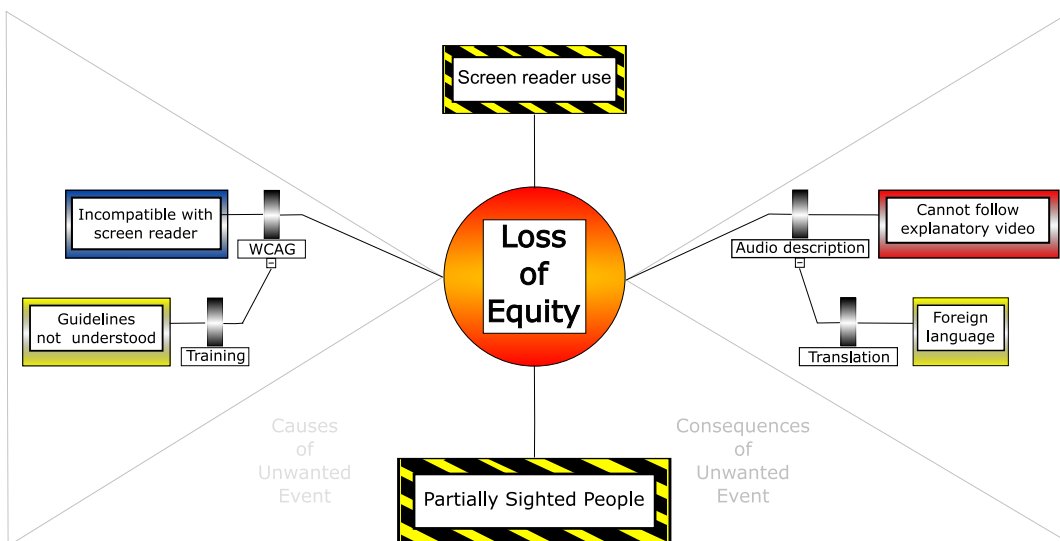


Figure 6.4: Example visualisation of Loss of Equity

Chapter 7

Evaluation of Jeopardy Analysis

7.1 Introduction

Through an analysis of current discovery practice (Chapter 5), design criteria for a novel discovery method were identified that address the problem of how to anticipate harmful interactions. These criteria were applied in the development of the Jeopardy Analysis method (Chapter 6). The evaluation of that method in workshops with experienced design practitioners from different domains is described, and the findings of that evaluation presented.

The research question [RQ2](#) is refined in section [7.2](#), taking into account the earlier findings. The evaluation of the method set out in section [6.2.2](#) is described in section [7.3](#).

7.2 Refinement of research question

The second overall research question is quite general

How can designers be helped to maintain a structure for their work that assists identification of undesirable interactions (RQ2)

This was refined for the user jeopardy workshops into two sub-questions [RQ2.1](#) and [RQ2.2](#) using the hypothesis developed in Chapter 6 that consideration of ethical properties of a design provides a stable basis of analysis that can be applied before discovery activities are complete:

Does thinking about usability issues as the loss of an ethical property help practitioners to challenge their assumptions (RQ2.1)

Does thinking about usability issues as the loss of an ethical property help practitioners to uncover design issues (RQ2.2)

These questions were addressed through observation of practitioners applying an approach based on that hypothesis and their feedback after doing so. Participants were recruited from established teams who were used to working with each other, and transcripts prepared of their discussions during an online workshop. Thematic coding of the transcript was used to identify discussion of latent issues in the design.

7.3 Study 3: Jeopardy workshop evaluation

7.3.1 Workshop method

Each workshop began with a briefing of its aims and the scenario to consider. The central activity was a discussion between the participants, facilitated by the researcher, and followed a step-by-step task list shared at the start of the session and made available on the [project website](#) for use during it. After completion of the task, feedback was sought on whether the participants felt the method would be usable and useful in their working practice. Transcripts of the workshops were analysed to assess how successful they had been in identifying [issues](#) present in the scenarios. These were determined by the researcher, in advance of the workshop, and characterised under one of the four generic ethical properties described in [6.3](#).

7.3.2 Procedure

Three evaluation sessions were run, starting with a pilot in January 2021, and followed by two sessions for analysis in May 2021 and July 2021. All the sessions used *Microsoft Teams* for facilitation and data capture. The evaluation focussed on the [issue](#) identification phase 2 of the method (see [6.2.2](#)). Phase 1 was covered by selection of the generic properties identified in section [6.3](#) and use of the provocation pictures in section [6.4](#). Phase 3 was omitted, as it was found in the pilot session to add too much additional briefing material and complexity.

Evaluation 0: Pilot session

A pilot session was used to get feedback on the format, and was not analysed. The participants were a research student with a professional design background, and his supervisor, a computing lecturer with experience of running online workshops. The session began with a short briefing on the idea of user jeopardy,

the properties to consider, and an explanation of the basic components of a bow-tie diagram, then moved quickly onto the activity.

The briefing expressed the research question as an exploration of whether the kinds of thinking applied to safety issues would also be helpful when thinking about usability, and whether thinking about how things fail helps you to ask the right questions and invite the right people into the process. The focus was then planning the user research activities by rephrasing the question specifically in terms of thinking about the questions you are going to ask and who should be in the room. The question was then rephrasing again to ask whether thinking about how things go wrong helps you to set up the right kinds of choices as you move through the later parts of design. So in the briefing the framing was setup to include safety, questions, people and choices as the key concepts.

It is a subtle but important point that user jeopardies, like safety hazards, are circumstances that *can* lead to an unwanted event but that event may never actually happen. They relate to properties of the design that have a precarious existence, but are not in themselves necessarily unwanted or unwelcome. To explain this, the image of somebody standing in the yoga pose ‘the dancer’ was used. This pose involves standing on one leg, while holding the other foot behind you with an outstretched arm [177]. In this pose, the potential for a Loss of Balance is clearly present, but the consequences depend on where you happen to be doing it, in other words, the consequences depend on the context, which was also considered an important point to communicate.

Procedure changes after the pilot

The wash-up discussion after the activity identified a number of useful points. Use of the yoga metaphor was dropped, as it was too abstract and probably too obscure, but was retained in a *YouTube* video available on the website. The format was initially changed to move bow-tie diagrams from the pre-activity briefing to a post-activity suggestion of how the information gathered during the workshop could be consolidated and visualised. This was to simplify the briefing and make it easier for participants to distinguish between the method and one particular way of visualising the output. Due to time considerations,

all mention of bow-tie diagrams was removed from the later evaluations in order to focus on the method.

To guide the thinking, a workshop canvas was produced for each property. This included a single phrase provocation, posed as a question, and a graphical representation of the broader issue as shown in Figure 6.3. The space below this was structured with some column heading prompts for the questions to consider for each jeopardy: what problem might occur, how might it be prevented, if it occurs how might it be mitigated, and what things might make it worse. These worksheets were made available on the [project website](#) and are listed in Appendix A as Figure A.4 to A.7. They were not used in the later workshops as it was too difficult to capture their use remotely. The whiteboard application available in *Microsoft Teams* only worked within the university, not externally, and activity in it was not recorded by *Teams* so would have needed third-party software to capture it. The use of *OBS Studio* for this purpose was tested but found to be unreliable.

Evaluation 1: Pre-scripted scenario

The participants were from a team that designs products aimed at children, and were used to working together online but were not familiar with *Teams*. The scenario was a company planning to adopt more flexible working, and possibly move to a four day week. To inform that transition they intend to use a smart-phone application that will allow employees to manage their own working hours, and conduct a campaign of user research to better understand what would be needed. The workshop task was to consider the problems the application should address, who should be involved in the user research, and what questions they should be asked. The four ethical properties of equity, agency, proportionality, and accountability were explained and suggested as a basis for discussion.

The participant were briefed on a scenario, then asked to complete a task based on the method steps (see 6.2.2). On completion of the task they were asked the questions listed in Figure 7.1. The scenario and task are listed with the model answers in Appendix B as Figure B.1 and B.2.

Evaluation 2: Work-based scenario

The participants were from a website design team, and were used to working together online using *Teams* and *Miro*. The scenario suggested by participants, based on a hypothetical but plausible task, was to add personalisation to a university website. The task that participants were asked to follow had the same structure as that for [Evaluation 1: Pre-scripted scenario](#) with a few minor differences reflecting the nature of the scenario. On completion of the task they were asked for feedback, again using the questions listed in [Figure 7.1](#). The scenario and task are listed with the model answers in [Appendix B](#) as [Figure B.7](#) and [B.8](#).

Recruitment

Participants were recruited by making direct contact with individuals in team leadership roles in the participating organisation, discussing the research with them, and inviting them and their team to participate. For session 1, the point of contact introduced me to their team but did not participate. For session 2, the point of contact was a participant.

Completion

Participants were provided with information in advance on the project website, including *YouTube* videos explaining the basis of the method, and briefed again at the start of the workshop before obtaining verbal consent to record, as discussed in [section 4.4.2](#). Electronic copies of workshop consent forms and participant background questionnaires were provided and collected by email after the session, to confirm the participant characteristics listed in [Table 7.1](#). Workshops were held using *Microsoft Teams* only for pilot session 0 and session 1, and *Teams* supported with a *Miro* board for session 2 at the suggestion of the participants who were used to working with it.

Table 7.1: *Evaluation participant characteristics*

Id	Session	Domain	Role
20	0	Higher Ed.	HCI researcher
21	0	Higher Ed.	HCI researcher
22	1	Childrens UX	UX Designer
23	1	Childrens UX	UX Designer
24	1	Childrens UX	UX Designer
25	2	Higher Ed.	UX Designer
26	2	Higher Ed.	UX Designer
27	2	Higher Ed.	UX Designer

Transcription

Caption files from *Microsoft Teams* were used as the starting point for an initial script that was corrected by hand, speaker attribution added, and the content anonymised before analysis. The transcript was structured in columns for each participant so that the logical flow of their contributions could be more readily seen.

Questions

Q1 User Jeopardy

- Did you understand what we meant by User Jeopardy?

Q2 Challenging assumptions

- Did it help challenge your assumptions?

Q3 Uncovering issues

- Did thinking about them help to uncover issues?

Q4 Equity, Agency, Proportionality, Accountability

- Which property did you find easiest? hardest?
- What others might have been relevant?

Q5 Applicability

- Do you think you could apply this in your work?

Q6 General feedback

- Do you have any general comments on the approach?

Figure 7.1: Evaluation debrief questions

7.3.3 Data analysis

Issues identified

As described in section 4.5.2, coding was used to identify places in the session transcript where participants addressed latent issues they had identified in their scenario. Model answers were prepared for each scenario, identifying the key issues that arise under each of the properties, and these are included in Appendix B in Figure B.3 to B.12.

Each of these latent issues was rated on a ordinal scale from absent to fully explored, relative to my analysis of scenario. Although necessarily subjective, my background in risk identification was deemed sufficient to make my review a reasonable benchmark for comparison. Although a lack of expertise in the specific scenario would be a valid criticism, an aptitude for identifying risks and vulnerabilities was assumed to be more relevant to the task. The criteria used are summarised in Table 7.2. The intention in using these ratings was not to compare the two sessions, but to draw out any conspicuously richer or poorer coverage, in order to provide insights into how practitioners might use the method when unfamiliar with it.

Table 7.2: *Rating criteria for evaluation workshop analysis*

Absent	Not mentioned at all
Indirectly	General issue mentioned
Partly covered	Specific issues mentioned, but some missed
Well covered	Rich discussion of the issue
Fully covered	Rich and comprehensive discussion of the issue

Practitioner feedback

Responses to the debrief questions were identified in the transcript and coded to systematically provide a distilled summary of participants' perceptions and initial experience of the method. Responses were coded to capture each of the points made and associated with the question they most related to, which was not always the most recently asked.

7.4 Evaluation findings

In both sessions, the participants identified most of the expected issues for each of the properties, as listed in Table 7.3 and Table 7.4. None were identified that I had not anticipated. In session 1, this resulted in a total of 257 statements and in session 2 to a total of 364 statements that were coded against an issue.

Evaluation 1 issues

The designers in [Evaluation 1: Pre-scripted scenario](#), specialising in children's user experience, identified at least one issue for each property that I rated as either *Well covered* or *Fully Covered*, listed in Table 7.3

Table 7.3: *Issues covered in Evaluation 1*

Property	Issue	Evaluation
Equity	Health	Well covered
	Responsibilities	Partly covered
	Contract	Fully covered
Agency	Location	Indirectly
	Whose choice	Well covered
	Which days	Partly covered
	Optional app	Partly covered
Proportionality	Check-in	Partly covered
	Who benefits	Well covered
	Surveillance	Well covered
	Corrections	Indirectly
	Repetition	Absent
Accountability	Longevity	Absent
	Accuracy	Partly covered
	Representation	Partly covered
	Responsibility	Well covered
	Visibility	Partly covered
	Jurisdiction	Absent

Evaluation 2 issues

The designers in [Evaluation 2: Work-based scenario](#), with a web development background, also did well in considering *Equity* and *Agency* issues but did not cover *Proportionality* or *Accountability* to the same depth, as listed in [Table 7.4](#).

Table 7.4: *Issues covered in Evaluation 2*

Provocation	Issue	Evaluation
Equity	Accessibility	Well covered
	Internationalisation	Partly covered
	Demographics	Partly covered
	Location	Partly covered
Agency	Whose choice	Well covered
	Advertising	Partly covered
	Social media	Partly covered
	Assumptions	Well covered
	Disorientation	Partly covered
Proportionality	Who benefits	Partly covered
	Third-party	Partly covered
	Corrections	Partly covered
	Repetition	Indirectly
	Longevity	Indirectly
Accountability	Accuracy	Absent
	Representation	Absent
	Visibility	Indirectly
	Responsibility	Partly covered
	Jurisdiction	Absent

Evaluation feedback

The feedback received in response to the questions in [Figure 7.1](#) was reasonably consistent between the two sessions, so will be taken as a whole. Asked if they understood what was meant by [user jeopardy \(Q1\)](#), both groups said they did not really understand it until they got into the task and started answering the questions. Other comments were that it seemed a broad approach covering a lot of ground, and that the images were easier to grasp than the words.

The second question (**Q2**) asked whether it helped them to challenge their assumptions. Both groups said they thought it had. Further comments were that it might be “easier to commit to” choices made from an ethics standpoint, and that it seemed sensible to “try and minimise user jeopardy”.

The third question (**Q3**) asked whether it helped to uncover latent issues in the design. Both groups thought that it did, and their performance in the task supports this feeling (see Table 7.3 and 7.4). Additionally, their comments included the observation that it had extended the range of things they had considered, and helped to make the issues relatable to their own experience.

Answering the fourth question (**Q4**), there was no commonly agreed property that was felt to be the easiest or hardest: it varied from person to person. The other properties suggested were specific to their domain. Participants in [Evaluation 1: Pre-scripted scenario](#), with a background in designing for children, suggested age appropriateness and organisational reputation would be important for them. They also commented that for them, the word ‘autonomy’ would be more readily understood than ‘agency’, and that if the words were “not in your daily language it takes you a bit longer to think about it”.

The fifth question (**Q5**) asked participants if they felt they could apply user jeopardy analysis in their own work. The answers were mixed: some in each group thought they could, while others thought they could apply it to high level business goals but could not see how they would apply it to their users. One said they liked having “these golden rules that we can follow through the project”.

Asked for general feedback (**Q6**), comments covered the format of the session, how challenging it was, and thoughts about timing and time-frames. The format seemed to “flow well” and the order of the properties was such that each “laid the groundwork” for the others. There was a general consensus that it felt challenging but it worked well and the time went quickly. There was a comment that the hardest part might be getting to do it early enough in the project, and a suggestion that long-term and short-term effects might usefully be addressed as distinct questions.

7.5 Critical reflection

7.5.1 Limited aims

The aim of this first evaluation of Jeopardy Analysis was to determine whether the approach was a sufficiently viable prospect to justify recruiting practitioners for a longer and more detailed trial. It would be unrealistic to expect any method to predict all possible undesirable interactions before observing them in usability testing or deployed use. The goal is a diagnosis of weak assumptions in the design, and given the identified pattern of interaction, an initial prognosis: how is that likely to affect users and what outcomes are achievable through avoidance or mitigation.

However quickly the diagnosis could be done, evaluating the accuracy of the prognosis might take significantly longer. Therefore a full evaluation of the approach would need a longer-term relationship with the participants. This has cost implications for researchers and participating organisations, and so other researchers need to be confident that these costs are justified by the potential benefits.

7.5.2 Conceptual difficulty

A workshop participant commented that Jeopardy Analysis “felt challenging” to use, and other studies have reported that practitioners thought methods were too complex and took too long to learn [54], as noted earlier. When addressing these concerns, I aimed to simplify practice rather than simplifying the concepts. The workshop format evaluated took participants through the problem in incremental steps, with the only the facilitator needing to fully grasp the abstract concepts. Post-session review and co-facilitation sessions where new facilitators shadow those more experienced in Jeopardy Analysis might mitigate the conceptual difficulty, as suggested for inter-professional education by Egan-Lee *et al* [104].

7.5.3 Balance of power

One of the design requirements for Jeopardy Analysis (D17) was that it should be based on an [ethics of care](#) rather than a rule-based deontological ethics. The relational ethics developed by Noddings [252], from the initial description by Gilligan [125], has three key concepts that are helpful in a design discovery context. Noddings defined [engrossment](#) as a non-selective attention to someone in order to understand them, [motivational displacement](#) as behaviour toward the one cared for that centres their needs and intentions, and [completion in the other](#) as the active recognition in the one cared for of the care being shown toward them. These are consistent with user centred design principles of user focus and active user involvement suggested by Gulliksen [139], and the open and engaging mindsets that participants in [Study 1: Ketso workshops](#) felt were important (see 5.3.3). However, a concern was expressed by Hoagland [152] that analyses based on an ethics of care are essentially one directional and non-reciprocal, and so will tend to reinforce “oppressive institutions” unless the analysis also involves an element of challenge from the one cared for.

A concern expressed by participants in [Study 2: Practitioner interviews](#) was a lack of recognition of the imbalance of power between designers and users. Use of the jeopardy analysis method would be flawed and self-defeating if it ignored this and degenerated into a one directional exercise in parentalism, with relevant ethical properties being selected entirely by designers with no involvement of the affected user communities. It would also be damaging to its credibility as a method if users were absolved of all responsibility for their own well-being. A sensible balance is required, and this might be best achieved by user involvement in jeopardy workshops and some form of co-design of any prevention or mitigation actions with users.

For practical reasons of participant recruitment and workshop timing, the evaluation sessions in [Study 3: Jeopardy workshops](#) only included designers. With a fictional scenario, selecting suitable people to play the prospective users would have further complicated the workshop design. Involvement of users as well as designers, of a real product, would have provided richer data and a more rounded evaluation.

7.6 Domains of use

In my participant recruitment, and the undesirable interactions discussed, I have focussed on software where users may not have chosen to interact with it, but it has become a part of their lives because of our increasingly digital society [99]. These are the areas where I feel Jeopardy Analysis has the most to offer, because the ethical case for intervention is most compelling.

7.6.1 Education

The [Accreditation of Higher Education Programmes \(AHEP\)](#) standards that are published by the Engineering Council [106] list learning outcomes for UK degree programmes that develop the competencies expected and fully meet the academic requirements for registration as a Chartered Engineer. These are summarised in [Table 7.5](#) with their Jeopardy Analysis contribution.

Exposure to Jeopardy Analysis as part of an undergraduate or post-graduate curriculum would contribute to five of these outcomes: designing with diversity and inclusion, cultural and societal, and environmental considerations (M5), evaluating environmental and societal impact and minimising adverse impacts (M7), identifying and analysing ethical concerns and making reasoned ethical choices (M8), using risk management to identify and mitigate risks (M9), and adopting an inclusive approach that recognises responsibilities (M11).

Table 7.5: *Contributions to AHEP of teaching Jeopardy Analysis*

No.	Outcome	Contribution of Jeopardy Analysis
M5	Design solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.	The abstract nature of Jeopardy Analysis helps capture these complex considerations in a flexible way, that allows their common features to be seen and exploited to avoid duplication.
M7	Evaluate the environmental and societal impact of solutions to complex problems (to include the entire life-cycle of a product or process) and minimise adverse impacts.	Beginning with discovery activities, Jeopardy Analysis is designed to support the whole life-cycle and explicitly addresses adverse impacts.
M8	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.	Jeopardy analysis provides a way of translating ethical concerns into the properties the design must have to address them.
M9	Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.	Jeopardy Analysis can enrich the teaching of risk management by providing a qualitative way of thinking about it.
M11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.	Using the properties that an inclusive design must have, Jeopardy Analysis avoids the problem-based approach to accessibility [276] and supports a broader discussion.

7.6.2 Public sector service design

Jeopardy Analysis may be particularly suited to public sector service design. As discussed in section 2.2.1, the demand for services to be ‘digital by default’ necessarily expands the variety of users and their interactions that the design must deal with and therefore the likelihood of some of these interactions being undesirable. The four basic ethical properties I suggest in section 6.3 are intended as a baseline. A more progressive design philosophy that aimed for the user to be in a thriving or flourishing state (Aristotle’s *eudaimonia* [12]), would benefit from a more detailed understanding of the obstacles to achieving this and might thereby achieve better overall service outcomes.

A challenge for designers working across organisations in the public sector in the UK, identified by Sangiorgi [312], is the tendency for power and funding structures to create poorly connected silos with weak collaboration. Being based on abstract properties that transcend the functional architecture of the design, Jeopardy Analysis is perhaps more naturally seen as a whole-system end-to-end analysis and so avoids the temptation to approach the problem in a fragmented way aligned with those silos.

In recent work, Salinas describes *Critical Service Design (CSD)* as a means of exploring preferable alternative futures, and in the local governance context as envisioning novel public policies and services that are able to support those preferable futures [308]. Jeopardy Analysis can contribute to that strategic design activity by translating strategic priorities into the ethical properties they require in the design if undesirable interactions are to be avoided, supporting the ‘backcasting’ activity [294] by helping to identify what support is needed from others.

Chapter 8

Discussion

8.1 Introduction

This chapter discusses the findings of my research, relates them to prior work, and makes suggestions for further study. The findings of each of the studies are discussed, and the research questions answered. The use of ethics as a unifying concept is discussed and related to ethical frameworks by illustrating the relationship between safety and usability and security, and mapping technical risks onto ethical properties. The idea of jeopardy analysis is then related to prior work and related practices, and its relationship with usability heuristics illustrated by mapping them onto ethical properties. Finally, limitations and reliability are discussed and further work suggested.

8.2 Discussion of findings

The first research question asked how current practice identified undesirable interactions:

What methods are applied in current software design practice to identify interactions with the user that the intended users will consider undesirable (RQ1)

The question was refined for [Study 1: Ketso workshops](#) to focus on discovery goals and practices:

How do practitioners approach and perform discovery (RQ1.1)

The question was refined for [Study 2: Practitioner interviews](#) to focus on shared understanding:

How do practitioners achieve a shared understanding of the problem (RQ1.2)

The second question, addressed by [Study 3: Jeopardy workshops](#), was how practitioners might be helped to identify undesirable interactions:

How can designers be helped to maintain a structure for their work that assists identification of undesirable interactions (RQ2)

The findings for each of these questions are discussed in the following sections.

8.2.1 Discovery goal findings

Research questions

In order to gain insights into the reasons for practitioners method choices, the question was split into three sub-questions aligned with the workshop design, as discussed in section [5.3.1](#). Three questions were explored in face-to-face Ketso workshops: what is done in practice ([RQ1.1.1](#)), what would improve

practice (RQ1.1.2), and what are the challenges (RQ1.1.3). No clear themes were identified in what is done, reflecting a diverse experience of discovery. Challenges centred around pressure on timescales.

What is done in practice	(RQ1.1.1)
What would improve practice	(RQ1.1.2)
What are the challenges	(RQ1.1.3)

Current practice themes

Two kinds of themes were identified in answer to the first sub-question. Firstly, the goals that the participants had in choosing discovery **Methods**, the **Mindsets** they saw as beneficial, and the **Outcomes** that they sought. Secondly, the practices that they considered to work well in **Empowering** them to succeed and in being **Knowledge-led** in their approach. These were summarised on page 95 and 97.

Participants indicated a preference for data-driven approaches. These are widely used for marketing purposes [208] and to drive innovation [313] and are well represented in the literature [29, 237] but analysis of the motivations for them is lacking. By identifying co-incident themes of certainty in how to proceed, having evidence to justify decisions to continue or terminate work, and a desire to be user-centred and have a validated understanding of the user, my findings provide possible reasons for the preference but further evidence and analysis are required to understand the commercial drivers for the collection of user data.

Knowledge sharing was a felt by the participants to be an important part of successful discovery and something that their organisations were good at. Effective knowledge sharing was found by Kuusinen *et al* [195] to be improved within teams that adopted agile practices but wider sharing with customers and colleagues across the company required more active motivators. This effect can be seen in my participating organisations. The **Empowering** theme included use of agile rituals such as stand-up meetings as a positive aspect of discovery but

the **Communication** theme discussed below also identified cross-organisational communication as one of their challenges.

Aspiration themes

Three themes were identified in the things that the participants aspired to and felt would improve practice, in answer to the second sub-question. These would support their professional **Curiosity**, be further **Empowering**, and make better use of **Knowledge**, as summarised on page 98.

Aspirations for deeper and broader discovery, and more continuous discovery processes, were linked to their desire for more flexible schedules and the time pressure they felt. A need for more discovery is consistent with the findings of a grey literature review by Münch *et al* [246] which gave inadequate discovery as a common reason for product failure. The aspirations for future practice discussed by the participants align with the aims of the emerging professional of research operations discussed by Metzler [235]. Efforts by the DesignOps and ResearchOps communities to develop a more scalable and sustainable approach to **UX** are ongoing, but case studies are beginning to appear in the literature, such as the Arizona University library case described by Blakiston *et al* [33].

Challenges and obstacles themes

Four themes were found in the challenges and obstacles to successful discovery discussed by participants, answering the third sub-question. Problems with **Communication**, local constraints on human and material **Resources**, obstacles resulting from human **Behaviour**, and problems embedded in an organisational **Process** were mentioned, summarised on page 100.

Many of the challenges and obstacles cited were those that might be expected in any large organisation and were not necessarily specific to **UX** or discovery activities. Availability of the necessary skills and knowledge, and having the right mindset, were two that might be addressed by training and continuing education. A study by Cajandar *et al* of life-long learning processes in **UX** [54] found that practitioners thought methods were too complex and took too long

to learn, that time pressure limited them to approaches they knew well, and that tool choice was sometimes limited by company policy on license purchases as well as current availability of licenses.

Methods versus tactics

The breadth of factors participants discussed suggested a diverse experience of discovery, and an *ad hoc* definition of success with no widely shared criteria within the organisation. This is consistent with previous work by Gray [133], that identified a flexible approach, and may reflect organisational procedures that embed tailored parts of published methods rather than adopting them as a whole or using an associated toolset, so reducing any ‘brand awareness’ of the method. Tactics that could be selected and combined according to the circumstances were preferred to a standardised method. In the descriptions of the practices they aspired to, there was a strong theme of empowerment and autonomy, and interestingly a desire to spend more time with stakeholders but also to be less constrained by their objectives. A desire to conduct both a broader and deeper discovery was expressed, which suggests that exercising greater autonomy and achieving the desired ‘user-led’ process might require a more time efficient approach.

Time pressure

A frequently discussed factor was time pressure. A focus on customer value and agility, leading to shorter development cycles as found by Clarke *et al* [65], implies a need for agility in user research and other discovery activities, so the mention of inefficient processes as an organisational challenge may also be related to a feeling of insufficient time. Currently, discovery and development are often separate streams of activity such as the dual-track approach described by Cagan [53]. Better integrated forms of continuous discovery that avoid sharp peaks in demand, such as described by Torres [363], were not in use by the participating organisations at the time of the workshops.

Challenging assumptions

An interesting omission from the data was vocabulary associated with rigour and challenge. This was missing from both of the sessions, and was not a point of difference between the participants with retail and academic backgrounds. If challenge is not considered an important part of discovery, that might be because it is more strongly associated with later stages of development, but more specific questioning was needed to determine how the emerging narrative is challenged during discovery, and this was included in [Study 2: Practitioner interviews](#) under research question [RQ1.2.3](#).

Tailoring the workshop format

The standard *Ketso* pack assumes up to eight people per workspace, but my experience with the first session suggested this would be too many, so in order to limit the number of people around each one to three or four an additional workspace was purchased. The number of leaves written by the participating design professionals, who were experienced in similar activities if not with *Ketso*, was sufficient that freedom to arrange them as they wished might have been curtailed if we had not done so. It also allowed everyone to read each other's ideas the right way up while seated, without walking around the table, so saving time.

For a complete cycle of questions starting with a definition of done, covering what works or does not, and revisiting the definition of success, a period of 90 minutes was barely sufficient to allow proper discussion. If the availability of meeting spaces is limited, the ease with which the felt workspace can be folded and packed up without disturbing the leaves could be exploited to hold a follow-up discussion session at another time or with the workspace mounted vertically on a convenient wall space rather than on a table.

8.2.2 Discovery practice findings

Research questions

Five question areas were explored in the interviews: how the next piece of work was chosen (RQ1.2.1), how information was gathered (RQ1.2.2), how their understanding was shared and challenged (RQ1.2.3), how much was enough to proceed (RQ1.2.4), and how that was translated into design choices (RQ1.2.5). From audio recordings, interview transcripts were prepared, and a reflexive thematic analysis (see 4.5) used to address the question of how practitioners achieve a shared understanding of the problem (RQ1.2) and how undesirable interactions are identified (RQ1).

How does the team decide the next task	(RQ1.2.1)
How does the team inform their understanding	(RQ1.2.2)
How is understanding shared and challenged	(RQ1.2.3)
How deep an understanding is enough to proceed	(RQ1.2.4)
How is understanding translated into design choices	(RQ1.2.5)

The analysis identified key themes in the interview conversations structured around these questions, as discussed below. The answers to these specific questions were dependent on the role of the participant (see Table 5.10).

In answer to the first question on [mobilisation](#), the business analyst was driven by what was next in the product backlog. The civil servants by one of three things: stakeholder initiatives, requirement changes or policy changes, or technical changes in the technology employed. The agency was driven by tenders they could bid for. The digital media designer had been driven by user generated data from experiments, the company having allowed any experiment to be applied to up to 1% of the users. The system supplier was driven by requirement changes and problem reports from customers.

In a study of new product development, Katzy *et al* linked mobilisation to recognition of an opportunity [179]. Kreuzer *et al* identified that digital

technology has accelerated opportunity recognition by dissolving boundaries between companies and their customers, and thereby enabling more continuous interaction either directly or via the data their product use generates [193]. That effect was apparent in the statements from the digital media designer, but not from the other participants.

Answering the second question on [engagement](#) and [discovery](#), the responses were consistent with what had been seen in [Study 1: Ketso workshops](#) where a range of methods were employed. The agency had a preference for qualitative methods, while the civil servants collected a broader range of quantitative usage data as well as qualitative data about the context, so used mixed methods. The system supplier was reliant on a documented requirement, but this could be quite vague so was supported by interviews with the customer to refine it. The digital media designer had a preference for quantitative methods, and commented that ideally quantitative and qualitative methods should be used together to produce combined insights, but knew of only one big technology company doing that.

A recent case study of [user research](#) in the [National Health Service \(NHS\)](#) by Duda and Chearman [98] described how a new website was brought into use in five weekly sprints. The first sprint was based on the statement of work between the agency and the [NHS](#), reflecting typical public sector mobilisation patterns described above, and included production of a user research plan. Repeated use of card sorting [86] and feedback from remote interviews was supplemented by analytical data from the previous website, in line with the mixed methods described by my civil service participants.

Responses to the third question on [sharing](#) included some of the same ideas as the [Empowering](#) theme identified in [Study 1: Ketso workshops](#). The agency and civil service participants made regular use of team presentations and agile rituals such as sprint reviews to share insights and challenge findings from user research. They also tried to involve the whole team in user research activities, either as observers or scribes, so that they would have personal experience of the context and not be surprised by the findings. Use of open display, or the online equivalent, of the research outputs was also favoured. The business analyst had

a similar approach but made more use of artefacts, ranging from sketches to short reports, to communicate findings. The digital media designer was less specific, but highlighted the need for user researchers to be present in design critique sessions to challenge departures from the findings. The system supplier used requirement documents, supplemented by prototype demonstrations and meetings, to share understandings with the customer and colleagues.

Challenges and barriers to effective knowledge sharing are well represented in the literature [123, 10], but descriptions of the practices adopted in practice are lacking. Regular briefings to colleagues, as used by several of the interview participants, was one of the practices described by Hemon *et al* in a case study involving a large multi-national software developer [146]. Another they describe as “backlog grooming” resembles the practice followed by the business analyst participant, of incrementally refining work-to-be-done as information becomes available.

The forth question on [iteration](#) and how much discovery is enough gained similar answers from most of the participants, though articulated in slightly different ways as having a clear question, or knowing your next action, or understanding what the [MVP](#) or [Minimum Viable Service \(MVS\)](#) would be. For the system supplier, the important criteria was reaching a point where the client was happy with what was proposed. For the digital media designer, where change was driven by micro-experiments, the question did not arise in quite the same way as discovery was a less distinct activity.

The question of how much is enough is directly addressed by Hall [141, p38], who also notes that unless it is based on recent user research specific to your current goals then prior knowledge may embed incorrect assumptions. Her advice, that the highest priority questions should be addressed, accords with the approach taken by most of the participants. Similar advice is offered by Gothelf and Seiden [129] but framed in terms of hypotheses about what design features will result in the desired outcome.

The final question on how [choices](#) are made and captured identified that designers are not always aware that other options were available, so choices are sometimes made by default, but it was felt to be part of [UX](#) research and

design roles' responsibilities to interrogate assumptions and challenge choices made if there were alternative options. The agency participant felt that people with an agile mindset were more conscious of making choices. Tactics adopted included involving the whole team to identify the riskiest assumption, and briefing choices made as part of regular team briefings. The system supplier had the interesting insight that they were well aware of their own choices at the design stage, but less aware of choices made by the development team while building it that might also impact the user experience.

Unconscious processes in design have been discussed in the literature, for example by Badke-Schaub and Eris [18], but not specifically the question of whether designers are aware of making a choice. Nor was any recent prior work found that documented how UX practitioners capture their design choices.

Shared understanding

The first key theme T1 identified that whatever methods were chosen to suit the context, the process of **discovery** was consistently driven by a need to build a shared understanding, and the challenges that practitioners experienced were linked to factors that frustrated that aim. Three supporting themes to T1 were identified. Development of supporting theme T2 showed **discovery** activity was tailored to the context and had no fixed process, supporting findings by Gray [133] that practitioners considered mindset more important than process, and that the generated artefacts were diverse in content and had life-spans varying from single-use ephemeral sketches to high quality research outputs retained for the project duration. Participants occasionally referred to a discovery 'phase' but made it clear that discovery activity was ongoing and not confined to any one stage of the work. Supporting theme T2 found a strong desire to challenge assumptions, and recognition that the equality of outcome needed to provide equity in the provided service did not mean uniformity, so design choices were made that focused on user groups with particular needs and prioritised removal of barriers over efficiency. The mention of personas was limited to contexts where the abstraction was useful for presenting inconvenient truths or including challenging user behaviours. Supporting theme T3 captured the challenges of

time constraints and funding mechanisms, and tactics used by practitioners to cope with them by prioritising discovery effort.

Anticipation mindset

The second key theme **T5** drew out the implications for efforts to anticipate problems of current **discovery** practice and its integration into development. It found a growing awareness of the need to anticipate, and some early adoption of techniques based on patterns in previous failures, but found these to be passive and lacking in depth. The significance of impact on the user was not always appreciated, and there was a preference for responding to problems rather than avoiding them, and a belief in some practitioners that anticipation was impractical. A conflict was identified between the desire to conduct more experiments and the impact that an unconstrained empirical approach can have on design. Concerns were raised about design being disenfranchised and that if the risks of an experimental approach were not better managed that design would be reduced to a multivariate test, treating all experimental outcomes as equal regardless of the possible harm.

Ethical safety

The final key theme **T6** developed the relationship between achieving a shared understanding and the approach needed to anticipate problems. It found that design choices were often locked in too early, not consistently documented or recognised as choices, and that usability was sacrificed to meet business objectives or to prioritise throughput. Addressing these problems was linked to the performance of individuals in the Product Owner role and the **boundary role** played by business analysts. Recruitment choices were significant enough to be regarded as design choices, and the diversity of routes into **UX** presented opportunities for a multidisciplinary approach that would cope better with complexity by actively negotiating understanding across the team. Remote working was found to be well established and was also felt to have a role in breaking artificial barriers within the company. These interactions within the

organisation reflect the importance of boundary roles in innovation described by Tushman [369], and the importance of negotiation in boundary spanning behaviour is consistent with the role of persuasion described by Vesalainen *et al* [377]. The benefits to information flow of remote working, as seen by my participant, were not identified in a recent study by Franken *et al* [115], but it is perhaps too soon to expect the available literature to reflect the full breadth of experience of the rapid increase in remote working seen in 2020.

The term *ethical safety* was synthesised as a way to describe how harm might be avoided by anticipating problems on the basis of *design ethics* and the *ethical properties* that the system should have. Achieving *ethical safety* was associated with a multidisciplinary approach, actively seeking a shared understanding, and developing a mindset that recognised the imbalance of power between designers and users and sought to address it by anticipation of problems. The term *ethical safety* is used in nursing ethics to refer to a practitioner's independence to act according to their professional values [275] and to preserve respect for patients [203]. My generalisation to usability is in keeping with that use.

8.2.3 Evaluation findings

Research questions

The question was refined into two sub-questions [RQ2.1](#) and [RQ2.2](#) using the hypothesis developed in Chapter 6 that consideration of ethical properties of a design provides a stable basis of analysis that can be applied before discovery activities are complete:

Does thinking about usability issues as the loss of an ethical property help practitioners to challenge their assumptions (RQ2.1)

Does thinking about usability issues as the loss of an ethical property help practitioners to uncover design issues (RQ2.2)

Addressing [RQ2.1](#), participants answering the second debrief question ([Q2](#)) said they thought it had helped them challenge their assumptions. Addressing [RQ2.2](#), participants answering the third debrief question ([Q3](#)) thought that it did help them to uncover latent issues in the scenario.

Identifying underlying assumptions, and challenging them, is a key part of critical thinking. In terms of Bloom's taxonomy [34], the aspects of critical thinking needed to uncover design issues are *analysis* of which components might interact, *synthesis* of what would happen to the system as a whole as a consequence, and *evaluation* of whether that is tolerable or not. Question [RQ2.1](#) focuses on the analysis step, and asks if thinking about ethical properties assist that analysis, while question [RQ2.2](#) focuses on the synthesis step.

When the use of different levels of abstraction in design was explored by Kokotovich and Dorst [190], they associated higher levels of abstraction with higher levels of expertise and ability to innovate. When they evaluated the ability of a multi-disciplinary team of students to move from 'novice' levels of abstraction to higher levels, they found that their participants did not move far from conventional views of the problem or develop higher level abstractions and were generally unsuccessful in stepping back from it. My choice of some-

what abstract ethical properties as the basis of the method was intended to concentrate on the essence of what was required, and give room for a more creative analysis of the problem. My participants relative success in doing so may be a result of the facilitation they received, and my prior decomposition of the abstract goal into more concrete questions, or their greater professional expertise in design compared to student participants.

The use of abstract ethical properties was problematic, to the extent that the participants found them difficult to relate to practical issues, but when translated into more concrete questions by the facilitator they were able to address most of the latent concerns in the scenarios without further prompting.

The generic properties chosen are potentially overlapping concepts, and to some extent this was done deliberately to prime the discussion for the next step, but it did appear to make it harder for the participants to associate concerns with properties or to suggest other properties that might be relevant to their domain.

The richest coverage was expected for concerns where there is an established regulatory requirement such as accessibility and data protection, or concerns where the participants might have direct personal experience. The team in the first evaluation had personal experience of part-time working and low-wage jobs paid by the hour, so fully covered all the concerns related to people on different types of contract experiencing a four day week differently. Both teams did well in covering the first equity related concern in their scenarios, namely health and accessibility.

The least well covered concern was *Accountability Jurisdiction*. Where the data is held in, and therefore in whose jurisdiction it falls, may be less relevant to companies that predominantly draw customers from their home market, or may be delegated to information governance specialists within the company. Working from home might have been expected to raise awareness of these issues, and related concerns about applications like *Zoom* [2], but designers themselves may not have direct responsibility for them or discretion to choose. For delegated concerns, and those related to particular life-experience, the diversity of the team is important. This reinforces the current practice finding

that [ethical safety](#) requires a multidisciplinary approach (see [8.2.2](#)).

The *Proportionality* property was intended to explore areas where the user contributes disproportionately compared to the benefit they receive in return. One aspect of this is how often actions need to be repeated, and the related issue of how long data is held. Neither team addressed these directly. The additional user burden of repeating information already provided, particularly if the request interrupts the intended action, may be unwelcome and in the case of compliance interactions such as cookie consent dialogues, Soe *et al* found that it can be a vehicle for unfair nagging and other dark patterns [329]. Repetition is not always addressed by usability heuristics [251], considered in information architectures [298], or included in measures of user burden [339], but without considering how often a question should be asked the related issue of how long the answer should be kept is poorly served. The participants did, partly or indirectly, consider what might be involved in correcting data and identified that having to erase all cookie data from your browser might seem a disproportionately costly way of changing your mind about one website, so a little more nudging from the facilitator might have surfaced the *Repetition* concern and with it *Longevity*, but this may be an example of issues that need explicit training to raise awareness of them.

Student practitioner use of [Value Sensitive Design \(VSD\)](#), as described by Chivukula *et al* [63] and reviewed in section [2.5.2](#), suggested that facilitation might be needed. The participants were unfamiliar with the method and did need the abstract prompts to be translated into more concrete questions, but once that was done no active facilitation was needed for them to consistently identify latent issues.

The property that the participants said they found most difficult, but also the most interesting from the point of view of things they were not currently thinking about so much, was *Agency*. Considering ways in which the user might lose confidence in their ability to influence outcomes or control the course of events, took more thought and had no obvious mapping onto things they were already doing, whereas *Equity* felt similar to accessibility concerns and *Proportionality* reminded them of data protection rules.

8.3 Ethics as a unifying concept

Hartmann used the values that a culture embodies as a unifying concept for the social sciences [144]. Applying this idea to UX design, the common ground between safety, security, and usability can be seen as the ethical properties that underlie these different views, as illustrated in Figure 8.1. The advantage of considering ethical properties when shaping the design is that they can be agreed early in the process and are likely to change only slowly over time.

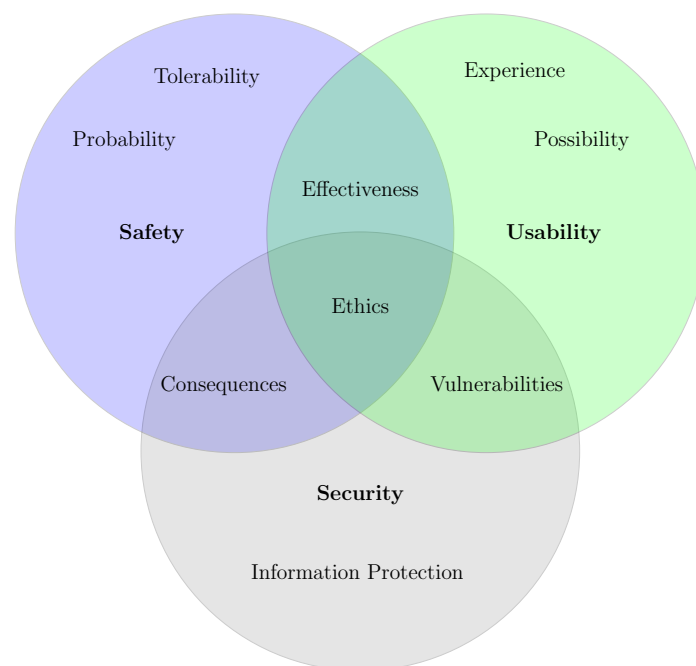


Figure 8.1: Ethics as common ground for safety and security and usability

I have contrasted ‘probability’ in the safety domain with ‘possibility’ in the usability domain, as it should not be necessary to quantify the likelihood of a usability problem to address it, though businesses may need to be convinced of that to justify corrective action. Similarly, judging quality of ‘experience’ can be a qualitative assessment rather than a quantitative assessment against a threshold for ‘tolerability’. How easily practitioners are able to relate properties to potential design features requires more evaluation, so this diagram will evolve as further research identifies other distinctions between the domains.

8.3.1 Ethical frameworks

As Lindberg *et al* found [212], practitioners are not in the habit of thinking about ethics yet, and find it hard to integrate into their practice, but practical means of addressing the issues are being actively discussed. The ethical field guide [258] produced by social change venture the *Omidyar Network* explores eight technical risk zones identified by the Institute for the Future [140, 259, 163]. These risk zones and their defining question are mapped onto the four generic ethical properties I derived in section 6.3 in Table 8.1. Many of them involve more than one property, and accountability is prominent.

Table 8.1: *Mapping of IFTF risk zones [259] onto properties (6.3)*

Zone	How might we ...	Property
Surveillance	protect privacy?	Agency Proportionality Accountability
Disinformation	promote truth?	Accountability
Exclusion	enable equity?	Equity Proportionality
Algorithmic Bias	promote fairness?	Equity
Addiction	promote healthier behaviours?	Agency Accountability
Data Control	enable transparency?	Agency Proportionality Accountability
Outsized Power	promote choice?	Agency Proportionality
Bad Actors	promote civility?	Accountability

Protection of users from surveillance has three related questions, as discussed by Andrew and Baker [7]: did I say you could have that, do you need it, and did you tell me you took it? These might need distinct interactions so it is useful to separate them. The same applies to data control. As discussed by Shu *et al*, measures to counter disinformation on social media have become necessary [323], so *Twitter* now inserts an accountability nudge and asks its users if they “Want to read the article first?” if they try to retweet a linked

article they have not yet accessed. Exclusion and bias are both aspects of equity, but for exclusion it is useful to distinguish [hard exclusion](#) where access is impossible and [soft exclusion](#) where there is no desire to participate, as this may be because the pre-conditions of participation are disproportionate to the perceived value.

Turel links addiction with agency [368] but it may also be an accountability problem if behavioural design is deliberately misused to create the addiction. Imbalances of power and choice can be a loss of agency and proportionality, and could also impact accountability if the imbalance is sufficient. I am sceptical about whether design can address civility as that assumes antisocial behaviour is inadvertent, rather than actively sought and associated with sadism as found by Buckels *et al* [48], and in extreme cases it becomes an abuse of power [70] or what Mall *et al* call toxic behaviour [219]. The response in these cases might be choosing not to build that feature, as discussed by Sandelin and Homewood [311], or as Widdicks *et al* put it, to repent and withdraw it [387]. Algorithmic amplification and wider dissemination of bad behaviour in pursuit of higher engagement scores, as alleged by a *Facebook* whistle-blower [395], is an issue of current concern to policy makers [386, 111] and may require audit activity, as discussed by Juneja and Mitra [174]. Lawyers and legislators are responding with litigation [31] and new law [192], whether the problem is fully understood or not.

8.4 Jeopardy analysis

8.4.1 Scope of jeopardy analysis

In designing a new method, my focus was high-level interaction design, on the assumption that more minor issues are adequately addressed by usability testing. Usability problems range from minor inefficiencies in a user interface, that are easily remedied, to fundamental flaws in the interaction philosophy that require a complete redesign. They were characterised by Manakhov *et al* as negative phenomena caused by a combination of design and context that

result in a shortfall in efficiency, effectiveness or quality of experience [221]. I find their definition broadly useful but do not accept their non-overlapping partitioning, as negative halo effects [4] may lead users to complain about efficiency and effectiveness because their experience was poor.

I intend jeopardy analysis to support user research and design from planning onwards. In a survey of ethics-focussed design methods, Chivukula *et al* [64] found these planning and scoping activities were under-served. Discussing ethical concerns, Gray *et al* [136] demonstrated close alignment of the use of unfair processing strategies [137] with negative end-user reactions in online discussion fora. These ‘dark pattern’ strategies give useful examples, but a method that focussed on deliberate misusability might support independent audit while offering little to honest practitioners. The anticipation needs to be effective enough that unfair design would be picked up, but the scope broad enough to include inadvertent problems that they would be motivated to avoid.

Limitations of testing

Some participants saw the need for anticipation, but believed they fulfilled that need by testing, as shown in Extract 5.27. Jeopardy analysis aims to avoid the situation where a failed test identifies an issue so far into development that it is then too expensive or disruptive to address.

Deming said [92, p29] that testing a completed artefact is too late, as its quality is already determined. For usability tests to have value they need to be formative assessments [305] that feed back into development not summative assessments that are either passed or failed. For products where mistakes are inevitable but intolerable, Deming recommended inspection, but in those I was involved in all we could do at that late point was apply limitations on use. The risk of that safety management approach becoming “rear-end analysis” had been identified by Taylor and MacLeod [348] and repeated an earlier finding by Taylor that processes based on “ergonomic checklists and late demonstration evaluation were ineffective and not directly related to mission effectiveness criteria” [347].

Reviewing operation of the safety case approach, Inge observed that deciding what evidence was needed “requires a greater degree of competence from those involved in it than does a prescriptive approach to safety, where managers can achieve compliance by following rules rather than making decisions” [162]. Linking problems with evidence of their mitigation, as Kelly advocated with goal structuring notation [182], first needs an understanding of what might happen and why. Jeopardy analysis is intended to provide that.

There may be occasions and contexts where anticipating a potential usability problem does not provide enough information for it to be avoided. In such cases practitioners might choose to do nothing until they have seen it enough to understand it properly, or give advice to users to help them recognise it and recover. The output of the anticipation method needs to be rich enough to support both of these strategies, and persistent enough to match the life of the problem (D14). If that can be achieved then it may ease reliance on testing.

Resilience and Robustness

It is useful to make the distinction between designing a system to be *robust*, so that failures are avoided, and designing a system to be *resilient* so that failures are detected early and recovered from quickly. My priority is to support resilience, by priming teams to recognise a problem quickly even if it cannot be avoided by design. Robustness can be difficult and expensive to achieve [89, 90], and focusing on failure can take attention away from unexpected successes that we might want to secure for future designs [154], as discussed in section 2.5.1.

Stability during change

Freezing the design for extended periods while risk analysis is done would be incompatible with the desire for continuous discovery and delivery (see 8.2.2), and repeated analysis would seem wasteful and costly. For anticipation to be practical, it needs to be based on properties of the design that can be agreed upon early and that will remain stable throughout the life of the product, so

that the analysis can be a continuous refinement of the issues, supporting and supported by continuous discovery and delivery.

8.4.2 Related practices

Project Premortems

The practice of performing a project premortem was described by Gary Klein in an article for the Harvard Business Review [188], and built upon the strategies suggested in a study by Mitchell *et al* [240] for constructing explanations of uncertain events. When compared with brainstorming, Gallop *et al* [120] found that working backwards from an imagined failure to the possible reasons was more effective and more time efficient in generating good quality ideas. That it worked well for safety analysis did not necessarily mean that it would be equally effective for usability, but it was an attractive starting point.

Consequence scanning

The responsible technology think-tank Doteveryone describe an ‘Agile event’ they call Consequence Scanning [45]. I find it a useful contribution to thinking about the problem, and it suggests sensible prompts for specific but common issues. My criticism would be that it simply asks the question ‘what are the unintended consequences’ without much conceptual scaffolding to support the discussion. For twenty five years, it was my job to answer that question. It was hard, even in a tightly regulated domain with a detailed goal tree [182] to provide focus. I believe it is too broad a question for general use.

Holistic personas

Holistic user persona descriptions, distilled from user research then augmented with personality traits, were found by Anvari *et al* [9, 367, 366] to be helpful in the conceptual design stage. As I aim to support the planning of user research campaigns, as much as their execution, there would be insufficient data at that

early stage to build a persona. If jeopardy analysis could guide designers to think about the impact on users in a way that invoked the same discussion of personality and emotional characteristics, either permanent or situational, then some of the same richness of thinking might nonetheless result.

8.4.3 Mapping heuristics onto ethical properties

The generic ethical properties used in the evaluation were sufficiently general that it should be possible to map known usability issues onto them, and doing so might indicate whether the approach is practicable. A time efficient source of suitable issues was those already distilled into usability heuristics.

Mapping Nielsen’s heuristics onto properties

The usability problems analysed by Nielsen [250] related to systems that predated the widespread use of graphical interfaces, but his analysis identified seven general factors, later extended to the ten commonly used heuristics [251], that can be mapped onto desirable properties, and as shown in Table 8.2.

Table 8.2: *Mapping of Nielsen’s usability factors onto ethical properties*

N01	Visibility of system status	Agency
N02	Match between system and real world	Agency, Equity
N03	User control and freedom	Agency, Proportionality
N04	Consistency and standards	Agency
N05	Error prevention	Agency, Proportionality
N06	Recognition rather than recall	Agency, Proportionality
N07	Flexibility and efficiency of use	Proportionality
N08	Aesthetic and minimalist design	Proportionality
N09	Help users to recognise diagnose and recover from errors	Agency, Accountability, Proportionality, Equity
N10	Help and documentation	Agency

Mapping web and work heuristics onto properties

Other heuristics directly address the needs of website users [266, 273, 362]. Those not already covered are shown in Table 8.3. Three heuristics targeting workplace use, from Muller and McClard [245], are included in the summary. These cover having respect for the skills of the user (H11) and supporting quality work (H13), which map onto *Accountability*. Having a pleasurable

experience (H12), in a workplace context, was mapped onto *Proportionality* on the basis that increased tool use can make a task more stressful, as found by Martin *et al* for adoption of online meeting tools [224], but depending on the tool might also map onto *Agency* if self-efficacy factors were important to workplace stress, as found by Thompson and Gomez [354], or perceived team engagement and social agency, as found by Price and LaFiandra [277]. The mapping is illustrated in Figure 8.2.

Table 8.3: *Mapping of web and work heuristics onto properties*

T03	Match system and user’s cultural aspects	Equity	[266]
W01	Make text and interactive elements large and clear enough	Equity	[273]
W03	Avoid short time-outs and display times	Equity	
W06	Provide sufficient but not excessive content	Proportionality	
W11	Avoid duplication or excessive effort	Proportionality	
W14	Make the sequence of interaction logical	Equity	
W18	Indicate if links go to another site or page	Accountability	
W19	Interactive and non-interactive elements should be clearly distinguished	Agency	
S07	Link depiction indicates its visited status	Agency	[362]
S13	Elements hinting where the user is exist	Agency	
S14	Map to directly access content exists	Proportionality	
H11	Respect the user and their skills	Accountability	[245]
H12	Pleasurable experience with the system	Proportionality	
H13	Support quality work	Accountability	

Mapping summary

From the spread and coverage achieved, it appears that these four properties would be a reasonable starting point for practitioners learning the method or beginning to explore the ethical landscape of a new product. Addressing properties also forces more context specific thinking, compared to the rather vague workplace heuristics.

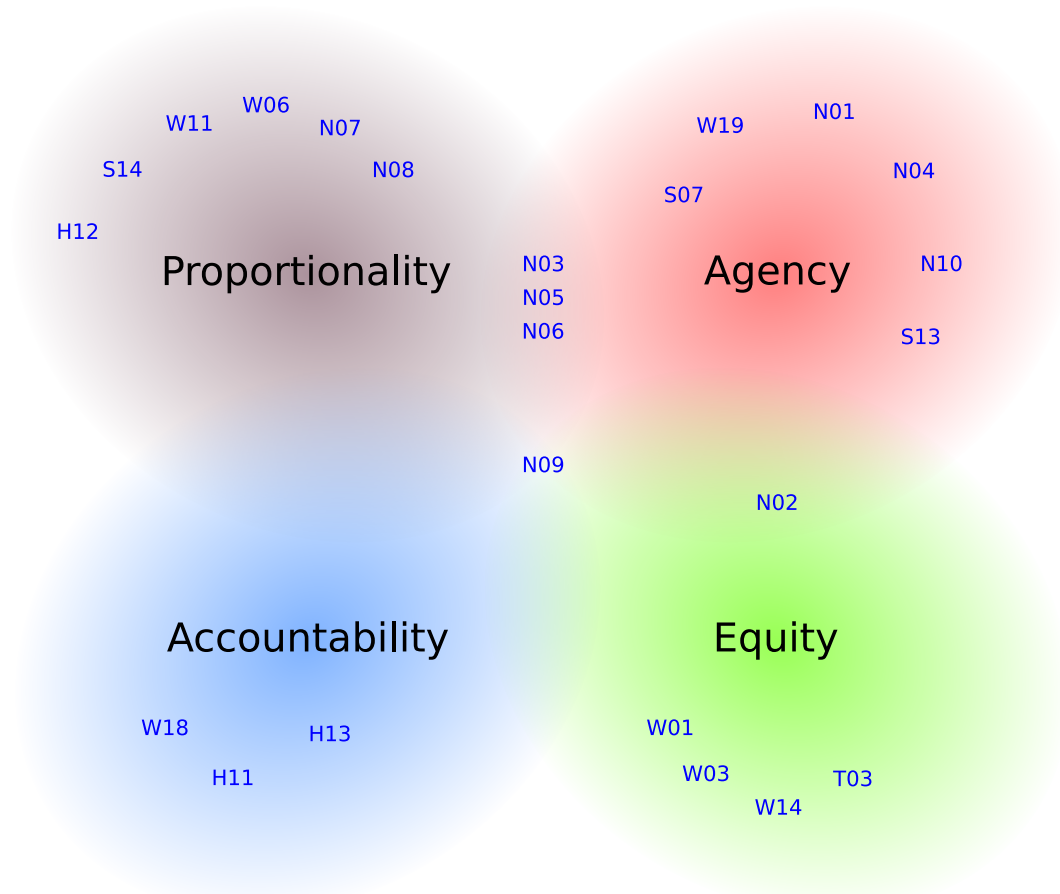


Figure 8.2: Mapping of usability heuristics onto properties

8.5 Limitations and reliability

Limitations of this qualitative research are discussed here, and the measures taken to ensure reliability, by identifying recognised weaknesses, and following the categorisation suggested by Lincoln and Guba [211] of credibility, transferability, dependability, and confirmability.

The findings are credible if the research addressed the intended phenomena, and described them accurately [321]. Transferability to another context can only be judged if sufficient contextual detail about the fieldwork is provided for other researchers to make that judgement. Dependability rests on having sufficient detail on the methods employed to be able to repeat them, though not necessarily with the same results as the phenomena may have changed. Confirmability depends on being able to demonstrate that the results derive from the participants and their ideas, rather than those of the researcher.

8.5.1 Participation

Three organisations participated in the workshops and six in the interviews. The three studies involved 26 practitioners in total, whose business activities included higher education, retail, digital media, and public services. Their types of employment included freelance individuals and agencies bidding for work, companies who supply and support a proprietary system, and specialists within larger organisations or civil service departments. As exploratory work, the aim at this stage was depth and richness of description, rather than breadth and coverage, but there are inevitably limits to the generalisability of findings based on this small sample.

As discussed in the critical reflection on Jeopardy Analysis (see 7.5.3), only designers were invited to participate. In a practical application of Jeopardy Analysis, concerns about the balance of power between designer and user would be better addressed by fully involving the current or prospective users and making it a co-analysis and co-design activity.

8.5.2 Period of engagement

The workshops and interviews provided snapshots of practice at the time they were held, from the perspective of the individuals involved. Engagement over a longer period, involving different workshop groups and interview participants, would have captured a broader view and understanding of the typical practices in the organisation.

8.5.3 Data captured

Only the transcripts of the evaluation workshops and interviews, and the leaves completed in the Ketso workshops, were included in the analysis. No audio or video recordings were made of the Ketso sessions, out of respect for workplace and participant privacy. Analysis of the conversations around the table might have provided additional information on the rationale for the statements made.

8.5.4 Pandemic conditions

Both [Study 2: Practitioner interviews](#) and [Study 3: Jeopardy workshops](#) were conducted during the coronavirus pandemic that began in late 2019. The participants and the researcher were all working from home with domestic network infrastructure and equipment. Individually purchased audio and video equipment, of variable quality, was used to conduct the online interviews and workshops, and they took place in domestic settings with the available lighting and furniture and occasional distractions from other family members.

The evaluation workshops were time-limited to 90 minutes as an adaptation to remote working, so only included jeopardy identification activities, and not the subsequent construction of a jeopardy model with challenges, mitigations, and consequences linked visually with a loss event in a diagram [68] as had been intended. This may have made it harder for participants to think about the problem, as they were not able to benefit from the act of creating and revising the [bowtie](#) diagram, or align their understanding by sharing it.

8.5.5 Highly regulated industries

Retail and public sector practitioners were recruited for the research. Contact was made with practitioners in the banking and finance sector, but despite expressing an interest they felt unable to participate, and expressed concerns about the regulatory framework they work under. Practitioners in healthcare were also initially interested but did not respond further. These are sectors that could potentially benefit from jeopardy analysis, and their feedback would have been valuable. Their absence limits the claims that can be made for its general applicability.

8.5.6 Credibility

Credibility of the study was addressed by contextual familiarisation, by the use of established methods, and by member checks and triangulation [321], in order to have confidence that the data gathered from them were relevant to the research questions and gave a coherent account of the practices described. Familiarity with the research context was developed by active engagement over three years with the communities of practice from which the participants were drawn, in person and on social media. Established methods for trustworthy qualitative analysis were adopted from Braun and Clarke [42]. The strategies suggested by Shenton [321] and case study practices from Runeson and Höst [302] were considered when reviewing the study limitations. After processing, the data gathered for [Study 1: Ketso workshops](#) was shared back with the participating organisation before analysis. The post activity debrief questions used in [Study 3: Jeopardy workshops](#) established whether the participants found the approach plausible, or applicable to their organisational context. The thematic analysis approach applied to the interviews enhanced credibility by working across the whole corpus of data when constructing and reviewing themes. A degree of triangulation of the current practice findings was achieved by using the structured questions in [Study 2: Practitioner interviews](#) to explore in more detail, with different participants and organisations, a related question to that already covered in [Study 1: Ketso workshops](#).

8.5.7 Transferability

Transferability of the results to other contexts was addressed by providing sufficient relevant details of the working context of the participants and relevant aspects of my background for other researchers to judge the transferability of their contributions and my analysis of them. As suggested by Shenton [321], these details include the number of organisations involved and their locations, the number of participants and the professional background required for their selection, the methods employed, the number and length of the data collection sessions, and the overall time-period involved.

8.5.8 Dependability

Dependability was addressed by detailed descriptions of the processes followed, sufficient to allow others to repeat the method, with example extracts provided to illustrate how the analysis method was applied to the data. Dependability and confirmability were enhanced by discussion of my approach to the work with my supervisors.

8.5.9 Confirmability

Confirmability was addressed by maintaining an audit trail, as suggested by Lincoln and Guba[211, p319], tracing data through each phase of the analysis to the results to support review activities and ensure that the findings reflect the experiences of the participants, not the preferences of the researcher. Findings were also discussed with my supervisors.

A trail was created by the use of the *NVivo* qualitative data analysis software to record data coding decisions, by digitising all physical artefacts generated during data collection and analysis, and by tabulating the allocation of coded extracts to themes in a spreadsheet as part of the review phases. Materials used in the workshops are included in Appendix A. The transcripts, coding, and themes are tabulated in Appendix E, and used as the source of example extracts.

Chapter 9

Contributions and further work

9.1 Summary of the research

Informed by a review of prior literature and a thematic analysis of current practice resulting from two empirical studies, an [interaction discovery](#) process was developed that considers the [ethical properties](#) that the design should preserve, maps these onto concepts that are meaningful in the problem domain, and uses the resulting [provocations](#) to anticipate and explore jeopardies implied by the design, as summarised on page [133](#). This was evaluated in a third empirical study.

Concept mapping and goal structuring were used to identify topics for an initial literature search (Chapter [2](#)). Recognising a social context in which the ubiquity of software makes its use non-discretionary, the topic of design ethics was identified as important to the study. Within the wider practice of [UX](#), the central role of [user research](#) in design practice was identified. A strong theme of knowledge sharing in Agile practice [[195](#), [263](#)] led to the adoption of Wenger's work on [communities of practice](#) [[384](#)] as a useful theoretical lens through which to understand the relationships between the roles in a multi-disciplinary team. The role of designers as [choice architects](#) was explored, noting that they may be entangled in their own purposeful stories. While studies were found that involved practitioners, few were focussed on [discovery](#)

or described current practice within the UK, and specific advice on suitable approaches for participants from the design community was lacking.

The description of the problem was refined and challenges identified using examples from daily software use (Chapter 3). A contrast between negative sentiment toward technology companies and positive sentiment about their products was reported in a public attitudes report by Doteveryone [238]. The threat to public confidence in the software profession has so far not led to the ‘revolt’ predicted by Wooldridge [391] but tech workers report negative impacts on their social interactions with friends [338]. Analysis of reported software project outcomes was used to demonstrate the lack of progress in addressing requirement shortfalls, and the distinction was made between market-driven strategic **technical debt** and practice-driven tactical debt. The conflict between working quickly enough to maintain progress but carefully enough not to miss the potential for harm, while taking on larger and more complex projects, was identified and related to Rasmussen’s dynamic safety model [285]. Examples of poor quality advice, tactless prompts, conflicting interests and motivations, and ways that well intentioned features supporting one use case may negatively impact another potentially more important one were provided.

The researcher perspective, methods used, and reasons for their selection were described (Chapter 4). My professional background was summarised, the epistemological, ontological, my methodological positions stated, and reasons for adopting a qualitative approach set out. Data collection methods were described, and details provided of the reflexive thematic analysis [40] approach used. The evaluation of the jeopardy analysis method was described, using guidance on design science research [356] and cognitive work analysis [378].

An initial understanding of the goals, methods, and mindsets employed in the current practice of **discovery**, from the perspective of practitioners, was obtained in **Study 1: Ketso workshops** by a thematic analysis of statements generated in collaborative idea generation workshops. Findings from the first study informed the questions in **Study 2: Practitioner interviews**. Analysis of the interview transcripts enriched this initial understanding of priorities and aspirations and suggested how the approach might need to change in order

to successfully anticipate problems (Chapter 5). Using those findings, criteria were explored for an anticipation method based on the ethical properties that should be preserved (Chapter 6). A method was constructed and evaluated online with practitioners in [Study 3: Jeopardy workshops](#) (Chapter 7). Main findings from these three studies were discussed and related to prior work, and further work identified (Chapter 8). The answers to the research questions are summarised in the next section. Identified threats to validity, and how they were addressed, and limitations of the research were discussed in section 8.5. Questions arising from this study that require further work are discussed in section 9.4.

9.2 Answers to the research questions

9.2.1 Motivating question

The motivating question [MQ](#) was

**How can the software design process be improved
to reliably deliver systems that maximise usability (MQ)
while minimising undesirable interactions**

The purpose of the motivating question is to acknowledge the wider context of the research. Analysis of current practice for [RQ1](#) found that up-front design thinking is sometimes concerned with possible solutions, informed by pre-conceived ideas about the problem as imagined, rather than an inquiry into the problem as experienced. That analysis provided further insights into what could be done differently and an enhancement to discovery practice was developed in response to [RQ2](#). The resulting user jeopardy analysis method progresses the aims of the motivating question by:

- identifying ‘undesirable’ as the loss of [ethical properties](#)
- considering all user outcomes, not just those desired
- supporting model-based approaches to usability testing

9.2.2 RQ1 — Current Practice

The first research question [RQ1](#) was

What methods are applied in current software design practice to identify interactions with the user that the intended users will consider undesirable (RQ1)

In [Study 1: Ketso workshops](#) and [Study 2: Practitioner interviews](#), it was found that practitioners chose methods that build a shared understanding, and their challenges related to factors frustrating that aim. Method selection was context dependent, processes were tailored by the team to suit their circumstances, and communities of practice within companies actively explored and experimented with new methods and shared their experiences of using them. There was a growing recognition of the need to anticipate some kinds of problems, but in general agility in responding to a problem identified in testing was preferred to anticipation. Predominantly, no methods are applied at the discovery stage to identify undesirable interactions. Usability testing, once a testable product is available, is preferred.

9.2.3 RQ2 — Anticipation of problems

The second research question [RQ2](#) was

How can designers be helped to maintain a structure for their work that assists identification of undesirable interactions (RQ2)

This was refined into two sub-questions [RQ2.1](#) and [RQ2.2](#) using the hypothesis developed in [Chapter 6](#) that consideration of ethical properties of a design provides a stable basis of analysis that can be applied before discovery activities are complete:

Does thinking about usability issues as the loss of an ethical property help practitioners to challenge their assumptions (RQ2.1)

Does thinking about usability issues as the loss of an ethical property help practitioners to uncover design issues (RQ2.2)

These were addressed in [Study 3: Jeopardy workshops](#) by observing design practitioners using the jeopardy analysis method (Chapter 6) and requesting their feedback after doing so. The participants reported that structuring their discussion of interactions around people and the design properties important to them did help them challenge design assumptions. They found the framing of the problem in ethical properties unfamiliar but felt they could use it by themselves with more practice. Latent issues in the scenarios were identified, and the participants engaged in rich discussions around them, without further prompting by the facilitator, beyond that already provided by the pre-scripted questions and their explanation. This initial evaluation suggests that thinking about usability issues as the loss of an ethical property could help practitioners uncover them, but generic properties are too abstract so they do need to be mapped onto domain specific terms, and therefore the provocation design step of the method (6.2.2) is important to its application.

9.3 Contributions

9.3.1 Contributions to knowledge

Practitioner view of discovery

Thematic mapping of responses to questions about the goals, tactics, current aspirations, and challenges of **discovery** practice provided insights into how **UX** practitioners view discovery activities in a workplace context. These included key features of the desired mindset [133], the methods used, and the outcomes sought. Success in the participating organisations required approaches that were knowledge-led and empowering. For them, their aspiration to greater curiosity meant broader, deeper, and more continuous discovery activity with more diverse user groups. Obstacles to successful discovery were identified in communication, culture, and business processes. Factors imposing material and human constraints were identified with implications for education, training, and operational management.

Current discovery practice

Analysis of interviews, building on my earlier insights, provided an enriched understanding of current practice. This identified that shared understanding was actively sought, that prototyping and Agile rituals played a part in more effective sharing, and that alignment with their colleagues and their end-users was valued by designers. The desire to challenge assumptions was associated with an empirical approach, where practitioners value anticipation of problems, but believe they do so by usability testing. The analysis also identified ‘consequence scanning’ approaches to anticipating problems that differ from current discovery practice, and are potentially in conflict with it, which were associated with ethical design advocacy and a more risk averse mindset.

Development of Jeopardy Analysis

Development of the Jeopardy Analysis method offers an [interaction discovery](#) practice that can help practitioners to identify some undesirable interactions, and addresses some potential weaknesses in existing ‘consequence scanning’ approaches. It helps anticipate usability issues, in a manner consistent with the aims of [Value Sensitive Design](#), while focusing on positive system properties that are stable over product life-times. It supports time efficient but rigorous analysis that integrates conceptually with existing safety techniques and tools.

Evaluation of Jeopardy Analysis

Evaluating the Jeopardy Analysis method with [UX](#) practitioners has provided initial indications that this is a practical approach, and a suitable basis for further research into interaction discovery techniques for general application.

9.3.2 Practical contribution

A method guide, worksheets and explanatory material guiding practitioners through a generic user jeopardy identification process have been used under supervision during the study, and are available for independent use from the project [website](#).

9.3.3 Dissemination and publication

A paper describing the results of [Study 1: Ketso workshops](#) was presented at the British HCI conference in 2021 [291]. Further papers covering the findings of [Study 2: Practitioner interviews](#) and [Study 3: Jeopardy workshops](#) are planned. Engagement with the practice communities that participated in the research will use professional meetups and the project [website](#).

9.4 Further work

9.4.1 Refinements for industry use

Initial feedback has been encouraging but further contact with practitioners is needed to refine the method and gather data on how it might be used in a workplace context with real projects and commercial pressures.

Constructing domain-relevant provocations

My proposed jeopardy analysis method includes a Phase 1 activity (p132) of translating the ethical properties relevant to the design into domain-relevant language when choosing [provocations](#) that will evoke a creative response to them. For evaluation purposes, my [provocations](#) were neutral and aimed only to pose questions rather than to trigger personal dilemmas as Ozkaramanli and Desmet did [262] or use aesthetically, functionally or conceptually challenging features as employed by Raptis *et al* [284]. As such they remained somewhat abstract. The difficulty of translating abstract concepts of user jeopardy into concrete concerns applicable to their domain and product, that was expressed by participants in the study, indicates that more detailed evaluation of this aspect is required.

Poor coverage of some concerns, particularly those which might normally be delegated to specific departments within larger organisations, requires more investigation and it is suggested that the benefits to jeopardy identification of targeted cross-disciplinary awareness training should be assessed.

Anticipation and discovery mindsets

The analysis here used a snapshot of practice as described by practitioners in 2020. With the introduction of an Online Harms Act the regulatory framework is changing [192, 390, 346] and technologies such as [Virtual Reality \(VR\)](#) may complicate platform governance [32] and the design practices adopted [341].

Ongoing work is needed to track the development of this topic during a period of potentially rapid change.

Cross-disciplinary awareness

Poor coverage of some concerns, particularly those which might normally be delegated to specific departments within larger organisations, requires more investigation and it is suggested that the utility of targeted cross-disciplinary awareness training should be assessed in a workplace context, where jeopardy identification has been integrated into the design process for a real project.

Bowtie diagrams and jeopardy models

Visualising the path of a latent problem from threat to consequence in a [bowtie](#) diagram may assist its anticipation, its understanding, and its recognition when it occurs. An evaluation of this would ideally follow similar projects from their inception, through the complete life-cycle to product retirement, so that the through life costs and benefits could be assessed.

Teaching jeopardy analysis

As discussed in [7.6.1](#), teaching Jeopardy Analysis in higher education settings would contribute to learning outcomes in inclusive design, identifying societal impact, making ethical choices, risk management, and recognising professional responsibilities.

9.5 Concluding remarks

This research is intended to benefit practice and enrich understanding of its UK communities of practice. It was only possible with the participation and encouragement of practitioners in Manchester and the wider community.

Appendices

Appendix A

Workshop materials

A.1 Worksheets and posters

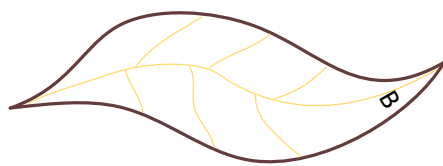
Interaction Discovery workshops

www.interaction-discovery.org.uk/workshops



What does successful discovery ...

- ... look like?
- ... feel like?
- ... produce?



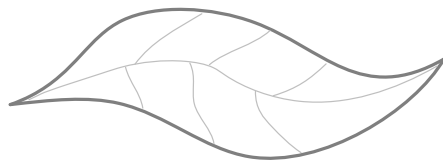
What works for you now ...

- ... mindsets?
- ... methods?
- ... materials?



What would you try with ...

- ... more time / people?
- ... more space?
- ... permission to fail?



What are the challenges ...

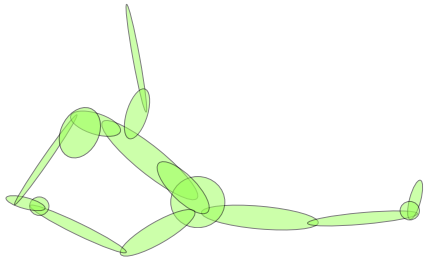
- ... behaviour?
- ... surprises?
- ... technology?

If you have questions about the particular workshop that produced these diagrams or the study as a whole contact Kevin Rigotti at UCLan or via the website

contact@interaction-discovery.org.uk



Figure A.1: Ketso workshop explanatory legend sheet



A user jeopardy is a precarious state in which a desirable system property may be lost.

User jeopardies are not categories. They are provocations to help you ask the **right questions**, of the **right people**, in the **right way**.

Jeopardy models are for sense-making.

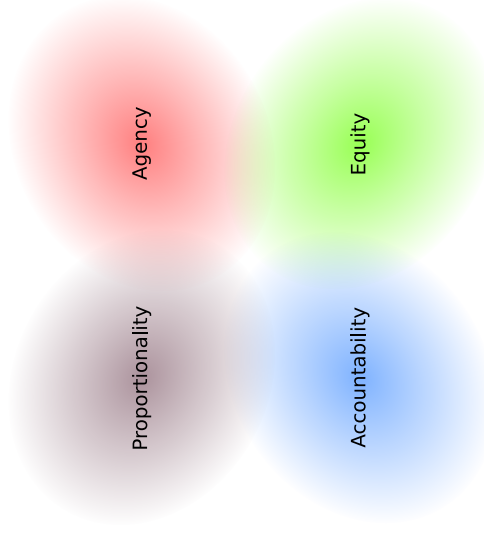
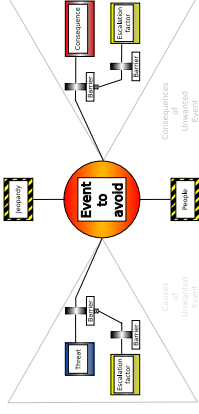



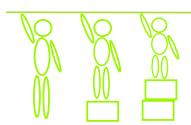






Figure A.2: Introductory poster for User Jeopardy

Workshop Plan



	<p>Introduction (10 minutes)</p>
	<p>Task brief (5 minutes)</p>
 <p>Equity</p>	<p>What distinct groups can you see? Might any be disadvantaged? Caused - Prevented - Mitigated - Worsened</p>
 <p>Agency</p>	<p>Can people make the choices they need? What happens if they can't? Caused - Prevented - Mitigated - Worsened</p>
 <p>Proportionality</p>	<p>Is what they have to do proportionate? What are they sacrificing? Caused - Prevented - Mitigated - Worsened</p>
 <p>Accountability</p>	<p>Will people feel trusted? Will responsibility fall in the right place? Caused - Prevented - Mitigated - Worsened</p>
	<p>Method debrief (15 minutes)</p>


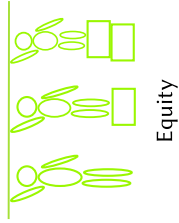
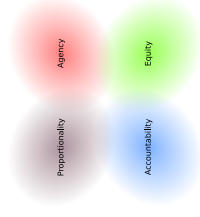
© Kevin Rigotti 

Figure A.3: User jeopardy workshop explanatory legend sheet



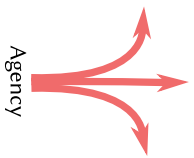
Equity

Might any group be disproportionately disadvantaged?
 ... and what questions would help you to know?

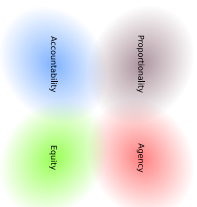


Problem	Caused	Prevented	Mitigated	Worsened

Figure A.4: Workshop canvas for Equity



Will people be able to make the informed choices they need ?
... and what questions would help you to know?



Problem

Caused

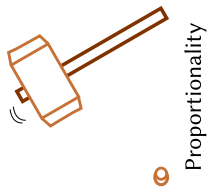
Prevented

Mitigated

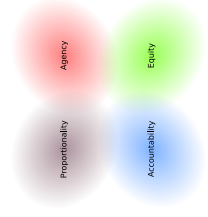
Worsened

Four large empty rectangular boxes with dotted lines, corresponding to the categories: Caused, Prevented, Mitigated, and Worsened.

Figure A.5: Workshop canvas for Agency

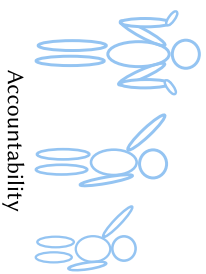


Is what people do proportionate to the benefit to them?
 ... and what questions would help you to know?

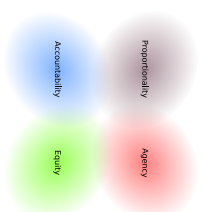


Problem	Caused	Prevented	Mitigated	Worsened

Figure A.6: Workshop canvas for Proportionality



Will you achieve a trusted transparent collaboration ?
... and what questions would help you to know?



Problem	Caused	Prevented	Mitigated	Worsened

Figure A.7: Workshop canvas for Accountability

A.2 Scenario descriptions and task sheets



4 Day Week at Monday Broadcasting

Scenario

The board of directors of documentary maker Monday Broadcasting have decided to explore the use of a 4 day week in their organisation. Consultants from a large IT company have recommended giving every member of staff a company smart phone, and have offered to provide an application for it that will help staff to manage their own working hours.

The chief executive, Gloria Monday, is unsure how that would work in their organisation, so before going ahead with the project, has asked the in-house design team to do some research to answer two general questions:

- What help would staff need to manage their hours?
- What data would managers need to run the company?

The personnel director, Peccata Monday, is concerned about possible unintended consequences so has asked *your team* to start the research by doing a User Jeopardy analysis to identify:

- What problems might surface?
- What questions they need to ask to understand these problems?
- Which groups of staff they need to include in the research?

The finance director, Robin Briton, has agreed to the User Jeopardy analysis provided that it take no more than an hour, so has suggested that it start by considering three of the roles in the company:

- Full-time designers
- Part-time researchers
- House keeping staff paid by the hour

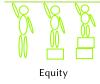
His assumption is that these will be representative enough.

Task

1. Discuss who would be affected by a change to a 4 day week. Are the suggested full-time, part-time, and hourly paid groups the right ones?
[5 mins]
2. Discuss how fairness and equity might be lost. What might happen? Who to? Could you prevent it? If it happened, how would you know? What would make it less unfair? What might make it worse?
[10 mins]
3. Discuss what choices might need to be made, and who by.
[5 mins]
4. Discuss how agency might be lost if the design makes a choice hard to make. What might happen? Who to? Could you prevent it? If it happened, how would you know? What might make the choice easier? What might make it harder?
[10 mins]
5. Discuss what data users might need to provide, and how often.
[5 mins]
6. Discuss whether the benefit justifies the data provided, or would it be disproportionate? What questions would help you to know? Who should you be particularly careful to ask?
[10 mins]
7. Discuss who is responsible, and what kind of consent needs to be given.
[5 mins]
8. Discuss how accountability might be lost, or mis-assigned. What might happen? How would you know?
[10 mins]

Figure A.8: Workshop scenario for Monday Broadcasting 4-day week

Monday Broadcasting task



Equity

Who would be affected by a 4 day week?
Are the suggested groups the right ones?

5 minutes

What might happen? Who to?
If it happened how would you know?
What would make it less unfair? Or worse?

10 minutes



Agency

What choices need to be made? Who by?

5 minutes

What choices might be hard to make?
If choices are frustrated how would you know?
What would make it easier? Or harder?

10 minutes



Proportionality

What data might users provide? How often?

5 minutes

Does the benefit justify it? How might it not?
What questions would help you to know?
Who do you particularly need to ask?

10 minutes



Accountability

Who will feel trusted? Who is responsible?

5 minutes

What kind of consent needs to be given?
How might accountability be lost or confused?
How would you know?

10 minutes

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Figure A.9: User jeopardy task sheet for Monday Broadcasting scenario

Personalisation of a University Website

Scenario

The university has received comments from some users of its website that the content is not always relevant to them. To improve engagement, it has been decided that information will be gathered that will support a more personalised user experience for all visitors to the website.

The website team want to ensure that any information they gather about users based on their behaviour, or from Google analytics data, is consistent with the university's policies and its commitment to safeguarding and protecting the privacy of its website users while being accessible and providing a positive user experience to everyone.

The team are concerned about possible unintended consequences so have decided to start by doing a User Jeopardy analysis to identify:

- What problems might surface?
- What questions they need to ask to understand these problems?
- Which groups of users they need to include in the research?

Personalisation can be characterised by considering the questions:

- What should be personalised?
- For whom do we need to personalise?
- Who does the personalisation?

Explicit personalisation, where the users participate by making choices, should do something sensible if no choices have yet been made. Implicit personalisation, where the system automatically generates personalised content, should similarly do something sensible on first use even if no information has yet been gathered.

Task

1. Discuss which distinct groups of website visitors you might have. Are these groups exclusive, or might they overlap?
[5 mins]
2. Discuss how fairness and equity might be lost. What might happen? Who to? Could you prevent it? If it happened, how would you know? What would make it less unfair? What might make it worse?
[10 mins]
3. Discuss what choices might need to be made, and who by.
[5 mins]
4. Discuss how agency might be lost if the design makes a choice hard to make. What might happen? Who to? Could you prevent it? If it happened, how would you know? What might make the choice easier? What might make it harder?
[10 mins]
5. Discuss what data users might need to provide, and how often.
[5 mins]
6. Discuss whether the benefit justifies the data provided, or would it be disproportionate? What questions would help you to know? Who should you be particularly careful to ask?
[10 mins]
7. Discuss who is responsible, and what kind of consent needs to be given.
[5 mins]
8. Discuss how accountability might be lost, or mis-assigned. What might happen? How would you know?
[10 mins]

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Figure A.10: Workshop scenario for University website personalisation









1		Discuss which distinct groups of website visitors you might have. Are these groups exclusive, or might they overlap?
2		Discuss how fairness and equity might be lost. What might happen? Who to? Could you prevent it? If it happened, how would you know? What would make it less unfair? What might make it worse?
3		Discuss what choices might need to be made, and who by
4		Discuss how agency might be lost if the design makes a choice hard to make. What might happen? Who to? Could you prevent it? If it happened, how would you know? What might make the choice easier? What might make it harder?
5		Discuss what data users might need to provide, and how often.
6		Discuss whether the benefit justifies the data provided, or would it be disproportionate? What questions would help you to know? Who should you be particularly careful to ask?
7		Discuss who is responsible, and what kind of consent needs to be given.
8		Discuss how accountability might be lost, or mis-assigned. What might happen? How would you know?

Figure A.11: User jeopardy task sheet for University website personalisation

A.3 Miro board

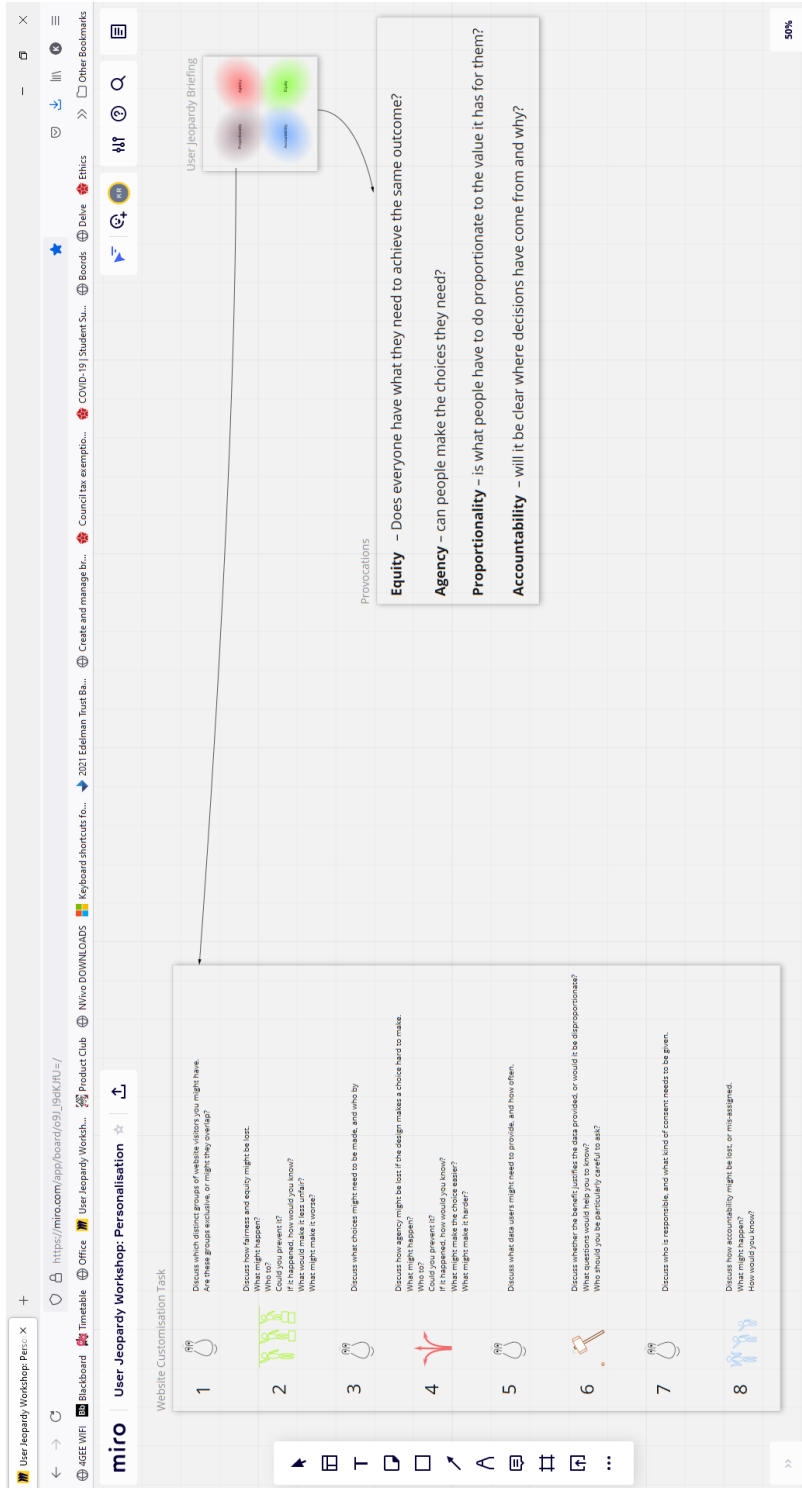


Figure A.12: Miro board layout for jeopardy analysis of Personalisation

A.4 Project website

Information was provided in advance to participants via the project website:
www.interaction-discovery.org.uk.

Appendix B

Model answers

Latent issues in the evaluation scenarios

For each of the evaluation scenarios detailed in Chapter 7 a model answer was prepared listing the latent issues that I had identified prior to the session.

Mobile App for 4 Day Week Scenario

The board of directors of documentary maker Monday Broadcasting have decided to explore the use of a 4 day week in their organisation. Consultants from a large IT company have recommended giving every member of staff a company smart phone, and have offered to provide an application for it that will help staff to manage their own working hours.

The chief executive, Gloria Monday, is unsure how that would work in their organisation, so before going ahead with the project, has asked the in-house design team to do some research to answer two general questions:

- What help would staff need to manage their hours?
- What data would managers need to run the company?

The personnel director, Peccata Monday, is concerned about possible unintended consequences so has asked your team to start the research by doing a User Jeopardy analysis to identify:

- What problems might surface?
- What questions they need to ask to understand these problems?
- Which groups of staff they need to include in the research?

The finance director, Robin Briton, has agreed to the User Jeopardy analysis provided that it take no more than an hour, so has suggested that it start by considering three of the roles in the company:

- Full-time designers
- Part-time researchers
- House keeping staff paid by the hour

His assumption is that these will be representative enough.

Figure B.1: Scenario for Evaluation 1 ('Monday Broadcasting')

Task

Discuss who would be affected by a change to a 4 day week. Are the suggested full-time, part-time, and hourly paid groups the right ones?

[5 mins]

Discuss how fairness and equity might be lost. What might happen? Who to? Could you prevent it? If it happened, how would you know? What would make it less unfair? What might make it worse?

[10 mins]

Discuss what choices might need to be made, and who by.

[5 mins]

Discuss how agency might be lost if the design makes a choice hard to make. What might happen? Who to? Could you prevent it? If it happened, how would you know? What might make the choice easier? What might make it harder?

[10 mins]

Discuss what data users might need to provide, and how often.

[5 mins]

Discuss whether the benefit justifies the data provided, or would it be disproportionate? What questions would help you to know? Who should you be particularly careful to ask?

[10 mins]

Discuss who is responsible, and what kind of consent needs to be given.

[5 mins]

Discuss how accountability might be lost, or mis-assigned. What might happen? How would you know?

[10 mins]

Figure B.2: Task sheet for Evaluation 1 ('Monday Broadcasting')

Equity at Monday Broadcasting

The scenario identifies three groups of employees: full-time designers, part-time researchers, and house-keeping staff paid by the hour. The groups suggested are a reasonable starting point, but do not capture all the relevant differences. Factors that might be important are:

- Health
There may be health reasons for wanting a shorter working day, or a longer but less intense working week. For example, syndromes that cause fatigue like myalgic encephalomyelitis (ME), or a heart condition. Health reasons might be permanent, or temporary, such as pregnancy or recovery from an injury.
- Responsibilities
Parents may need to coordinate their working days to share childcare responsibilities with each other or with a child minder. External organisations may also impose responsibilities, such as sitting on the local council or being a lay magistrate.
- Contract
Full-time staff will want to know what this means for their salary. Will it be the same, or reduced? Part-time staff will want to know if this changes the days they will need to work, or the days they will be expected to be in the office. Staff paid by the hour will want to know if they will be employed fewer hours, especially if the plan is to close the office for an extra day at the weekend.
- Location
Staff working remotely and only visiting the office occasionally will want to know what difference a 4 day week makes to them. If daily working hours change then anyone commuting by public transport may need to use different services, possibly affecting the duration, cost, or comfort of the journey.

Figure B.3: Equity in Evaluation 1 ('Monday Broadcasting')

Agency at Monday Broadcasting

Concerns around Agency relate mostly to the suggested phone app, and depend on what design choices have been made.

- Is a 4-day week my choice, or my boss?
- Can I choose which 4 days?
- Can I choose whether to use the app?
- If check-in is automatic can I turn it off?

Figure B.4: Agency in Evaluation 1 ('Monday Broadcasting')

Proportionality at Monday Broadcasting

Concerns around Proportionality relate to privacy, data use, and who actually benefits from the proposed change or the use of the app.

- Who does this app support, me or my boss?
- Do I tell it I'm working or does it monitor me?
- Do I have to check-out for breaks?
- How often must I use it?
- How long is data held?

Figure B.5: Proportionality in Evaluation 1 ('Monday Broadcasting')

Accountability at Monday Broadcasting

Concerns around Accountability relate to who is responsible for any adverse impact, how problems are reported, and responsibilities of use.

- Who do I tell about problems?
- Can I tell it I vary my hours or location?
- Must I tell it I'm working late or alone?
- Who can see my working hours?
- Where is data held?

Figure B.6: Accountability in Evaluation 1 ('Monday Broadcasting')

Website Personalisation Scenario

The university has received comments from some users of its website that the content is not always relevant to them. To improve engagement, it has been decided that information will be gathered that will support a more personalised user experience for all visitors to the website.

The website team want to ensure that any information they gather about users based on their behaviour, or from Google analytics data, is consistent with the university's policies and its commitment to safeguarding the privacy of its website users while being accessible and providing a positive user experience to everyone.

The team are concerned about possible unintended consequences so have decided to start by doing a User Jeopardy analysis to identify:

- What problems might surface?
- What questions they need to ask to understand these problems?
- Which groups of users they need to include in the research?

Personalisation can be characterised by considering the questions:

- What should be personalised?
- For whom do we need to personalise?
- Who does the personalisation?

Explicit personalisation, where the users participate by making choices, should do something sensible if no choices have yet been made.

Implicit personalisation, where the site automatically generates custom content, should similarly do something sensible on first use if no information has yet been gathered.

Figure B.7: Scenario for Evaluation 2 ('Website personalisation')

Task

Discuss which distinct groups of website visitors you might have. Are these groups exclusive, or might they overlap?

[5 mins]

Discuss how fairness and equity might be lost. What might happen? Who to? Could you prevent it? If it happened, how would you know? What would make it less unfair? What might make it worse?

[10 mins]

Discuss what choices might need to be made, and who by.

[5 mins]

Discuss how agency might be lost if the design makes a choice hard to make. What might happen? Who to? Could you prevent it? If it happened, how would you know? What might make the choice easier? What might make it harder?

[10 mins]

Discuss what data users might need to provide, and how often.

[5 mins]

Discuss whether the benefit justifies the data provided, or would it be disproportionate? What questions would help you to know? Who should you be particularly careful to ask?

[10 mins]

Discuss who is responsible, and what kind of consent needs to be given.

[5 mins]

Discuss how accountability might be lost, or mis-assigned. What might happen? How would you know?

[10 mins]

Figure B.8: Task sheet for Evaluation 2 ('Website personalisation')

Equity in Personalisation

The scenario is open, and does not identify particular groups. Relevant factors might be

- Colour schemes with high contrast for accessibility
- Low animation / motion for accessibility
- Location as an indicator of home versus international T&C's
- Different student demographics (teenagers versus mature, etc)
- Users other than students, e.g. teachers, family, etc
- Different degree levels (undergraduate, postgraduate, research)
- Different situations and contexts of use.
- Language settings
- Cultural sensitivities

Figure B.9: Equity in Evaluation 2 ('Website personalisation')

Agency in Personalisation

Concerns around Agency relate mostly to the use of information supplied for third-party integration.

- Can I opt out of personalisation?
- Personalisation used for targeting of adverts.
- Personalisation data used for social media integration.
- What assumptions are being made about me?
- Might a personalised content change be disorienting?

Figure B.10: Agency in Evaluation 2 ('Website personalisation')

Proportionality in Personalisation

Concerns around Proportionality relate mostly to third party access to data and granularity of control.

- Who really benefits from this?
- Can I choose which third party services have access?
- Can I correct specific details or do I have to start again?
- Can I just agree once or is it every time I visit?
- How long do you keep the data?

Figure B.11: Proportionality in Evaluation 2 ('Website personalisation')

Accountability in Personalisation

Concerns around Accountability relate mostly to who has access and how they are supervised.

- How do I know that quoted statistics are accurate?
- How do I know that quoted feedback is representative?
- If a third party loses my data who is responsible?
- If I chat to someone via the site what can they see?
- Where is my data held?

Figure B.12: Accountability in Evaluation 2 ('Website personalisation')

Appendix C

Community engagement and communication

Events attended

Networking and knowledge sharing events attended are listed in [Table C.1](#).

In addition to these evening events, the Northern UX and CampDigital one-day conferences were attended in 2018 and 2019, the peer-reviewed ACM CHI conference in Glasgow in 2019, and a number of academic seminars in related areas but not attended by UX practitioners.

Table C.1: *Events Attended for Research Purposes*

Date	Organisation	Event
16/11/2017	User Research North	Uncomfortable bedfellows? Doing data and ethnography in product teams
28/02/2018	Manchester Digital	Demo Nights - Digital Voice-activated Devices
15/03/2018	User Research North	An introduction to Jobs To Be Done
01/10/2018	NUX Manchester	What I've learned about UX from working in Advertising
04/10/2018	Tech Nation	Tech Nation on Tour
06/12/2018	UX Sessions	James Barley - Agile UX Research
15/01/2019	UX Crunch	Design Sprints
04/02/2019	NUX Manchester	Deceptively Simple: Designing a Voice Experience for Preschoolers
05/02/2019	UX Crunch	Design Systems
12/03/2019	RealUX	Why Collaboration is key to UX and CRO
01/04/2019	NUX Manchester	The Power of Experience Mapping
09/04/2019	UX Crunch	Bias and Design
01/05/2019	Design Sprint	Ask Me Anything
14/05/2019	RealUX	Empathy in UX: considering cultural differences to getting stakeholder buy in
28/05/2019	User Research North	An evening with Jared Spool
01/07/2019	NUX Liverpool	Service mapping to make friends and influence people
23/07/2019	UX Crunch	Data Driven Design
20/08/2019	UX Crunch	Engaging Stakeholders
29/10/2019	UX Crunch	Design Ops
07/01/2020	UX Crunch	User Research in Business
03/02/2020	NUX Manchester	Experience Design x Brand

Appendix D

Tools used

NVivo

Thematic coding features

The *NVivo* qualitative analysis tool, made by *QSR International*, allows source texts in various formats to be annotated with thematic analysis codes and these codes to be arranged in a hierarchy to structure the analysis and support theme generation. Extracts of the text that have been coded can be highlighted, as shown in Figure D.1, but the highlighting does not automatically update when additional extracts are coded. Which codes have been used in the visible text can be indicated in the code ‘striping’ display, as shown in Figure D.2, but the number of codes that can be selected for possible display is limited. This limit applies across the whole of the current code-book, regardless of how many are actually used in the visible text, so some of those used may not be shown.

Deficiencies

NVivo has a core of well designed coding facilities, but is less supportive of theme generation and code management. This is not helped by a number of bugs affecting display of the code list on large high resolution screens. These bugs were fixed in version 1.6, released in January 2022, but I had already begun theme construction on paper by then.

[Intro and consent to record]

Interviewer: ... just makes it easier for me to analyse it later

Yeah, absolutely,

Interviewer: I don't need video, but it saves me having to scribble notes furiously

Absolutely, really hard otherwise isn't it, yeah, as a business analyst, I kind of, I completely empathise yeah.

Interviewer: Okay, how would you describe your role?

Yes I am a **business analyst**, so I'm a, a contracted business analyst, so I **work for a client for a period**, and, you know, **deliver almost business analysis services** to them, depending on what it is they need .

Interviewer: Okay so are you freelance or ... ?

I am yes, absolutely, I'm **freelance**

It tends to be **quite long contracts, like a year or two or three years**,

Interviewer: Oh, okay

Yeah, **doesn't move around too fast** but yeah that tends to be how it works

Interviewer: Yeah it's better to be on a longer contract, you're not constantly having to beat yourself up.

I know, absolutely, yeah, coz it **takes time to look for another contract**, it's like a sales job really to **try and do that**.

In many cases especially with **public sector** we **can only sometimes agree funding for like almost like a financial quarter at a time** so you're often **having to renew contract documents about every quarter**

the **current one I mean is really unusual it's actually about two months into a 12 month long so that's good**

Interviewer: yeah

Interviewer: so how do you decide what to do next?

Yeah, in a, on a day to day basis, and actually it's all about because the commonly um the clients I

Figure D.1: NVivo example of coded extract highlighting

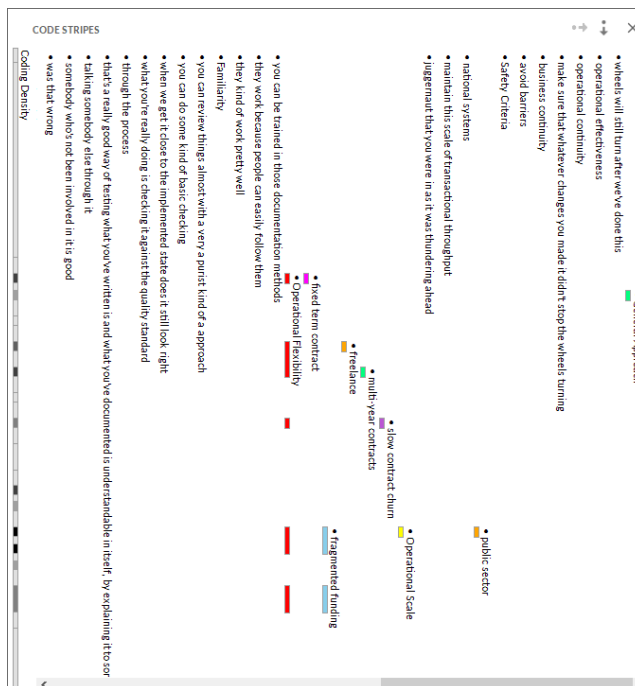


Figure D.2: NVivo example of code striping

Overleaf

Editing features

The *Overleaf* website provides an editing environment for \LaTeX documents. It has the advantage over local text editing of allowing collaboration and review by inviting others to access the document, generally processes the input quicker, and avoids the overhead of keeping the installation up to date. The advantage of \LaTeX over using *Microsoft Word* is that bibliography management and facilities for index and glossary generation are far better, it is more robust for large documents, and it integrates well with *GitHub* for revision control.

Deficiencies

The \LaTeX system lacks support for image description and generating PDF output with the structured tags needed by screen readers. The *Overleaf* search and replace facilities only act on the current file, so large complex documents like a thesis are easier to search with an editor like *Emacs*. While \LaTeX does have built-in vector graphics support, and this was used for some figures, the lack of support for SVG makes it harder to include diagrams without the loss of resolution that results from rasterisation. Operating within a browser, *Overleaf* only supports one window onto each document, and for large complex documents this makes it harder to check consistency than editing with *Emacs*.

Appendix E

Thematic coding data

E.1 Phase 1 — Familiarisation

See [Data familiarisation](#).

E.1.1 Ketso leaves

Table E.1: *Ketso data workshop 1*

Leaf	Felt	Colour	Idea
001	1	Yellow	strong process
002	1	Brown	‘In the Wild’ deployments (technology probes)
003	1	Brown	lab based experiments
004	1	Brown	co-design sessions
005	1	Brown	workshops with end-users
006	1	Brown	understanding competitors - analyse
007	1	Brown	observation of users in real-world settings
008	1	Brown	pilot tests and ‘mess’ activities
009	1	Green	Lexus style (live it)
010	1	Yellow	feeling happy
011	1	Yellow	a happy client
012	1	Yellow	feel have gained more knowledge than had before
013	1	Brown	field based - touch see do
014	1	Brown	test make build (confirm)
015	1	Brown	group discussions
016	1	Brown	coffee shop’ moments

Table E.1: *Ketso data workshop 1 (cont.)*

Leaf	Felt	Colour	Idea
017	1	Green	leave the office more - get in context
018	1	Green	gather more (question on the table)
019	1	Green	time off other activities e.g. teaching!
020	1	Green	workshops for collaboration and discussion across disciplines
021	1	Green	build everything!
022	1	Grey	passion / laziness
023	1	Grey	attitudes of staff (previous processes and workplaces)
024	1	Green	freedom / ownership
025	1	Green	educate staff on benefits
026	1	Yellow	clear scope for next stage
027	1	Brown	computer based - internet/search SM YouTube forums
028	1	Brown	research literature
029	1	Brown	literature review and research
030	1	Green	try competitor products (take apart)
031	1	Green	loads of resource for 'In the Wild' work
032	1	Green	trying lots of new technology to consider solutions
033	1	Green	loads of money and people for prototypes
034	1	Yellow	Efficient use of what you have available to you
035	1	Brown	hands-on demos with stakeholders
036	1	Brown	client delivered - existing knowledge industry insights
037	1	Brown	expert knowledge - industry academic
038	1	Green	in-depth open discussions with users
039	1	Green	loads of time with target users
040	1	Green	build an expert group to tap into (network / meet)
041	1	Grey	quantity of deliverables
042	1	Grey	lack of time and resources
043	1	Grey	time!
044	1	Grey	availability of resources
045	1	Grey	timescales / funding
046	1	Grey	budget and cost of tech
047	1	Grey	access to participants / users
048	1	Green	better scoping out / planning of project: scope document Gantt chart
049	1	Green	loads of time
050	1	Green	loads of time
051	1	Green	loads of time
052	1	Green	sharing of resources and better collaboration

Table E.1: *Ketso data workshop 1 (cont.)*

Leaf	Felt	Colour	Idea
053	1	Green	in house tech / workshop / kit
054	1	Yellow	quantified feasibility (facts)
055	1	Yellow	clear user understanding
056	1	Yellow	in-depth not vague understanding
057	1	Yellow	clear target usage context
058	1	Yellow	cohesive feasible ideas
059	1	Grey	fast changes in cutting-edge technology
060	1	Grey	quality of expected deliverables
061	1	Grey	expertise
062	1	Grey	changing user group
063	1	Grey	poor / unrealistic planning
064	1	Grey	ideas constrained by practicalities
065	1	Grey	structure of project (rules eg. 3 quotes)
066	1	Grey	unexpected challenges
067	1	Green	working with not against constraints
068	1	Green	exploring other domains / areas
069	1	Green	exploring other domains / areas
070	1	Green	peer checking of plans

Table E.2: *Ketso data workshop 2*

Leaf	Felt	Colour	Idea
001	1	Yellow	asking the right questions / framing problems
002	1	Yellow	the problem has been defined
003	1	Yellow	exploration around an area
004	1	Yellow	understanding of the problem you are trying to solve
005	1	Green	rolling discovery to explore new areas
006	1	Green	easy access to a diverse audience
007	1	Brown	talk to the user
008	1	Brown	multiple sources of data
009	1	Brown	workshops - brainstorm ideas
010	1	Yellow	mapping out journeys - services users etc
011	1	Yellow	checkpoints to assess what you have found and decide to continue or stop
012	1	Green	clear outcomes with the team - time and autonomy to achieve them

Table E.2: *Ketso data workshop 2 (cont.)*

Leaf	Felt	Colour	Idea
013	1	Green	time to complete discovery and use output to inform work going forward
014	1	Green	time to think
015	1	Green	research library
016	1	Brown	the way we work - open sharing communication
017	1	Brown	North Star for the team - agreed outcomes to aim for
018	1	Brown	regular communications - show and tells
019	1	Brown	playback what you have found and discuss next steps as a team
020	1	Brown	stand-ups - planning - rituals
021	1	Grey	deadlines
022	1	Grey	heavy work load - no time to collaborate
023	1	Grey	admin
024	1	Yellow	produce clear next steps on how you will tackle the problem
025	1	Yellow	we know what to do next
026	1	Yellow	understanding of next steps - business cases - opportunities
027	1	Yellow	organisational culture setup
028	1	Green	best practice across teams
029	1	Green	developing skillsets - experimenting with methods
030	1	Green	time to focus on important issues - homelessness
031	1	Green	user led product direction
032	1	Green	training others how to do discovery
033	1	Green	digital skills team
034	1	Green	not constrained by funding
035	1	Green	empowered to say no
036	1	Brown	collaborative mindset
037	1	Brown	designers leading process - involving others
038	1	Brown	collaboration across teams
039	1	Brown	human centred
040	1	Grey	lack of digital sophistication / understanding
041	1	Grey	mindset - rest of the business
042	1	Grey	existing funding model flawed
043	1	Grey	meetings
044	1	Grey	long winded processes - sign off - jumping through hoops
045	1	Green	more projects - robust teams

Table E.2: *Ketso data workshop 2 (cont.)*

Leaf	Felt	Colour	Idea
046	1	Brown	ace team of user researchers - qualitative and quantitative - not every team has this
047	1	Grey	cannot recruit fast enough - lots of design roles open
048	1	Grey	other peoples processes and deadlines
049	1	Green	work displayed in an area which is more visible
050	1	Green	innovation lab - try out new technology
051	1	Brown	visual presentation of ideas - sticking things up on the walls
052	1	Yellow	bringing different people together across the business - facilitation
053	1	Yellow	had input from various sources / people
054	1	Yellow	researching business - users - market - stakeholders
055	1	Yellow	the team understand the audience
056	1	Green	shared understanding of our audience
057	1	Green	more stakeholder input
058	1	Brown	bring people on the journey
059	1	Brown	workshops to prioritise work to be done
060	1	Brown	involvement with key stakeholders - funders - decision makers
061	1	Grey	unclear strategy
062	1	Grey	unclear outcomes
063	1	Grey	low stakeholder engagement
064	2	Green	question the implementation
065	2	Green	destroy presenting from decks
066	2	Green	evidence / users being listened to
067	2	Brown	advertising' - challenges / progress
068	2	Brown	honesty around the business goals
069	2	Brown	displaying our work within our workspaces
070	2	Brown	regular input from stakeholders
071	2	Brown	using methods and tactics but not being a slave to them
072	2	Green	like to have senior decision makers in the team full time
073	2	Green	I'd like to help more people (stakeholders - SME's) actually design and build for themselves
074	2	Green	stakeholders spending a lot more time with the team
075	2	Green	faster approval processes
076	2	Brown	visualising by sketching or quickly coding

Table E.2: *Ketso data workshop 2 (cont.)*

Leaf	Felt	Colour	Idea
077	2	Brown	working with people closer to the problem than you (subject matter experts)
078	2	Brown	creating prototypes
079	2	Brown	trying things quickly and iterating
080	2	Brown	multi-disciplinary team
081	2	Grey	old broken technology we have to interface with
082	2	Yellow	acceptance
083	2	Yellow	case studies / examples - stop - start
084	2	Yellow	we have had an honest up front discussion about stakeholder expectations
085	2	Yellow	shared understanding
086	2	Yellow	a problem is understood by a group
087	2	Brown	framing the problem
088	2	Brown	having a kick-off - making sure everyone knows why we are doing something
089	2	Brown	working with subject matter experts
090	2	Brown	asking and observing people
091	2	Brown	team sessions - why are we doing this work
092	2	Brown	working directly with our users / potential users
093	2	Brown	saving judgement for later in the process
094	2	Grey	lack of understanding around complexity
095	2	Grey	budget
096	2	Yellow	solutions have been validated or not
097	2	Yellow	an outcome that hits the brief
098	2	Yellow	there is a clear direction of what's next
099	2	Yellow	confidence in how to progress
100	2	Yellow	evidence to stop further progress
101	2	Green	intuition over data
102	2	Green	I'd like to take stakeholder objectives out of the equation
103	2	Brown	deadlines instead of judgements
104	2	Brown	allowing for randomness and unpredictability
105	2	Grey	stakeholders solutionising up-front
106	2	Grey	solution can be prescribed before discovery
107	2	Grey	a lack of direction from leaders (in the past)
108	2	Yellow	it feels less scary like the fog has lifted
109	2	Yellow	you feel inspired
110	2	Brown	emphasis on action/doing above all else

Table E.2: *Ketso data workshop 2 (cont.)*

Leaf	Felt	Colour	Idea
111	2	Brown	being open minded
112	2	Brown	mindset - thinking laterally
113	2	Grey	us versus them mentality
114	2	Grey	hierarchies
115	2	Grey	culture of hierarchy
116	2	Grey	fear for jobs/employment
117	2	Grey	JFDI
118	2	Grey	risk taking - misguided or lack of
119	2	Grey	reliance on other teams within company that work differently
120	2	Grey	lack of communication - similar work often going on in multiple areas
121	2	Grey	third party bias against inhouse - e.g. an agency are more expert
122	2	Grey	bonuses
123	3	Yellow	stakeholders engaged upfront and throughout
124	3	Green	recruit the right people
125	3	Green	recruit participants from the central data eco system rather than from an agency
126	3	Green	stakeholders more involved / coming to do research
127	3	Green	shared data insights with other teams that may benefit you with your discovery
128	3	Grey	stakeholder engagement during and after discovery
129	3	Grey	crossed wires with stakeholders / decision makers (direction - outcomes)
130	3	Grey	not always knowing who to ask about things
131	3	Green	more 'data' stuff (and someone to handle it)
132	3	Brown	design toolkit to assist with discovery when struggling
133	3	Grey	lack of budget to start or continue
134	3	Yellow	good insights
135	3	Yellow	objectives have been achieved plus more valuable insights found
136	3	Yellow	looks like whole team has a shared understanding and has participated
137	3	Yellow	team is on the same page regarding outcomes and ready to move on to the next steps
138	3	Yellow	finding out things that you were not previously aware of

Table E.2: *Ketso data workshop 2 (cont.)*

Leaf	Felt	Colour	Idea
139	3	Yellow	output - understanding of the bigger picture / problem space
140	3	Green	produce lovely artefacts to show and preserve learnings
141	3	Yellow	feels a bit overwhelming confusing chaotic at first but light at the end of the tunnel
142	3	Yellow	patterns emerging
143	3	Yellow	know the constraints before you start
144	3	Green	permission to build outside current technology and governance constraints
145	3	Green	permission to go deeper into discovery rather than being restricted by time
146	3	Green	time to explore the whole ecosystem not just one problem
147	3	Green	speaking to real users about their experience of the service
148	3	Brown	regular check-ins with the team
149	3	Brown	research is visible to the team throughout and not a surprise at the end
150	3	Brown	using data to identify customer problems
151	3	Brown	defined roles within the team
152	3	Brown	defined process to find final outcomes
153	3	Grey	restricted to one problem (stay on the surface)
154	3	Grey	transparency within the team eg. undefined roles
155	3	Grey	access to digital services
156	3	Grey	internal technology / process
157	3	Grey	restricted by historic technology or governance / procurement processes
158	3	Yellow	having identified effective methods for what you want to discover
159	3	Green	spend a week shadowing users - get a job in a shop
160	3	Green	more competitor / landscape research
161	3	Brown	team sessions - assumption mapping - service mapping - personas - knowledge sharing
162	3	Brown	workshops - methods for internal discovery
163	3	Brown	observing users in context in the current world - whole team should take part
164	3	Brown	participant generated drawing

Table E.2: *Ketso data workshop 2 (cont.)*

Leaf	Felt	Colour	Idea
165	3	Brown	surveys
166	3	Brown	in depth face-to-face interviews
167	3	Brown	guerrilla interviews
168	3	Brown	analogous research / service safari
169	3	Brown	remote interviews
170	3	Brown	sacrificial concepts
171	3	Yellow	there is a buzz around the success of the discovery
172	3	Brown	mindset - flexibility - curiosity - excitement - empathy - openness and alertness
173	3	Grey	solution-led thinking (some people think they already know the answer)
174	3	Yellow	having enough time
175	3	Grey	drive by's
176	3	Grey	not always enough time to do research before deadlines
177	3	Grey	time
178	3	Grey	deadlines and limited time in the team

E.1.2 Interview transcripts

Table E.3: *Transcript of Interview Zoom-001*

	[Intro and consent to record]
<i>Interviewer</i>	<i>Okay, how would you describe your role?</i> Yes I am a business analyst, so I'm a, a contracted business analyst, so I work for a client for a period, and, you know, deliver almost business analysis services to them, depending on what it is they need.
<i>Interviewer</i>	<i>Okay so are you freelance or ... ?</i> I am yes, absolutely, I'm freelance. It tends to be quite long contracts, like a year or two or three years.
<i>Interviewer</i>	<i>Oh, okay</i> Yeah, doesn't move around too fast but yeah that tends to be how it works.
<i>Interviewer</i>	<i>Yeah it's better to be on a longer contract, you're not constantly having to beat yourself up.</i> I know, absolutely, yeah, because it takes time to look for another contract, it's like a sales job really to try and do that. In many cases especially with public sector we can only sometimes agree funding for like almost like a financial quarter at a time so you're often having to renew contract documents about every quarter. The current one I mean is really unusual it's actually about two months into a 12 month long so that's good
<i>Interviewer</i>	<i>Yeah. So how do you decide what to do next?</i> Yeah, in a, on a day to day basis, and actually it's all about because the, commonly the clients I have, have products, usually software products or business processes that they are trying to improve or maintain, and what from an agile approach, which is the most common thing I see these days for the kind of clients I work with, basically they've got a backlog of things that we want to do with this product or a system or process however it is, so it's a backlog of here's the thing we'd like to do or here's a really detailed spec of what we want to do.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

There can be differing levels of detail what tends to happen with the backlog is, I don't know if you know, the kind of, it's a prioritised list, so the top things are the things that you kind of go in you know what do I need to do next I'm just going to take the top three things off the list and then you just keep that list prioritised. If something new comes in, you work out where it goes in the list.

Every now and again you have a look at it and go we don't need that anymore let's move that up or let's move back down and you kind of shuffle things around a bit and then you keep refining the detail of that so the stuff that's on the top.

You are saying, here is the, here is what I want to do, here is my spec, here is my description of what I want.

You don't do that for the ones at the bottom of the backlog because you might never get to them and it might be a long time till you get to them and the idea of agile is that your organisations need might well have changed by the time we get to the top of the list so you keep at the top of the list, you refine them more and more and more detail as we get towards the top of the list so the ones that are just ready to go are the ones that you just pick off the top.

Interviewer ***So is your direct point of contact the product owner?***

Yeah, product owner, exactly, yeah.

That's the direct point of contact.

Quite a lot with the SME's, are kind of Subject Matter Experts, I was going to say small and medium enterprises, Subject Matter Experts, yeah, often it's not exclusively the product owner but often the SME's as well to iron out the detail but almost by keeping the product owner in the loop

Interviewer ***OK, so how do you go about gathering information on what the problem actually is?***

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

That is a that is \$1,000,000 question I would say and I suppose it is, it's a, you know, what's useful to have, is kind of a range of techniques to choose from and use, so if it's, the most important thing is to understand what the issue is, and then that often involves a range of things really, it's either reading what's already written about it or talking to a person who's experienced it, sometimes documenting and testing back what they've said, understanding it first then, and then maybe finding out more information about it to elaborate whether that's in an interview situation or emails or again sharing documents, reading existing documents, specs, standards, policies, that kind of thing, and gathering that information from there, it's, it's, and it's not just one thing it's a whole range of things it's more about choosing your methods according to the situation one answer to that is more having your toolbox to go to use the right tools for the case.

Interviewer

So once you've got this mass of information, how do you go about sharing your understanding of what the data really means?

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

yeah that is, that is absolutely key because there's no point you have it all in your head and the person you're trying to do it for doesn't understand it or has got a different idea in their head about what it is that you think we talked about so that again almost like having a range of things that you, a range of methods of documenting things to choose from, whether it's drawing out a process or bullet point list of "here are the main points I think this covers it" or data definitions and a data model with entities and relationships all depending on what that is, so there really is a set of models, really, whether it's a process model or a data model, list of requirements, whatever it is actually that I think with every requirements document I do or set of requirements I will really try and think what is it that is going to give that clearest picture of particular diagram is it a standard way of doing it or just something that'll make it easy and choosing the right kind of method of checking that the understanding is right you really need a kind of a common common language common deliverable that you're kind of product owner or your SME your Business Contact can say yeah that's what I meant and you can then pass that on and explain it more to the people who are then delivering what the business change needs to be.

Interviewer

Are there any particular techniques that you find really useful?

So let's think, what have I used most recently um, yeah So for example, really, like, small detail, it was a change of a page in a system and needed to move things around. There were like, let's say 10 pages, with five or six things on each page, and they're saying ah they're not in the right kind of order so the first thing he did was document what we've got at the moment which things appear on which page show them altogether in a kind of an easily not kind of a bamboozling way and then mark them in a way that we could easily kind of reorder them and know what we've reordered and where they've gone.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

So that's one example of that, um but again I suppose a common thing is having a method of documenting it that allows you to exchange that information and check the understanding with somebody else and understand what the changes were trying to do so we can document that change as well which isn't always easy.

The challenge at the moment is doing it remotely so you're not even standing at a whiteboard or something like that you have to often do things with documents or wave your hands on a zoom call or something like that which

Interviewer

Would you normally try to visualise it up on a wall or whatever?

Yeah, I would often do that. I often um I often make I was going to was going to find I'm sure I've got loads of diagrams here which are often throw away diagrams. I will I will I will draw a diagram with arrows and bits of text and then, at the moment, kind of scan them in and take a photo and just share it yeah, um and say look "point - point - point" is what we thinking and then often just throw it away or write it up as a bit more of a definite kind of tighter output, really, tighter deliverable.

I think, as a rule of thumb, if I find myself drawing the same diagram again and again for different people, then I'll write it up then share it.

Interviewer

Do you try to anticipate problems that you might have?

Yeah, I think, I suppose two things really from that, I suppose one is if you kind of try and follow good practise then you're kind of avoiding issues to start with really. If you know a lot of standard ways of documenting things work because, and you can be trained in those documentation methods like process models, they work because people can easily follow them so they kind of work pretty well.

The other thing the agile approach is often a good approach because the Agile kind of Scrum methodology where you are developing or changing in short bursts means that actually you are seeing changes straight away really,

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

or really quickly, and learning from them, and going “was that right, was that wrong, do we move on, or do we change what we just did” and so it makes it less important to anticipate, I would say, it makes it more important to deliver something, and then check whether it was right, because the anticipation only takes you so far, and even the documentation only takes it so far, because it’s still an approximation of what the final result is going to be. So, you know, it’s a combination of those things, but I think good documentation and quick checking is a good combination that works in practise.

Interviewer

If you had something where you couldn’t just let it happen and then recover but you needed to avoid it how would you approach that?

So, yeah, I think, you know, with those kind of things, it would be more, um, yeah, depending on what you, what you are doing, really, you know, if it’s a piece of software, you are doing more testing, you’re doing more user acceptance testing, as well, you’re doing more time on mock-ups or wire frames that help to visualise the, are we all speaking about the same thing.

Even if we’ve all got the same idea when we when we get it close to the implemented state, does it still look right, or does that, that visual test fail, so I think it all depends on, it’s an appropriate amount of effort for the time it would take to actually do the work, you know, it can be that it takes more effort to test it um than it does to just do it and get it wrong, but you’re right if it has a bigger impact then you need to do that more carefully, documented more, and do a lot more kind of test, test checkpoints along the way, through the process.

Interviewer

So, once you’ve got this story developed as a team what do you do to challenge that story?

Yeah I mean often if you’ve written it a good way to challenge is to get somebody else to read it, so often somebody who’s not been involved in it is good, another SME is good, a tester is often really good for giving it a good push and poke.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

Again the kind of you know you can review you can review things almost with a very a purist kind of a approach so if you're looking at a data model for example and going have I got my data definitions right in my relationships right you can do some kind of basic checking of or maybe an easier example is like a process model kinda see where the process starts and ends is everything linked up is it clear what the conditions are for going one way or another there are some really basic stuff that kind of means what you're really doing is checking it against the quality standard um too you know and that's one way of challenging it so either you kind of almost internal checks against an external standard or you're just getting more people to look at it and think.

One thing that I was just telling somebody on the phone is I found a really useful tool is just talking somebody else through it. By articulating it you almost immediately as you're saying it you can be thinking well that doesn't make sense does it which you know you might have written it down already and thinking this all makes sense this all sounds fine, as soon as you say out loud and you start to realise you're adding little caveats and changing the wording coz you don't feel like what you're really is clear, then that's a really good way of testing what you've written is and what you've documented is understandable in itself, by explaining it to somebody else.

Interviewer

How much does your own experience help there, examples from your past experience?

Yeah, I think, a lot actually. I think um you know as a business analyst you can do lots of certifications and I really enjoy doing certifications.

I think, again, it's good to have a set of tools and techniques to draw on and it gives you a bit of confidence, and it gives the people you're talking to a bit of kind of "oh this guy knows what he's talking about", but I think certainly it only takes you so far and the experience you have of trying and failing and trying again and getting it right are the things that kind of embed the shortcuts to the right answer and the ability to then communicate that on to somebody else as well.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

	<p>So I think, yeah, definitely a combination of good training if you like or good reading and experience in the practice, the theory in the practise as a combination really matters.</p>
<i>Interviewer</i>	<p><i>When you're describing your level of experience to a client how would you describe it?</i></p> <p>Yeah, I always struggle with this, um, this is a hard thing as a freelancer to kind of not, you know, how to blow your own trumpet without seeming horribly immodest and this is where actually certifications can be really good.</p> <p>They can be like bit like you know I've got five GCSE's and B's in English and Maths or something like that, you can say this is a level to which I've been checked against really, and here's my experience, so I think yeah it's a combination of um demonstrated skills and um experience of I've done this and I've done this and have done this and often what I found really useful with the client is to kind of understand first what they are looking for and then tailor that story to say I've either got a lot of experience in that or less in that but I can but my transferable skills in that area are this and it's customising the message to the client really but you need to understand what they're looking for first, so it's probably good BA skills to use really in the selling yourself to a client, as I would have thought.</p>
<i>Interviewer</i>	<p><i>Is this the sort of role you've always had?</i></p> <p>It's interesting, I feel like um it's been the role I've headed towards through my career really. So I started off as a, did a maths degree, started off as a young developer in a very small software house in a [company location] and ah kind of moved from business to business always in IT uh and then did a bit of project management work and then kind of actually found that all of that kind of analyst/developer/project manager to try and deliver things, actually the role I kind of settled into and realised this was a good match of skills in terms of the kind of people skills and the not so much technical skills but the analytical skills, the business analyst was a really good fit for that really.</p>

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

So I was just glad I found it by accident in that I started contracting and almost took the first contract I could get really that seemed to be a good fit, and it was, ah, I rolled up on the first day in a room full of 20 other BA's all with a different idea of what a business analyst should do, so I kind of, that was a good proving ground for what it is that I felt I could offer as a service really.

Every organisation I work for has a different idea what a business analyst does as well. That makes the first week really interesting.

Interviewer

When you are thinking about the problem at the early stages how do you know when you've done enough discovery?

Okay. Yeah it's hard isn't it.

Again that kind of agile approach helps you get a sense of, again a test of, is it going to be that I could ask more questions but is it going to be quicker to do, and do and check, rather than check check check and then do.

So it's a judgement call, um what is really useful is, to know that you've done enough, is to, is to write down,

I was just telling a junior business analyst just on a call just before, she was, you know, her brain was full of stuff and I was saying the really important thing you need to do because you feel like you don't know where you are,

from do I know enough or have you got there, kind of articulate what you know, just write down bullet points, start documenting it really don't be bothered about formatting just make a list and like an initial requirements list and it's by doing that you realise where the gaps are in the knowledge, where the questions are,

and the sooner you do that as soon as you can start to almost like shape the scope of what the work is that you're trying to do, and what's in and what's out, and where the gaps are, and so it then gives you the ability to kind of um close the funnel down a little bit rather than it just opening and opening, it allows you to build a boundary, and kind of see where the jigsaw is missing pieces,

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

so yeah, it's, and then you just need to judge uh depending on what it is you're trying to deliver, um is it going to be more work to, like I say, check more than it is just to do and test that it is okay afterwards.

Interviewer ***On the teams that you typically work in would you have someone who's a user research specialist, actually talking to customers and gathering data?***

I've worked on a, with a couple of clients who, we've done that, so in particular where, but not, certainly not on every project, you know, very often what you're doing is you're working with the constraints of an existing design of a system, and it is difficult, you know, when you're dealing with a lot of small changes.

It's difficult to almost say, I can see that this isn't a great way to do it but actually we've got a whole backlog of changes we want to make, if we spend a lot of time doing a, kind of redesign, we're not going to get to the other things we want, so it's about choosing your priority, really, as an organisation, what is it that's going to make the most difference to you.

The big the big thing around whether or not we need to spend, where it's kind of it's and there's enough of a business case if you like, to do the user experience kind of, um you know, investment, is dependent on the, your, kind of, user base for a system I would say.

So where I work is in for, more recently, organisations that support clinical research in England and the UK, so very often what we're doing is we're writing systems. Some of them are internal systems that are going to be used by a small set of staff who are really well trained and kind of specialist, and actually if the system is a bit clunky, not easy, actually most of the, most of the detail is in what the what they're doing with the data, rather than what they are doing with the system, if you like, so it's, and a lot of things you can get around with a bit more training.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

The other side of it is often the people that are not using the system, as like that's not the bread and butter system, as part of their work, they are the researchers, you'll recognise this, the other researchers who are kind of having to put in a funding application and fill in a whole form with all of these things and send it off and you're wondering what the rejection is, what the reasons, what do you do next, following a process, all of those things, are were you really get a benefit from mapping that user journey, because actually this is a disparate group of people who may have done it once, may have done it 100 times, you know, may have done it lots of times before, or never before, and really you need to make it very intuitive, very easy for them to follow what it is that they need to do throughout the process, to get it right, because what you're really trying to do as well is avoid barriers being put up, because, you know, what a lot of these organisations that I work for are there to do, is to make it more likely that research will happen, so you're trying to remove the barriers and make it easy for a researcher to do that. I'm not sure it works very well at the moment but you know it's reducing the barriers it's not a perfect solution but it's getting rid of that and making it, you know, what would stop them doing that next step and how can we avoid that being a barrier for them.

Interviewer

Have you worked on any systems with very large numbers of users?

Yeah. Ones like the clinical research one for the kind of national systems at the moment they do have thousands of users, but the thousands of users in that they don't use them very often.

Interviewer

Yeah

I think in terms of big systems where it's like the day to day system there was a few years back in telecoms, really, it was there was like a telecoms customer relationship management system and that was hammered by a lot of contact centre as well as the kind of back end provisioning departments and customer service and billing departments, so teams and teams of people, and that was, yeah that was a lot of users.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

The main challenge there was about maintaining, I suppose business continuity now, the kind of operational effectiveness, really, and the operational continuity to make sure that whatever changes you made it didn't stop the wheels turning on the, on the, the juggernaut that you were in as it was thundering ahead.

Less about "how can we make it easy for them", but more about "how can we just make sure" that we can maintain this scale of transactional throughput really.

Interviewer

Did the scale of the user base change the way you approached it?

I wasn't so much involved then in the system development, it was more in the kind of IT customer, kind of, back end IT department interface was where I was. This was, this was the first time I've probably got an inkling of myself as a business analyst, I think, in terms of translating being the translator between the two.

So yeah, I think it, it certainly made you, um there were certain choices they had to make um in the same way I've described probably about what is it that there's not usually a, there are options of what you can do, there are pros and cons of them all, it makes you really say what is it that's important to what it is we're trying to do and the way that we're trying to do it, what we're trying to achieve, is it that we need to do it faster or more accurately, you know, these things are often a trade-off and it made you kind of have to check, um and get right I suppose.

Thinking about the earlier bit of our conversation about, um, how do you know when you've done enough, it really makes you think is this going to be, is this going to be the right thing, and if it's not the right thing how do we make it that we know earlier that it's not the right thing, as early as possible.

Interviewer

So you think more about the outcome?

Yeah, and that indeed, and yeah the business operation, yeah, to make you the, is it the, yeah, the wheels will still turn after we've done this really.

Sorry I think [family member] was just trying to

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

<i>Interviewer</i>	<p><i>That's alright</i></p> <p>[to family member] I'll be finished in a minute. Sorry, I didn't answer that question, sorry.</p>
<i>Interviewer</i>	<p><i>Some people have been talking recently about doing a hypothesis based approach where you say we believe this and then they go and look for some evidence that is true or not true, have you used that sort of approach?</i></p> <p>Yeah, so that rings a bell from about year ago, when actually we were dealing with a process that was, it was actually about research costs in the [organisation] really, about the things that, you know, if you've got a big pharmaceutical company funding research, it's a really tricky kind of funding model because they are, they are obliged to fund all of the work that gets done, but then, yeah, so then that's kind of a commercial approach.</p> <p>For the non-commercial approach it's that actually, you go and find, you know, research funding, for example, from a funder, a different kind of funder, and what is it that they need to fund?</p> <p>The interesting thing with the [organisation] kind of research is that, what you've often got is, you've got a set of patients who are trying out a new treatment, it's all very other topical these days, trying out a new treatment, and what the funder needs to fund is, what they shouldn't be funding is just that patient's standard treatment, so if they get, you know, they get a blood test every week, that's fine, that's part of the [organisation] commissioning that should fund that, if this new treatment says maybe we can just make do with doing a blood test every two weeks or maybe it's actually if we do a blood test every day the outcomes for patients are much better, then what you really doing is saying what's the difference between the standard treatment and the extra things that we're going to do as part of their study, so they are trying to quantify the delta of the standard treatment versus the research treatment, if you like.</p>

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

This was a really tricky area that involved a lot of different parties in the NHS that the Department of Health, and NHS England, the clinical research network, all of these different parties and it was very broad brushed, it was, whilst it was also capturing some real life pounds and pence, it was also kinda going if we're like within 100 pounds of it that'll be good enough.

So it was a really difficult thing to actually bring in all of the inputs and kind of logically take them to a conclusion and actually more of a hypothesis approach I think, it was what kind of given enough of the research that was done, it was more proposing some options and then kind of modelling them and kind of taking people through the scenarios and, kind of, going if we did this how would this work what would be the problems and what would be the improvements, and having a few different scenarios, almost a few different hypotheses I suppose, and going to test it out what the outcomes would be and then it was a very informed decision to go with, you know, what was the best way to wait to go and because there wasn't just one critical success factor it was about getting the right funding into the [organisation], it was about not making it too admin heavy, it was about again not having a blocker to the researchers who aren't good at costing up a research project, all of these kind of things.

It's like, okay, we've got to balance all of these things really, really carefully

So it was a, yeah, maybe it's more like a hypothesis approach that they did that really. It's almost like you didn't need to define it too much, other than you know come up with some good options, good informed options, without knowing for sure what would work and what wouldn't, and then just testing I suppose.

Interviewer

How did you find that approach, had it worked well?

Yeah, it was, it was, it was interesting.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

The hard bit was a lot of stakeholders with a lot of different opinions and different agendas and different aims from the work really. Also a lot of different, what the other thing that we had to do was get past quite a lot of that, this had been going on for a long time really, years, and getting past a lot of "so this happened, now we're doing this".

So, like, putting the past in the past, saying this is what we are bringing forward from it and now we're focusing on the next steps, really, to, otherwise we were always just talking around the same, same old issues, really, without ever moving forward, but yeah it was, it was a really good challenge, if that answers your question.

Interviewer

Yeah, getting everyone to be on the same page is always tricky. How did you tell whether you had a shared understanding was it obvious when you didn't or not?

Erm, yeah.

So this was the thing, I suppose, it's not so much in terms of shared understanding but more of a consensus, I suppose that, anyway, a shared understanding was necessary.

So what I did was I did lots of separate interviews and then I kind of fed back what had come from all these things to the wider group, so we kind of identified the kind of decision makers in the group, and, but there were lots and lots of aspects of it, and what we couldn't do, but I think what we kind of realised fairly quickly was every time we got this big group together, they talked and talked about the same issues and we never got to a conclusion.

So what I did was, I actually used an agile technique of planning poker, really, or a consensus, kind of a, I can't remember what you call it, method of getting to a consensus, where basically, you kind of, we were like, different ways of measuring would this work, what's our confidence in this working, or how good do you think this would be, you know, this option or this option.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

And with consensus cards you basically, each of you in the room, hold up a, you kind of define your benchmark to say if it's this good it's like a two, if it's this it's an 8, or something like that and then everybody privately chooses what the number would be, and then all at once held up the card, and what that let you do was kind of go "it looks like most of us are doing fives and eights, you've chosen a 2 and you've gone for a 13, why did you choose that, and could you tell us ..." so it allows you to kind of go for the outliers, everybody else is at consensus so that's great, you don't need to say why did you agree with everybody else, you've kind of got it, and what it means is you can then inform the group by these other people who have a different perspective on it to say why did you think that was more complicated or why didn't you think that would work and then they can then establish a, we just then revisit the consensus and you get a pretty good consensus, a broad brush consensus, which was a massive step forward, so that was a really good, that was a really good technique that was useful with a set of people who needed to agree and hadn't agreed for years. So we, that was a good win, I think.

Interviewer ***Yeah, that's an interesting approach.***

Yeah.

Interviewer ***Were there any sort of standard brainstorming or workshop techniques that you found particularly useful?***

Do you know what, I probably, yeah, again, depending on the situation.

I don't think I've got any absolute favourites although probably the people I've talked to will probably disagree, I bet. They'll probably say he always says this, when he's asking me a question, he always phrases it this way. I think, I tend to find, I think to, kind of, set some basic kind of factors you know, what we're trying to achieve, what would what would this mean if we have this, those kind of things, a little bit of kind of envisaging what the future might look like in very broad terms,

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

and then actually a kind of revisiting and elaborated I would say, so eliciting the kind of, you know the, what's the requirements behind what is expressed really, yeah.

Yeah, I think it's more that really.

I tend to just find a quick way in and then it just builds from that usually, and if you've got whiteboards, it depends on what you're doing, if you're doing the process you can often map out a process quite easily, but you still are often better starting with something basic, you need a little bit of kind of good groundswell of fact and information, and then you can come up with a draft, and then you can elaborate it a bit more, I would say.

Interviewer

Okay, you've carried on working through lockdown have you needed to do things completely differently or are you finding a lot of the same thing still work?

Yeah most things are okay actually.

Interestingly because, you know, with the clients I'd worked with in the last six months, two different clients, and they I didn't always go into the offices, you know, so I work from home probably 60% of the time.

So it was more extending that, it was, it was trying to spot the differences with never seeing the people, and certainly the video conferencing has gone up, the client I had like a year ago, everybody had cameras turned on by default.

The client I had, I mean now, it's only in the last few weeks, even, with a move to Microsoft Teams, it is actually, that they've gone there just recently, and everybody's cameras started to be switched on because I think there's a need to have that kind of a human contact a bit more, and to see the, you know, a bit more body language as well, so I think that really does help.

I think we found that does help, and not just relying on emails or voice, really, you can see whether somebody is smiling or looking a bit askance or you know, or just down right mad, and you deal with it then can't you, really rather than second guessing whether or not they really liked what you said or they really didn't like what you said.

Interviewer

Yeah, the visual cues are useful aren't they, so you don't trip over each other.

Table E.3: *Transcript of Interview Zoom-001 (cont.)*

Yeah, they are, they absolutely are.

As I remember back to kind of early days again as a young developer, about two jobs in, really, and we did one of the things, it was a great ten person software company and we did sales, support, development, absolutely everything, and so we're doing some kind of support training, and it was a really, we did some kind of communication skills training about, you know, how do you communicate, just if you can talk but they can't respond, or if you can talk and they can respond but you can't see what each other is doing, and how different it is when you can also see what each other is doing, and then just opens up so much more, you know, the bandwidth of information you get from seeing each other is so much more. So yeah that absolutely sticks with me.

[Closing remarks and thanks]

Table E.4: *Transcript of Interview Zoom-002*

	[Intro and consent to record]
<i>Interviewer</i>	<i>So what have you found when you've been doing work yourself, and talking to other designers, how much does anticipation actually happen in practice?</i> Very little. Some anticipation happens on a on a micro-level. Going back perhaps a decade there was this whole, I won't call it a phase because that implies that it's, you know, transient and dying out and it's not, but there was a whole sort of growth of the idea of behaviour change through interaction design And there was anticipation there in terms of whether if we change interface 'A' we're hoping for behaviour change 'B', so the anticipation is, you know, if we make this button bigger more people will click it. If we set these defaults the behaviours that we want, essentially to hit our goals, will transpire as a result of that, so there's that kind of anticipation happens very frequently.
<i>Interviewer</i>	<i>Yeah.</i> You know, you could call that maybe first order anticipation because that's extraordinarily tight time scales. We're talking, you know, if I click this, what's the system response. We're talking seconds and minutes of anticipation. What we are, I mean, by extrapolation, you can say there's some anticipation that we think, okay well if we do that we will hit our KPI or growth target of 'this' because people will sign up and they won't churn. That kind of thing. So you can kind of say that's a limited form of anticipation. Other than that first order anticipation is practically nil in the practitioner space I have theories on why that is the case if you'd like me to sort of branch off into those
<i>Interviewer</i>	<i>Yeah, sure</i> I mostly blame agile and lean start-up for this I'm actually like a defender of agile, in particular, lean I'm less keen on but ...

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

Particularly the lean advocates, have convinced us that we live in a state of such flux, the technology is so magically radical and different than anything that came before it, that it's a waste of time to predict.

That ergo the only valid way to anticipate the future is to build it, so we have this deeply empiricist ideology of build - measure - learn build - measure - learn which has all sort of problems in it.

It completely disenfranchises design as a activity and as a job role but it also deprioritises any attempt of moral imagination or ethical anticipation of what might happen, and so the entire world becomes a multivariate test, where you ship something, and if people die you change it.

We're seeing this with Tesla. Tesla's autopilot is a multivariate test, live pilot, with people's lives.

That's claiming to be a level 4 autonomous system, through the name, which of course is actually level 2 autonomous system, and so people are dying as a result of this ideological stance that they're taking, because they're not interested in doing anticipation.

Waymo on the other hand are doing absolutely the right thing. They've seen videos of people falling asleep in the cars, so they are not releasing anything to the public until it's Level 4, so you could argue that they are doing some anticipation on the social consequences of their innovation, and Tesla are saying we are going to push it live anyway. So, it's a hard job to convince a lean start-up ideologist that, actually, we can anticipate.

That we won't get 100%, you can never anticipate 100% of the unintended consequences of your decision.

Nevertheless you can get some, and so I think we have a moral obligation to try, and to mitigate any risks and to exploit any opportunities that come from that anticipation. But the lean folks will say there's no way we could possibly know, we just need to have a hypothesis, we need to build, then we need to validate whether the hypothesis was true, and then we roll that data back into our second round of experimentation.

So that's an extraordinarily difficult mindset to shift.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

	Nevertheless I think there is a little bit of progress in shifting that mindset and obviously I want to try and be in the vanguard of that erosion, if you like, but yeah in a nutshell I think that's probably the largest challenge.
<i>Interviewer</i>	<i>Yeah, my concern about it is scalability. It doesn't scale up to large diverse populations of users and it doesn't scale up to greater complexity either.</i> When you say it, are you referring to lean start-up here, or are you referring to anticipation?
<i>Interviewer</i>	<i>Relying on testing to pick things up.</i> So I worked for [Social media company] for three years 2012 to 2015 and [it] essentially lost its way, well, it decided that, it decided to replace product strategy with experimentation. For two of those years where they didn't really care about a coherent product narrative of what this thing is meant to be, it was just, you know, the CEO turned round one day and said anyone can ship any experiment to anyone, up to 1% of users, and that's, you know, that's 3 million people. One percent of three hundred million monthly actives at the time, and you can guess what happened. You know, some terrible things started to happen to the product, and it lost any kind of coherence, if anything moved the needle then, you know, it shipped to 100%. So it sort of scaled but it scaled from [its] existing belief of what they thought users were, which was west coast, technically literate people and some of those folks did quite nicely from the tests, because they gave them features that they could understand and that they wanted, but there's no evidence it had any impact on global growth so it didn't seem to have any effect on usage rates in Middle East, North Africa, you know, Japan, etc. It is a very global company, so I think as a proposal, I think that's probably fairly accurate. Yeah, and it's infuriating to work when it's like that, you can imagine, yeah.
<i>Interviewer</i>	<i>Okay, do you think that doing anticipation properly has implications for user research? Would that need to be done differently?</i>

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

I have two immediate reactions there which was yes of course and no of course not. I've just got to figure out which one of those I actually believe.

Okay the case for no:

I think, if you ask a purist researcher they will say that's absolutely not my job, I'm just there to report on behaviour, you are asking me to speculate and hypothesise and that is fundamentally not something that we do within this scientifically predicated body of work that we do.

However, maybe this is, okay, so there is a, almost a puritanical streak I think in a lot of design research in order to practise design research, in that they view design research as sacrosanct.

To sort of have almost, shrink wrapped behaviourism, right, and we're not interested in anything else other than observed behaviours, so they look at market research with deep suspicion because that's all hypotheticals, it's all propensity to buy, if this were to happen would you do X, so you get some researchers, generally I think not necessarily the very good ones, would say we don't need, that's not something we would ever look at.

I think the more sophisticated researchers who have a slightly more, kind of, blended approach who understand more different more techniques and approaches and mentalities and yes ideologies when it comes to research would say you know what, yeah, there is something we can take from market research particularly trends research" which I think is fascinating in the field is totally ignored and maybe we can use some of those to start to stretch the time horizon, essentially saying okay it's not just we saw their sets and we think there is something happening around this particular behaviour on a longer term basis or that may become something we need to participate in our product work would like to think a more sophisticated researcher will be open to that. My experience of most UX researchers in London is that they would run a mile from it

Interviewer

Right, do you think it might need richer data, or much more contextual information?

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

I don't think that the quality of the data matters. I think it's an ideology thing

I think it's a "this is my process". I mean you know if you hung around with UX people long enough, right, they are extraordinarily process orientated, they are convinced that their process is the one true way.

So having richer data is not really going to help

One parenthesis to that is data science. Richer quant data will, well should, help to lend colour to the research process.

Again I'm sure you've observed that a lot of user researchers are sceptical or fearful of quant data, and of data science as a movement generally, partly because they don't understand the statistics, but also they see it as undermining the qual value that they bring, and rightly so actually because it does, in a lot of companies, undermine it.

Again a sophisticated company that treats research as a broad church I think would have data science and research under one roof. The only company I know that does that is Spotify, who have a combined insights team that bring those two together. I've not heard of a single other company that does that.

Data science is always in engineering, and research is always in design or product.

Potentially richer data could, richer quant data could help researchers.

It informs models, right, here are segments, groups that are exhibiting interesting shifts in behaviour, now let's dig deeper on why that's the case.

So you don't diminish any value or agency of the qual work there.

Interviewer

Yeah

You know, it's still terrifically important, but the quant stuff helps to set you up, to look for that arc, if you like.

Other than that though, richer data in terms of having more interviews and more diary studies and whatever it is, for the researchers alone isn't going to make any difference, until there's that breakthrough or until they sort of snap out of that model of I'm just here to you know be a neutral passive observer of behaviour. I think we're there.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

What I'd love to do is drop a couple of trends researchers into a classic UX research team because it would just blow their minds. They wouldn't know what the hell had hit them and I just think that would be fascinating. You'd sort of you know plant it, then stand well back.

So you could argue that would be rich data coming in because those folks would be looking for different patterns but that's more of a you know injecting a different role and a different perspective than injecting more data.

Interviewer ***Yeah, one of the things we tend to do in aviation safety analysis is start from a hazard focused approach so you try and imagine the different categories of ways that things might fail and then you look for evidence either that the design makes them impossible or mitigates them in some way. Would you see something like that happening?***

So, that's part of my approach. I definitely don't want to blow my own trumpet here and say I'm pioneering anything but I'm trying to get companies to think in a way that's a bit more like that. There's essentially two ways that you can anticipate this sort of stuff, right.

You can do a priori – you can do sort of it step by step – or you can do it by looking at existing risk categories and try to map backwards from that and both of those I think are entirely valid.

With regard to that, what I've started doing recently now in my work, and in my work shopping and things like that, is to you know I have my own essentially a threat map if you like that I've cobbled together from a number of sources you've probably come across Ethical OS, if you haven't Ethical OS is from the Omidyar network but they basically have risk categories.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

So they say okay well you know what is the chance of this system being used for disinformation or abuse and harassment or whatever it is, and so once you have those predefined categories, yes you can have a relatively fruitful conversation and say here's the known risk, does this apply to us, as you say, do we have evidence that the system is designing that out, somehow, do we have protocols and systems and interfaces that will mitigate and so on.

Of course the down side of that or the potential weak spots of that for emerging technologies is that is a static list, and although the threat model itself tends not to change that much, you find stuff slipping through the gaps a little bit because you have all these unanticipated emergent properties of technology which you just didn't, you didn't realise that this system would ever be used for social communication.

I mean you probably heard about students when they have like Twitter and TikTok blocked on their school networks, they comment in Google docs to send messages to each other during classes, right, things like that.

Basically Google Docs as a social media experience was not anticipated, so if you try to back trace from that you probably never would never find that risk.

So yes I like to do that kind of backcasting but I also like to do it, okay, step by step: what could this cause, what could this cause, and then suddenly or in some pretty unanticipated territories of optimism far-out territory, so I'm trying to do it. I'm not aware of many other companies doing it other than those that have read ethical, who have looked at the Ethical OS website or who were sort of have some literacy in this sort of responsible design field, but not many, yet, not many yet.

Interviewer

You've got a team, you've got a cross disciplinary team, how would you go about making sure the whole team understands what the research data is really saying, what that implies for the design?

Research data? Now are we talking about kind of classic design research or are we talking this kind of research that looks at risk?

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

Interviewer

Either really. Would you go about it the same way or would you need to share the information differently to get it understood?

I'm assuming as a relatively well performing team, as is, so I'm going to take it as read that they already have relatively good mechanisms for feeding design research and behavioural research information in to inform product strategy and interface design and things like that.

That's a big assumption as actually a lot of companies don't have that, like they have the researchers and then there's this wall, you know, you create a bunch of docs and then designers ignore it and design whatever they were going to design in the first place.

When that's done well, I see it as a parallel stream, what I don't like is commissioned research for specific projects.

So I think an anti-pattern or failure state essentially is "okay we want to build X well let's research it first and then let's design it" and so on because the problem is again lean and agile will always try to compress that and omit the research, so that's why that doesn't work.

So ideally the communication method there is a parallel, ongoing stream of work that yes you can spin up different foci within and then feed that across.

um and I would probably be looking for researchers to sit in on design critique sessions so that essentially they can stop some downstream leaks you know where things have been going against, you know, where the designers are designing in a way that contravenes what they put in research and then the researchers can say "well hang on if you refer back to this set of research we did" this is a problematic way to approach the problem.

So that's kind of how things should be. Now how that changes if you have this sort of work I think if you leave it just to the research function to be this sort of the arbiters of that ethical risk and ethical sort of anticipation, or that user safety risk, then I think, I don't think it's going to work as well as if you involve a wider set of people.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

I mean, for example, I would love every designer in Silicon Valley to do a tour of duty within the user safety team. I had a little bit of interaction with user safety when I was at [Social media company] and you know it's the dark underbelly of humanity, you know.

It's abuse, it's child pornography, it's, you know, it's absolutely horrible stuff, and once you've been exposed to some of how people are trying to use your platform for terrible things that doesn't leave you.

Right, you immediately from that point on, you recognise every decision I take has the potential to be used to harm others and I think it's that realisation that needs to happen. So this is why I want designers to be involved in it. Once they see, you know, the negative consequences of some of their decisions, then they're trained to look for those, and to consider them on the sketch board, let alone before shipping the product.

So I wouldn't want that to be just the domain of research, because they'll run into all the same problems, that research currently does.

How I would do that, yes push them into user safety teams. Training is obviously a good part of it, and so this is, a lot of the work I do is training designers to do that kind of work, and then this is another reason why I'm trying to lean on the futures toolkit and speculative design and things like that because there are existing techniques to anticipate potential consequences of technological decisions, and so helping people to use some of those in their design process will help to shift their mentalities.

I'm not so interested in will they for this particular problem, anticipate the correct consequence and mitigate it, because the chances of actually landing on the right one are pretty small, but it's training them to think that way so that they apply it naturally in all their designs from that moment on. That's how I want to try and shift design mentalities.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

Interviewer

Do you think designers necessarily are aware when they're making a choice? So they might be used to trying to nudge the user in a particular direction but are they aware that they might have nudged themselves into an awkward corner?

Increasingly aware. The landscape is shifting. Ask me five years ago and, definitely not. That was, you know, the whole, you know.

In 2015 and before we were still in this sort of halcyon era of technological exceptionalism and cyber libertarianism, and everything we do is beneficial and positive and transforming the world, disruption, etc, and so there was this a glossy veneer over every design decision.

Obviously since 2016 to today, the techlash and so on, I think companies recognise now that there is, there are dark implications from some of the things they do.

I think some of them only believe that or any realised that because they are getting sued and because they are getting dragged in front of congressional hearings, etc

So I don't think it's sort of from heart, it's more of a "we're going to get our asses kicked if we don't do this stuff"

It is more of a risk aversion thing. I think designers are most sensitive to this. Designers are always, it might be that I'm a designer by training, no well by practice, but it is always designers who I have the easiest conversations about this stuff with. They are naturally attuned to it now. So it's getting easier.

The other pattern I'm seeing is this is also to do with seniority so I mean I've been a designer what 20 years and I'm in a mid career, obviously this is a sort of slightly infantilised industry and that you're a senior practitioner after 3 or four years which is just ridiculous, but there we go. So by that standard I'm pretty damn senior.

It's folks like me, I think, my sort of level of experience, you know 10, 15, 20 years are probably the most attuned to this stuff because they made the mistakes before and they've seen the problems that they can cause with careless design.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

The other group who are very attuned to it, without wishing to be too stereotypical, are the very junior designers, the young kind of grads, millennials I suppose, but millennials are 38 years old now aren't they, but it is true I think that say you're 20 early 20s designer is more values driven than my generation has been and that they are very clear that those values need to be imprinted upon work they do, which is great.

So for me there's kind of this U curve that the senior folk like me get this and the junior folk get it, it is the people in the middle who kind of get it but don't really care because they are climbing the corporate ladder, you know.

I've tried to climb off the corporate ladder and I don't, I don't want to be on it anymore, but they're like okay I want the senior manager position or I want to be promoted to staff designer rather than senior designer or I've gotta save for a deposit for my house, things like that, so I think they are more invested in, not necessarily towing the company line, but not rocking the boat too much.

Those are the folks that I find it hardest to have those conversations with, yeah, but as I say it's still shifting. Compared to five years ago, if the U curve was like that [unrecorded gesture], it is now, at least it's a lot, it's a lot steeper. I'm hoping that the middle will come up in time as well.

Interviewer

Do you find that people are conscious of the imbalance of power between them as people designing and building systems and people using them?

No. No they are not. I mean, a minority are. Most of these people, again sweeping generalisation, most of these people are too young to recognise that.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

You know if you go to Silicon Valley, even if you step into [Social media company], the average age of a software engineer that might be 27 or something like that so you know half the team is fresh out of Harvard or Stanford Oregon and bless them they're ridiculously intelligent people and generally quite nice people but they haven't got the world experience to understand the world, you know, they haven't travelled much, they've sat in front of screens for most of their young lives, so they don't necessarily see the impacts or they're not trained to understand what the impact might be on people who aren't like them because they haven't met that many people who aren't like them, I suppose.

And so because they haven't got that visibility into that I think that makes them quite poor judges of power, if you like, I think it's once people again get a bit more global perspective and a bit more experience of screwing people over by doing the wrong things that's when the recognition comes in.

But again coming back to designers, designers believe themselves to have little power, because they look at mostly the product managers but to an extent software engineers who overrule them and they say "ah well poor me I actually don't have the power", and again part of my work is to say you do, you get to create the future, and so you know you're imbued with enormous power, and then with that comes responsibility, but yeah I generally I think that there's not much literacy in the topic of power I think in these organisations other than corporate power in typical political hierarchies but that's all internal.

Interviewer

Yeah, I think in academia it really only starts to bite at research degree level when you're writing things to give to an ethics committee, and they pull up and say hold on there is an imbalance of power here. Lower down the tree you just don't tend to hear about it at all.

Yeah, I mean, the only time the word power will be used other than computing power would be among employees who are more literate in social justice.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

Folks that have been paying attention to Black Lives Matter and things like that are probably better setup for those conversations but obviously those aren't uniformly or universally popular in Silicon Valley companies, there's a lot of backlash against that kind of thinking as well.

Interviewer

Do you find any particular activities helpful in getting people to think along these lines ?

Well yeah I mean as I say some of the tools from "futuring" as distinct from futures thinking as a discipline, so I do you know things like the futures wheel, I bring that out quite a few times when I'm training, there's something called the actor triangle, which is from Nordkapp's actionable futures toolkit, is basically a triangle that allows you to anticipate who might be sort of hidden stakeholders in the system beyond just the user.

So I mean you know tactical tools I use those two particularly but a few others. Doteveryone had this consequence scanning framework you may have come across, so you know things like that, but those are very micro exercises. In the broader sense, no I can't.

It sort of has, there has to be an appetite for it. Usually from my experience, there's a designer, reasonably senior enough that they're listened to, who starts to say "hey we've got to start taking this stuff more seriously" and then they convince the rest of their team through a process of either lending books or giving brown-bag lunches or something or just advocating for the issue and then eventually they get some budget and they bring someone like me in and that's typically how it goes. So it's not tools so much as one or two mobilised people speaking up and grouping together and saying hey we're not going to let this lie until eventually one caves and then throws money actually trying to address the problems.

Interviewer

Do you think the whole DesignOps push with people trying to reduce the uncertainties will help or hinder this?

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

I think it hinders it. I'm in a minority view. The rhetoric is that it will help, that DesignOps and design systems and all this, it's all about efficiency, right, making our teams more efficient and more effective. The theory goes that what will happen then is designers are freed from the busy work of the minutiae of interface grooming and therefore are liberated to focus on more important issues such as responsibility and consequences.

My view on this is that that's not how capitalism has historically worked, that what will happen is that these people will commoditise themselves into unemployment, that you will modularise and efficient-size the hell out of the system, and then management will just say great we don't need as many designers anymore and they'll fire them. So I think there is a whole bunch of self-delusion going on among that field, you know, it just doesn't happen that you "oh brilliant you've got more spare capacity now you can tackle issues that matter". This is not the way that's going to go down.

My further concern with DesignOps is that it's still predicated upon the idea of user centred design being the one true way, and it will try, it is essentially kind of an accelerationist perspective, but saying what we need, the answer to all our problems, is more user centred thinking, more effectively, more often.

But that is the problem. It's this narrow perspective on who we're designing for. And if we, if we say the answer is just to do what we're doing but more efficiently, then we'll make mistakes more efficiently as well, so I don't think unless there is a fundamental recasting of the role of design, I don't think it helps in any way.

Interviewer ***Interesting.***

I'm a minority viewpoint on that but I'll stick with it, yeah.

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

<i>Interviewer</i>	<p><i>One of the things that motivated me to do this research was the feeling that we were running out of road with the way that we were doing our assessments because our time scales were getting squeezed, systems were getting more and more complex and somewhere in between we were just going into what in aviation terms you'd call coffin corner: you can't slow down, you can't speed up, you've got nowhere to go.</i></p> <p>Right, yeah. Yeah, I certainly recognise that pressure, for sure.</p>
<i>Interviewer</i>	<p><i>Alright, thank you very much this many interesting discussion is there anything else you'd like to ask me about what I'm doing?</i></p> <p>I don't think so but obviously you know if you have anything you know it's going to be a while yet I'm sure until thesis is done or whatever but you can share any findings that you have at some point down the road I'd love to hear what your conclusions are, yeah.</p>
<i>Interviewer</i>	<p><i>Absolutely, yeah.</i></p> <p>OK. Maybe, maybe one question is, without without revealing the contents of your confidential research, but do the patterns I'm talking about, are other people reporting similar things, or is it, or am I a slightly dissenting voice?</p>
<i>Interviewer</i>	<p><i>It's striking a chord certainly, it's similar to things I'm hearing. I was interested what you said about people following a process, whereas a lot of the time what I'm hearing is "what we look for is a mindset" so people are taking more of a playbook approach, and not having a fixed process, quite so much, but it does depend a bit on how big the organisation is and how much they'll get beaten up by management if they're not following a process that the management understand.</i></p>

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

Some of my, a lot of my clients now, are kind of big consulting groups and so they need, it's not necessarily sort of audit and risk kind of mentality, but they want to see rigour to this. They are not, they're worried about teams operating too loosely, you know.

So I have to frame it as there's actually a structured way that we can start to anticipate some of these things and partly that helps me in my sales process as well you know I'm not just some guy he's just going to come and say ethics actually have something I can say and here's the way we change our process accordingly.

Yeah, I can see the value in mindset shift as well but I also think good tools properly applied in the process can create that mindset shift as well. It can force it through you know.

Interviewer

Yeah, the other thing I'm not seen much, which surprised me, coming from the background I come from, is there is not a lot of traceability. If you ask someone "that design feature, where did that come from" sometimes they're a bit stuck for an answer.

Again, Agile. If you asked that question 20 years ago in software development right you'd have a very clear waterfall trail of where that came from because you've got, okay well it went through approval Level 3 on this date and it was signed by these people, and so on.

Agile now, in fluid teams, you know, you have designers touring between "well you are on messaging this quarter but after that you're going to go to the profiles team" you know. Yeah, knowing exactly what shipped when, Agile definitely blurs all that doesn't it, so I think that's definitely a reason for it.

Interviewer

Do you find with the sort of turnover you typically get now that it's always a bit of a challenge to bring new people onto the team, do the onboarding, when there isn't much documentation of how they got to where they are?

Table E.4: *Transcript of Interview Zoom-002 (cont.)*

I don't know, I haven't, I haven't been, sort of, inside a big team now since, well five years since I've been independent, so I don't know what it's like these days, but historically yeah, I mean, it's always been a problem but would people even read the documentation if it exists, you know, if there is a kind of okay "here's how we think, what we've tried previously on this project" and part of the reason that these people are brought on is because you need fresh ideas and some of those will be re-inventions.

Interviewer

Lessons learnt documents do tend to be write only, don't they?

Yeah, it makes more sense in aviation given the enormous risk. Software people don't see risk in what they do. You know, they think software is soft, it's malleable, it could be remade at will, and to some extent that that is true. I would imagine if you were to ask that question of someone building software for the nuclear power industry for example then I'm sure they document the hell out of it.

[Closing remarks and thanks]

Table E.5: *Transcript of Interview Zoom-003*

	[Intro and consent to record]
<i>Interviewer</i>	<i>Okay, so how do you decide what your next piece of work is going to be?</i> Across all of [Department]?
<i>Interviewer</i>	<i>Whatever your experience is, yeah.</i> I guess, at the moment working like trans locale projects across [Department], it tends to just come down from whatever the Minister says they want, which isn't always the thing that people want the most, it seems that there's somethings are just things ministers want, somethings are put in manifestos and then we have to do them regardless of whatever else happens, I guess political, a lot of it is political, like when we leave the European Union, when we vote to leave the European Union and a whole load of work comes our way in. We just have to do that, but then from the perspective of being in a project team, I'm for example, I used to work on the [Activity] licence service and it's like a completely different thing once you're in a service, we would use a mixture of user research data and business requirements to try to work out what had the most value and what had the most, given that most of it comes down to cost as well, like if something is really, really high on a user need list, but costs a fortune, we have to balance it out and work out what we can do for, to be cost effective, but that's how it works in teams. Well then across [Department] there's just loads of different political stuff that we don't really have to my knowledge much user input into what we do next, it's always political.
<i>Interviewer</i>	<i>Do you have any sort of standing backlog of things you would like to do, a wish list of any sort?</i> Yeah, we do, each programme probably has that, so the [Activity] licence programme sits in regulatory services and they're basically responsible for a whole host of like permits, like [Department] do a lot of giving people permission to do stuff.

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

Everything's got a permit. So they've got a massive backlog of all the permits that [Department] have, and they're all traditionally paper or PDF forms or post office visits, things like that, and they've got a backlog of what they want to move online, and I think they've probably scoped that based around, like, transaction levels and how many users use them, and how bad the service currently is, so they've got a wish list, but they don't necessarily have massive say over when they start to do that work.

Like, they probably had a plan for this year and then COVID happened, and we stopped a lot of their work and put people in emergency COVID stuff, so yeah there's backlogs, but there's other stuff can come and attack your backlog at any point.

Interviewer

Yeah. Okay, so when you're starting to gather information on whatever problem you're attacking next, what sort of user research techniques do you use?

Actually, I tend to do whatever the user researcher advises me to do.

I'm not researcher, but from experience we tend to do a variety of stuff, from workshops with stakeholders and policy, to mapping sessions, user interviews, and going to observe people just doing their jobs, or something we did a lot with [Team-1], we just went to [Sites] and stood in the [Place] where the trucks are coming in and out and just observed, like, what happens, and people come in with the lorry, they come in and hand over paperwork, people are sitting there sort of signing paper, giving it them back, and then they go through.

So yeah, I don't know, I don't know what the technical research terms are, but observations, interviews, and workshops.

Interviewer

So does that just involve user research professionals or does the rest of team get involved?

We have an aim to try and get everyone involved in research so it's normally the researcher, but they never do anything on their own. It's normally the researcher and one other person.

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	<p>I'd say, from my experience, in teams it's normally like 50% research and design but every now and again the designer will step out, and there'll be a developer or an architect or delivery manager.</p> <p>That's the theory. It doesn't always happen but most people are on board and want to go and do research. There's some people that don't seem to want to much, but for those people that researcher will normally playback research sessions, either in a video or with a presentation.</p>
<i>Interviewer</i>	<p><i>OK, so you have quite a variety of data then.</i></p> <p>Uh-huh.</p>
<i>Interviewer</i>	<p><i>Actual recordings and videos?</i></p> <p>Yeah it depends on the researcher. I think most of the ones I've worked with give presentations, I've worked with a couple that have had recordings and if they if they can share, they do.</p> <p>There's all kinds of legalities around that now though and so I think most people try not to. Because you can't really redact a video, so ...</p>
<i>Interviewer</i>	<p><i>Ah. Right, yes.</i></p> <p>Yeah, so it depends on how sensitive the service is as well, what can and can't be shared.</p> <p>I think you can't really go wrong with the presentation and some quotes, and no one's name underneath it, is normally the easiest way of doing it. Although, even that had an issue last week, because someone did some research with internal stakeholders and did that, anonymised quotes, and somebody (the service owner) declared they knew exactly who it was said that, so ...</p>
<i>Interviewer</i>	<p><i>Oh right. It was catchphrase they used a lot was it?</i></p> <p>It must have been yeah. Hopefully, it wasn't a controversial one, but ...</p>
<i>Interviewer</i>	<p><i>That's interesting. So you don't do the kind of thing that say Coop might do, having a wall in the office just covered in stuff?</i></p>

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	<p>Yeah, we try to, in places that have, [Location-1] office has a lot of walls and we have, most of them are covered in stuff, so the [Team-2] teams have got research walls up, and post it notes, and research sessions.</p> <p>I used to pin up, like, early prototypes on paper and just have feedback comments, like, stuck on each page for, like, one colour for positive, one colour for pain points, or something. It's really a bit dependent, it depends what office space you've got. It's harder in [Location-2] because they haven't got any walls, they're open plan, but they have a lot of virtual boards.</p>
<i>Interviewer</i>	<p><i>Yeah. Okay. So once you've all had some time to have some contact with the research data how do you, sort of, share your understanding?</i></p> <p>With like the wider stakeholder teams and stuff?</p>
<i>Interviewer</i>	<p><i>Or even within the team, how do you make sure you actually have the same understanding?</i></p> <p>Mostly through presentations, in those research teams that I've worked with. If we have a Sprint where we've done a design and research sprint then that will get fed back to the whole team.</p> <p>Usually the researcher leads some kind of presentation or the designer will talk through the prototype and why things have changed.</p> <p>We try to involve BA's. The BA is actually really involved in research as well so they are quite good at bridging the gaps sometimes with developers and updating tickets as we still have quite a reliance on Jira so a lot of stuff gets fed back into Jira as findings from research and stuff like that.</p> <p>We have different ways to save feedback in the prototype as well because we have ever changing prototypes and we're trying to work out the best way of saving that research insight says that we know why we made decisions without ending up with a mammoth prototype just with too much stuff in it so we've trialled a few ways of doing that.</p>
<i>Interviewer</i>	<p><i>Okay so traceability is something you're aiming for but it's difficult sometimes?</i></p> <p>Yeah because it's difficult, because prototypes should be things you can throw away shouldn't they.</p>

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	<p>You do an approach like we learn from it then throw it away but then we often go and pick something back up again six months later or the teams change a lot. So a different team will look at something and go “Why is that, like that” and then they have to ask questions and dig around and see if someone still here.</p> <p>So I kind of think the prototype should be throw away but we do need to document somewhere how we ended up where he did and what we tried.</p>
<i>Interviewer</i>	<p><i>Yeah. So do you have something that you can use for on-boarding when you get a new member of the team or is it just conversations?</i></p> <p>I’ve got like a Trello board for onboarding designers. It has like various stuff in like introductions to government and civil service, introductions to designing, [Department] resources, and there is always two columns at the end for like the project they are joining and where the delivery manager and teams can put links to their Google drives or their SharePoint drives and share their research and stuff. So there should be stuff whenever we bring someone new in there should be hand-over period in this.</p> <p>In theory they get a Sprint to just shadow existing team members as well so that they can learn before they have to jump in. The stuff can be different places and some teams are using Google drive, some people are using SharePoint, some people are using Microsoft online, so ...</p>
<i>Interviewer</i>	<p><i>Okay. Yeah that’s quite a variety of technology</i></p> <p>Yeah. Yeah, it would be good if we had just one thing but we can’t find one thing that works for everyone so ...</p>
<i>Interviewer</i>	<p><i>Yeah. Okay that’s fair enough. Do you have any particular team activities that you use to share your understanding? Was it just normal meetings?</i></p> <p>Just normal meetings really, I think, walkthroughs, demos and prototypes and then people just asking questions. Yeah, nothing specific.</p>
<i>Interviewer</i>	<p><i>Okay. So how do you know as a team that you’re all on the same page?</i></p>

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	In theory, the daily stand-ups should give us a hint if we have strayed from the same path
<i>Interviewer</i>	<i>Yeah</i> I think retros are good at that to make sure everyone's in. When we do prioritising and planning for the next sprints and make, if we're all agreeing on what the next most important thing is for the next Sprint, which we don't always do. Yeah, I think it used to be just because we were all in the same room as well – we had co-located teams. I think it's a bit more difficult now that we are remote but hopefully the retros and ceremonies help with that.
<i>Interviewer</i>	<i>Yeah. Presumably, you're all working from home now, are you?</i> Yeah. Yeah, which is making things more difficult for stuff like that.
<i>Interviewer</i>	<i>Yeah, so do you have a sort of standard way of challenging stories? If you have a bunch of user stories that you've got in front of you?</i> I don't know if we have a standard way of challenging them, but if its something that you don't think is needed, we tend to try and use actual research or data to prove or disprove stories. That would be the advice I'd give anyone, if you actually don't agree with something try to back it up with facts, otherwise it becomes a war of opinions and it doesn't really ever end well does it.
<i>Interviewer</i>	<i>No that's true.</i>
<i>Interviewer</i>	<i>Okay, mostly my research is about what happens during discovery. One of the questions I've always got is how much discovery is enough, and how do you know?</i> Yeah, that's a question I probably have as well, as when's enough.

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

It's weird because we have to estimate every project in a really water-fall way but we don't actually work waterfall because discovery is, the whole point of discovery is you don't know, do you, until you've done it, you don't know what's going to happen next but Government just isn't built to work like that, so we have to estimate for a Discovery and an Alpha and a Beta, so that there's money in the project to last that long, and then we end up with these bizarre discussions about "yeah let's do an eight week discovery then a twelve week Alpha and a twelve week Beta" and we have to, we have to kind of loosely commit to that up front, which is really, like, doesn't feel right at all, and then we always try and push like "well we won't know until discovery" but if we don't estimate for the whole thing then we can't get people to do the whole thing.

If you have to recruit someone to do a project and then we stop at Discovery, because it's the right time to stop and think about Alpha, then we'd have to lose that team so this is one thing that bugs me massively, because it's really hard to work the way that we should work and make it fit how we hire people but I think, my experience discovery is that it should be like, you've got a clear problem to solve or a clear statement that you either want to prove or disprove.

Because people normally come to us with "we want this" so discovery tends to start off with like, why do you want that, and will it actually achieve your goal, or what is your goal, and I guess once you know enough to have a rough idea of how you could test something in Alpha then you've moved to an Alpha or you've stopped completely, but I don't think it's ever actually finished, like once the discovery phase stops and you move to Alpha, discovery just still kind of carries on in the background, doesn't it, it's not actually ever finished, so yeah most of our discoveries tend to stop because that's when the project said that they would stop, and which is the wrong way of doing it.

Interviewer

Yeah, you just discover what you can discover in that time?

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	<p>Yeah and then keep learning, as long as research carries on I think it's OK but yeah roughly we try and stick to, I think that the recommended GDS time frame I think was like 8 to 12 weeks or something like that which is strange because every project is different.</p>
<i>Interviewer</i>	<p><i>That's quite a lot as a quantum of effort.</i></p> <p>Yeah it is, and we do get a lot of push back sometimes of how much is it necessary, can we do a shorter one.</p> <p>I've seen people push for four-week discoveries which I think is intense to try and learn something in four weeks because you are coming at it from a blank canvas but yeah, I don't think we've nailed that in [Department] yet.</p> <p>We, like, we always try and push for like discovery is just to understand enough, or to even try and uncover the real problem you're trying to solve, and then Alpha is to try and think of how you might solve that problem.</p> <p>It's hard to box that into any kind of time frame, it just depends doesn't it when you feel confident that you have a real problem to focus on.</p>
<i>Interviewer</i>	<p><i>Do you try and assess the technical risk of stopping early?</i></p> <p>Yeah, we have involvement from like a bunch of different disciplines in discovery so we should be able to cover that.</p> <p>There's always people involved from the business and from Policy and from stakeholders who should be able to work out what risk could be. I'm not sure if we do that always, but I hope we do.</p> <p>I think there's, I think one project did get stopped in discovery, like mid-discovery for budget reasons, and we did have to produce a document to sort of show like we've stopped early and this is your risk, because we knew we had a bunch of users we hadn't even spoken to yet, so I think in the discovery report we had to highlight the facts that we'd only actually like done 50% of the work and there is a huge risk that the user groups we hadn't made contact with would be a large part of the Alpha, and it could make the whole Alpha invalid. So I think we just flagged it in an end of discovery report.</p>
<i>Interviewer</i>	<p><i>Yeah. Oh well, that's good, yeah.</i></p>

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

Interviewer ***So there were lots of choices once you actually decided to go forward and build something or design something. How do you make your early design choices? Do you get the whole team together or just certain people or ...?***

Yeah, it's hard to answer that one as I'm not in a team anymore, I'm kind of leading the team, but from what I've seen and what we observe, we tend to get if we can the whole service team to be involved in some early workshops trying to highlight like what is the biggest risk or the riskiest assumption from this from the discovery and try and work out how we could solve that, but yeah it should be a team effort with maybe a couple of workshop sketching sessions. I was involved in a sketching session a few months back with the [Team-2] team, so we just kind of all given sort of a little worksheet instead of set tasks and trying to draw out what we thought something could be to fix a very certain like small slice of a problem.

Interviewer ***Okay, so how aware are you when you're making a choice – is it always obvious or do you look back sometimes and think “Oh yeah we honed down our options at that point” without necessarily realising?***

I think that happens all the time in our office. I think, if Alpha is like a way to start as the first time you think about how you're going to fix this problem, there should be like five or six really different ideas that come out of an Alpha. It tends to be just an online, especially in Government sometimes, it's an online form and we always kind of know that before we start Alpha, then maybe we just spend a lot of time looking at different sequences of questions for the online form. I don't know how much time we spend looking at different ideas, we should probably do more I think but ...

Interviewer ***Yeah, so do you have a sort of standard way of capturing the decisions that are made or are they just embodied in what comes out?***

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	Usually slide decks from early alphas, where we would try and record like sketching sessions and have a kind of a step by step of the project. It ends up being in GitHub a lot of the time if we move to a coded prototype we have the GitHub repo with design decisions kind of logged in it, but every team across [Department] I think does that differently, we are trying to standardise how we could do that better.
<i>Interviewer</i>	<i>So what actually would be in GitHub? Is it a document or is an input file to a design tool or ... ?</i> Usually it's a clickable prototype of something, with a cover or page of cover on it, with links to different sprint versions. Sometimes it's done in tagging, so you can just tag your repo at certain points, and have it saved where you were at, but I've seen other people just have a cover sheet that literally has Sprint by Sprint what they worked on, links to Jira tickets, what they did, and then they have versions of prototypes, they just end up with multiple folders, and call them like "Sprint one" folder, "Sprint two", so you can link to different instances of the prototype and see how it's evolved.
<i>Interviewer</i>	<i>Okay, so in principle if you took one forward and then that turned out to be a dead end you might still have the others around that you could pick up and run with?</i> Yeah, you should be able to just roll back to the previous one or yeah just take a copy of the previous folder and make that the one above yes yeah carry on where you were.
<i>Interviewer</i>	<i>So, one of the things that I've been wondering about a lot is scalability. So if you've got a large, diverse user population or you've got something that's highly complex, either in the data itself or the algorithms around it or the system aspects, does that cope when you're relying mostly on testing to tell you whether you've got it right or do you need to anticipate more?</i> You mean because the audience is really diverse you can't test with everyone?
<i>Interviewer</i>	<i>Yeah.</i>

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

Yeah. Don't know. Probably, most government services are for absolutely everyone, so yeah, we probably do always have gaps. It's a hard thing to scale, the only thing that I could say that we do consistently to make sure that we don't have gaps from people who might need specific, people with access needs, to try and use that to get a broad user base, and make sure we've got everything as accessible as it can be, but people from different backgrounds and stuff like that is difficult to recruit, so I don't I don't actually know how we do that.

Interviewer

Yeah. So what brought me into this, is most of my career has been spent doing aviation safety related things, where you would start by trying to think about the hazards and then you build up a hazard model alongside the actual design work, but that's difficult to do in an Agile way. So what I'm wondering is what sort of anticipation could people do, could they start to think about categories of things going wrong and then think about those as they're doing discovery and working up their understanding of the problem?

Yeah, you mean like start with what you think is a real edge case, and if it works for that, then it will work for everyone?

Interviewer

Yeah.

Is that the kind of thing you mean? Like an inclusive design model, would be to think about the worst possible scenario and if you can make it work in that context then it will work for everybody else rather than designing for the 80% and then thinking over the edge cases, we'll bolt something on, it's like flipping it on it's head isn't it, and doing the worst case, if that's what you mean?

Interviewer

Yeah, at least thinking about it, because you might know from previous projects that you tend to have these kinds of problems, so you at least prime yourself to think about those, while you're talking to people and gathering data and building your understanding.

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

Yeah I think the rural programmes probably have to do that more because they have to anticipate [Users] in really remote locations potentially having awful Internet connection and a lot of the services that we aim at them tend to have a lot of data and maps on them because we want to understand like where the [User Location] is and it just doesn't work because as soon as their internet cuts out they lose everything, or the internet is really slow and it's just not ...

So I think they use a base of the actual researchers stuff, and personas are rolled around a base user of someone with really poor internet connectivity in a remote place and how can it work for them, and then if you have got a good connection and it's just, it's a progressive enhancement rather than treating them as an add-on at the end.

Interviewer

Okay. So what sort of variety of personas might you have then? Would you have people with different constraints on how they could use it or particular issues?

Yeah. I think so, I'm trying to think back to the [Activity] and the [Team-2] ones I actually worked on, or the [Team-1] ones. We tried to have a mix of real people, and then from every possible background, and I think from the [Team-1] ones we put together for a [Team-1] tracking project it was looking at people who would have different perceptions of what we're doing, so I think we had some people he would just sceptical about the whole service and we had to factor in how they would be thinking, and then people who were people who have seen it all before because we try to do the same schemes over and over again.

Yeah. I'm not, I'm never really sold on personas massively as a thing that they're really helpful but then people get too fixated on fictional people.

Interviewer

Yeah, they are only intended to be an abstraction. Do you ever include personas that are deliberately awkward, say you might have a stropky person persona, or a forgetful person, or whatever it might be?

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

I've seen bits of that used, yeah, like disinterested people versus interested people or you get highly engaged users versus really un-engaged users, I've seen that. I haven't seen one that's purposely like, kind of ... I guess maybe the [Team-1] one was like that. We had some, we had a sceptic persona in the [Team-1] team, that was just like "it'll never work, you can't do this, it is not possible" type because that task was a really difficult service and a difficult task, and people ... from research we had numerous comments that that was a real part like those of that that was a real face and we did create a sceptical persona. Not sure how that went down with the business, they thought we were just trying to be particularly difficult, but it was like the quotes we used for him were true, they were things that people did say, but when you put it all together in a persona people kind of think that you just made it up to be awkward but ...

Interviewer ***Yeah, even though the bits might be from real life?***

Yeah, from real life snippets. Every persona has a real life quote and so that's how it works in [Team-1] anyway, so it was like this is based on fact, this is a real thing someone said, they're just given him the fake picture and a name but it's basically a real feeling that came through.

Interviewer ***Yes, nice approach, some quotable quotes.***

Interviewer ***Okay so we said a bit about mobilisation, and how you decide what to do next and a bit about techniques. I've been getting quite interested in storytelling and narrative and how you challenge stories and things. Would you have content designers as part of the team for the forms or is the amount of content too little to really sustain that?***

We do have content designers looking at forms. Just for the, most of the forms that we have that haven't been worked on yet, have got a lot of content like explaining each bit of the form and using just language that people just don't understand so, yeah, we try to.

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	<p>It's difficult if it's just the form, a transactional form, like that is not masses of work but most stuff tends to have start pages on Gov.UK as well and other stuff that content designers work on.</p> <p>So, every service I've worked on has hired a content designer as well, yeah.</p>
<i>Interviewer</i>	<p><i>Good. Right, I think I've covered most of what I wanted to ask about. Do you have any questions about what I'm up to or anything we've discussed today?</i></p> <p>Yeah, just what are you researching on? Like what's the purpose of it all, I guess, really?</p>
<i>Interviewer</i>	<p><i>Well there's two bits to it firstly what is current UX practise in UK coz there aren't that many academics who are looking at us you know there's Colin Gray in the states talking to practitioners over there documenting what they do then there's people in Scandinavia documenting the way they approach things that is not actually many people in UK universities documenting in a peer reviewed way what people actually do here. So that was one part of it was to try and fill that gap and then to see if we could build anticipation into it in a way the scaled up a bit better</i></p>
<i>Interviewer</i>	<p><i>What I was finding with my safety analysis work was that we were getting squeezed on both sides we couldn't slow down because the business needed us to move forward at a certain pace and we couldn't really speed up because then we start missing things so we were getting into what in aviation you call coffin corner where you can't speed up you can't slow down you've got nowhere to go.</i></p>
<i>Interviewer</i>	<p><i>So what I was hoping was I'd find lots of really cool stuff that UX practitioners were doing that we can apply to that kind of problem but it's looking like it might be the other way round. There might be things we were doing that would be useful in UX so it will be interesting to see how it pans out really.</i></p>

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	Are you going to publish like findings and stuff?
<i>Interviewer</i>	<i>Well, I'm about half 2/3 the way through PhD at the moment so there'll be my thesis which will probably be read by me and my supervisor and that will be it. Hopefully be some good papers coming out of that and then whatever means we can find to brief people back on what we found after talking to them.</i> Okay it's just because I'm interested in how other people do this because you have, like, there's loads of books on theory but I've not worked anywhere yet where anything relates even remotely to theory and books because it's just like life and people. Everything is different but ...
<i>Interviewer</i>	<i>I know people like Jared Spool are very keen on the playbook approach, that seems to be coming up quite strongly in lot of organisations now particularly big organisations will have their own playbook so I guess you'll have a GDS playbook at some point?</i> I don't know, I've not heard that mentioned lately. I've been to a couple of workshops with Jared Spool and I love his work, but I haven't heard anyone across Gov really ever discuss playbooks or ways to tackle common problems. We all do have the same problems with the same push backs but we haven't really got anything like that as a go-to thing. That's interesting actually, maybe there should be at some point.
<i>Interviewer</i>	<i>Yeah, I guess you've all got your own particular wrinkles that make it slightly more complex?</i> Yeah, I think, and I think it's difficult because GDS kind of own all that cross government stuff but at the same time they're not in a Department so it's like, it's almost like they can write stuff just like it should be, like a "discovery should be like this" and "Alpha should to be like this" but when I look at what they publish and then I go sit in [Department] or some part of [Department] where they just have not experienced any of this, it's just not possible to work in that way, because the people just literally will not allow it, they just don't understand, they don't understand Agile, they don't understand GDS, they don't understand design.

Table E.5: *Transcript of Interview Zoom-003 (cont.)*

	<p>And it makes it a lot more difficult than I thought it would be when I joined, like when I joined I read a lot from GDS and thought this is amazing, and then I joined and I was like this is nothing like I thought it would be, so maybe it's just because it's different. Inside a Department sometimes is just different than kind of outside looking in it at how it should be.</p>
<i>Interviewer</i>	<p><i>Do you find that you can see the difference in culture between different departments?</i></p> <p>So, I used to think so, because if you read different departments blogs they all have a perception of, in my head, being more advanced than [Department] in the kind of UCD and Agile approach, but when I speak to people it feels the same, like we all put on a front of we're doing really well, and we've all got little pockets that do really well, but for every area that's doing really well like [Team-2] is really quite far in its journey of becoming user centred and becoming Agile, for every [Team-2] there's another bit of [Department] that jumps out of nowhere that's just literally never heard of design, has no idea why we're here, so it's kind of, I think this is almost too big an organisation to even know where we are at. I think everyone, every org that I've spoken to, is like that they've got good bits and they've got bits they haven't started work on yet.</p> <p>[Closing remarks and thanks]</p>

Table E.6: *Transcript of Interview Zoom-004*

	[Intro and consent to record]
<i>Interviewer</i>	<i>So when you are starting a new project and you are sort of deciding as a team what the next thing is going to be, how do you decide what that's going to be?</i>
	<p>I suppose it's more a response to client requests and the client requirements in terms of projects that surface, so I work as one of the analysts in a team of four, and we basically respond to either new client requirement which is a paid for a change request or responding to issues and problems and things, bug fixes basically, so the stuff that I'm really interested in, and you know, which really I only really sort of appreciated I was working in the UX/UI kind of environment when I started working at this new company.</p> <p>I've actually been doing it for 10 years and not really realising what I was doing. So the stuff I'm really interested in, is the new functionality, new tool, change request paid-for type stuff from existing clients, so really the client requirement is the starting point obviously and I noticed from when I first started, that the concept of a user interaction or user interface and things being designed for that, didn't really exist. What was being provided and sold to clients at the time was "here's what the system can currently do, let's try and mould your expectations to what we can currently do".</p> <p>I don't work like that. I'm very much a visual learner, and I'm very much a visual designer, and my past has always been, I've got a sort of E-Commerce background, so my past has always been how can I make the path to purchase as simple as possible for somebody who maybe isn't as IT literate as me. That has always kind of been my sort of goto setting really.</p>
<i>Interviewer</i>	<i>So how would you describe yourself? Would you describe yourself as a systems analyst?</i>
	<p>Not really. I don't really analyse our system. I work to understand, so, work is the wrong way of putting it, so when I'm trying to solve the problem, that involves a lot of me working out how a system works, what it is currently capable of doing, but also what I believe the solution is for the client, in the first step.</p>

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

<i>Interviewer</i>	<p><i>Yeah, so there's a good slice of design work going on in there.</i></p> <p>Yeah, I'm much more comfortable in the design end, and so I'm much more comfortable speaking with the client, and not necessarily trying to achieve what they've asked for, but it's more about trying to understand what their problem is, because those two things are a lot of the time very different, because I find a lot of the time the client has presumed the solution, so has asked for "give me this" rather than allowing me to understand what their problem is and solving that for them.</p>
<i>Interviewer</i>	<p><i>Yeah</i></p> <p>So the UX/UI design side of my job is where I'm much more comfortable than in the database architecture and the SQL stuff.</p>
<i>Interviewer</i>	<p><i>Yeah the term UX has come to collect up pretty much everything, everything but the kitchen sink these days, so a lot of organisations don't necessarily use that as a job title.</i></p> <p>Yeah, and if you're the creative one.</p>
<i>Interviewer</i>	<p><i>So you have business analysts and user researchers and lots of different job titles wrapped up in that whole term, so ...</i></p> <p>Yeah and if you're considered to be the creative one in the team, anything to do with a fancy looking GUI, that gets lumped your way.</p>
<i>Interviewer</i>	<p><i>Yeah?</i></p> <p>Yeah, definitely.</p>
<i>Interviewer</i>	<p><i>Okay, so business analysts would probably be a better description of you maybe?</i></p> <p>Yeah, my technical, on my pay slip it says systems analyst.</p>
<i>Interviewer</i>	<p><i>It sounds like you've got quite a lot of experience. Have you been doing this for a while?</i></p>

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Yeah I kind of fell into out of University really. I was working for an E-Commerce company, a small E-Commerce company selling beds and mattresses online, answering the phones, and I was just doing it to earn a bit of money. The boss at the time needed somebody to look after their website so I sort of taught myself WYSIWYG HTML quite quickly, and started managing her product range on the website for her, and then it just progressed from there. I stepped into a couple of different companies, incrementally bigger each time, in terms of turnover and size of product range and that sort of stuff, and that gave me really good understanding of the things you could do to directly influence profit margin, you know, and bottom line, by making the path from landing page to completion of baskets as easy as possible.

Interviewer ***The whole sales funnel type thing?***

Yeah. I was really very comfortable with talking with my, as I knew it then, the end user, the customer, it never bothered me in terms of, I've met a lot of developers along the way who really do shy away from, can't stand any contact with the outside world, very happy just in their own little development bubble, you know, and not wanting to engage with the client directly, but I'm very happy with that.

Interviewer ***So how do you actually gather information about the problem is it mostly talking to the person who is going to pay for it, or the people are going to use it, or . . . , how do you actually go about doing that?***

A little bit of both, and it's something that I'm trying to implement at work, is this, I'm trying to develop a culture of early client engagement, because like I say it didn't, it doesn't really exist. I'm trying to sort of swing us more towards a very customer client focused development company as opposed to being just responsive and being a database architecture company with a kind of a clunky front end.

Interviewer ***So do you anticipate getting end users in to discuss prototypes with them or have chats about what they need and would expect?***

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Yeah. So, it would always be with the, sort of, the project stakeholder, a very, you know, my ideal is a very early client engagement meeting. Obviously, it can't be face to face now so Teams meetings has become the new norm, and actually I found them quite productive because it helps to structure the conversation in a way that you wouldn't really get if you are all sat around the table.

I often find that sitting around the table, sometimes the conversations can fly off on tangents quite quickly, whereas a collective zoom meeting, when you get over the initial technical apologies, you know, there's always my Internet's rubbish or apologies my headset isn't working, or let's try it. Once you get over that kind of thing everyone just kind of jumping straight in because now you've usually got three or four stacked up through the course of the day so you just need to get on.

Early client engagement with the stakeholders, usually that's after a requirement document has come in.

Our sales team will have been contacted or support will have been contacted in the first instance by their client. So if it's a bug, it's support. If it's a new requirement it'll be from the sales team. Sales team really don't fully understand what it is that we have, that we offer, because they are sales, and so they just say yes to everything and then hand over to us to work out what it is that the client actually wanted.

Yeah, they sell the "etherware" and then we produce the actual thing.

Yeah, so once I've sort of understood as much as I can from the initial client requirement documents, I then start putting that down into something that I think is what the client actually wants, and then we have a client engagement discussion. Sometimes that can be with a very early wire frame or even a prototype depending on how well documented the initial requirements is.

Interviewer

Is most of the information captured in documents?

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Most of it is, yes. Usually, it's not well formed at this stage. It can be something as simple as it as a one-liner or something is broke and needs fixing, but we don't know what, or it can be something very, very general, very high level, like "we would like a public facing map that displays all of our street bays and furniture".

You know, and that as a concept, for a council, is massive, so then, you are then into the refinement period of, you know, trying to help the client refine their own requirements.

You see, I always find I'm helping to define the requirement on those early client engagement calls, because you need to get the buy-in from the client there.

Interviewer

Once you've got your own head around what you trying to do, what problem you're solving, how do you then share your understanding with the rest of the team?

I always build the prototype and I always offer, there is a supporting document that goes with that, and the aim there really is to, I start with the prototype first, I build out what I think the journey of the end user is going to be, based on my understandings, that helps me to ask a lot of initial questions of myself and my understanding of the architecture that sits behind it all.

It also gets me pulling in some information from colleagues or the more knowledgeable about certain areas to help me build my understanding.

Once that prototype is sort of built, that then informs the written specification document, and it's then that I start testing my theory against the actual structure of the database, and the information, and it helps me to pin down where, where am I getting this bit of data from, in this data field, on this screen, rather than it all be just ethereal it's actually now becoming a bit more concrete.

Interviewer

Where is this coming from, where is it going to, yeah?

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Yeah, and so I'll try I'll pull other senior analysts, there's two guys I work with who've been with the company for a long, long time, their knowledge of the SQL databases is just remarkable, and so rather than me going away in trying to spend a few hours you know sifting through all the tables just asking [Name-1] or [Name-2] is a much quicker step step solution and then ...

Interviewer

There's no substitution for conversation is there

Absolutely ... I'd also pull in some of the dev team, and again something I'm trying to harness going forward is a closer relationship between analysts, sales and analysts, analysts and devs, analysts and testers, because I feel like an analyst is a bit of a conduit between the different parts of the development process for a project.

Having a conversation with the developer, not just, doesn't just help me to understand the capabilities of the code and the things that are already there because, that was it, you have to spend a lot of time reworking code that already exists, so what I don't want to do as an analyst is create this concept with something that is then going to mean a developer's got to rewrite thousands of lines of code for me to be able to achieve the thing that I've, you know, promised to the client. So having the conversation with the dev really helps me to inform my design because there is always another way of thinking about something, so there's always another way of solving something, so it's great to get their input in that, and they also, they buy into it nice and early then, rather than them just receiving a document cold on their desk one day, or in their inbox, saying build this, they are already involved. They've been involved in the design process from an early stage so I found that's been, and some of the feedback I've got from the developers is, this is a great way of working and can we have more of it please.

Interviewer

Yeah. So, you're working as more of a cross disciplinary team rather than individuals separated by documents?

Absolutely, yeah.

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Interviewer ***Yeah. Okay so if at the early stages when you're still getting your head around the problem you spot the potential for a usability issue, say, or some issue that you think the development team need to be aware of when they come to code it, what do you do?***

I suppose a very recent example is there's been a big shift towards using the dot.gov styling for some of our front-end portals and we've been trying to replicate some of the functionality of some of the existing front end portals. There's been a real disconnect between what's currently there and what the dot.gov styling says you should be doing on screens like this, and so they've posed a lot of design issues. Not issues but potentials for learning shall we say, where, yeah we've had open, I've pulled devs and analysts onto a call, we've all had just an open discussion. I've set the meeting up to say this is the point of the conversation, here's what we're trying to achieve. I already know what the system is capable of doing, but we, I believe we need to change, and here's my suggestion, and I'll get, and then try, and we have just an open discussion with analysts and devs about what's the best solution, isn't it really, and so yeah, it's much more collaborative.

Interviewer ***Do you get the stakeholders back in at that point to see what they think about it or do you wait until you have something more concrete?***

Not at that point, no. Something more concrete, yeah. For our clients there's, somebody once told me that, you know, web design and or UX design, any kind of digital interface, there's this concept of black magic. From a client point of view, all they get is the flat screen in front of them. What happens behind that is black magic and they don't need to know. All they're interested in, is what surface, what comes to the surface, so we would only then go back to the client at the point at which we'd sort of solved that problem, or pre-empted the questions around the issue, and had a solution for it, and then I'm going to go back to them, so.

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

And that's happened recently with one of our large clients. We've got a new client, they are huge for us in terms of scale of work and income, but also demand on time. I think they epitomise a new breed of clients who are employing a lot of very talented educated people straight out of University who are trying to do things by the theory book rather than from experience, so if it's kind of forcing us to, I hate using the phrase "to be like the Amazon of" but people use kind of Amazon as almost this benchmark of E-Commerce and, you know, functionality or something, so there's always kind of "Oh, you know, like Amazon do" is kind of something we deal with quite a lot but it tends to be because, it really is a very high expectation of what a user should experience from the service, the tool, the thing that there into, whether that's the member of the public using a public facing web portal, whether it's the person on the street with a hand held device scanning peoples registrations to see if they've got a parking permit or not, or if it's the client user in their office using our back office system.

We are sort of battling on three fronts a lot of the time, and so when it, when our clients are especially the, like I say, the sort of the younger employees of the client who been brought up in a completely digital world, so their expectation is already at the Facebook / Twitter / Amazon level of what is a norm.

Interviewer ***I want to be able to do this on my phone?***

Absolutely, absolutely, yeah.

Interviewer ***Right, okay. So, you've got quite a diverse set of people involved there. How do you know that you've all the same shared understanding?***

I think that's the understanding document that comes back from a developer.

So once, the steps I'm trying to implement are that once we get the requirements in and we have the very early client engagement meeting, that's where I need to make sure that I fully understand the client requirements, and the client requirement is fully formed at that point, that instantly is your first measurable.

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

When it gets delivered to the client way down the line, if anything is different than was agreed at the start then obviously I failed [OB?], and our development process has failed.

If anything comes back from the client at that point so, you know, “though this isn’t what we meant” it’s kind of almost the clients issue passes, I say it hesitantly, but if the client has signed off at that early client engagement point “yes you fully understood my requirements” and then something new comes out of the bag later down the line, you kind of, there we can’t mitigate for that.

But, having that early client engagement, then going into the prototype design consultation with devs, all that kind of internal understanding, my specification documents handed over to a developer for understanding, understanding from a dev comes back, if I then think he or she’s fully understood what it is I’m requesting of them, it goes into development with them I’ll then have another client engagement meeting, and I’ll say here’s the prototype I’ve put together based on the conversation that we had back in April or whatever, I just want to double check that this is meeting your requirements, and this is where your expectations are, because this is my understanding of what you asked me for, and that’s why I find a digital prototype that you can walk through, and it’s got clickable steps, and it’s not like a fully formed web thing, you can’t really give it to the end user, to the client to use, but it’s a series of interactive screens where you can walk through the user journey.

Interviewer

Yeah, it’s somewhere to hang your thinking isn’t it

Yes, it’s been hugely beneficial in terms of our understanding and assessing the clients expectations because then when it comes out of the development cycle and it’s released it looks like the prototype. So what they’ve seen and played with a little bit is what they get delivered so there’s no surprises.

Interviewer: Yeah. Do you try to challenge each other to make sure you’re challenging assumptions? I think I challenge others more than they challenge me in terms of assumptions.

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

I think because I'm the new kid, then there's always a lot of "Oh well it's because it's always been like that", "we always return that though", "that API exists because it's what's always been there", and I'm the one saying "well that's ridiculous", "you're requesting information, you've got all these nodes here for information you're requesting, you're doing nothing with it".

It's a pointless exercise if you're only using 12% of the data you're pulling back in that web call, you need to cut out 88% of your call, and just have the, you know, just streamlining.

So, I do a lot of the challenging, but I do believe now the other three members of the team that I'm working are, I'm encouraging them to challenge me more, you know.

The other three guys are the first people I will then take an early prototype to, knowing full well it's going to go through the vacuum pressure test of let's crush it and see what comes out the other side.

The two lead guys are obviously very much "why're you doing that", "this is weird", "we don't currently do that", "what're you doing that for" and so it really helps to make sure that I understand, that I've got really good reason why it is that I'm putting in the thing that I'm asking for.

Yeah, there is a, we are getting, a culture of challenging, of challenging assumptions, I think would be a good way of putting it, yep.

Interviewer

Okay, when you're having your discussions with the client and presumably go through a couple of iterations of that how do you know when you've understood enough when your discovery is complete in inverted commas enough that you can go forward and build things?

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

I think once the client is yet happy with that, it's always a very good sign. The large client I've just discussed previously and who are, who have been very challenging on time, we very rarely got out of a meeting where there weren't further actions. A lot of the time there was scope creep and we are always very conscious of that, but also they did raise some good points along the way, and it, so it wasn't really until the main stakeholder in that process said "yes I'm happy with that now", and I think it also depended how far that, how many meetings we'd had, how far down the line we'd got in that discussion, would then sort of depend on my response to it, so if it was very early, and it was it "yeah I'm happy with that" I kind of would sometimes go back and rework some of the things in that he said would be nice to have, because it was very early in the process, so if they weren't difficult things to implement, we keep getting a little bit of kudos here by providing some extra functionality that they would like, but aren't expecting until much further down the line.

If we'd had eight or nine calls about the same issue, and had been a very torrid sort of back and forth over "we want this" and "you've also asked for this" so you're actually in direct conflict with yourself here "which of these things would you like to proceed with" or "we want them both", "you can't have both because one is taken away from the other" so which one wins?

So if that happened, so 9 Teams meetings later, and probably 20 hours spent in discussion, when the stakeholder finally conceded "okay we will have that then", there's no more work for me

That's it. line drawn under that said thing, let's do exactly what they've signed off on. So that's the client lead bit I suppose, that at the time frame of design. There where, there are obviously also internal time constraints, there are considerations given to other work, from other quarters, that's come in, that is waiting, so sometimes the case of "[Name] you gotta get this box off by next Friday" and that's it, that's as much design time as you've got, you've got until Friday and that's it.

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

	<p>So obviously that then really hinders my idealistic approach to really holistic and involved client engagement project, and designing for the user, and all that good stuff I really want to drive home. I tend to find that's the fat that gets cut when the when the clock is ticking.</p>
<i>Interviewer</i>	<p><i>So, what is it that really limits the time spent is it availability of people or meeting deadlines or some combination?</i></p> <p>Meeting deadlines. Sometimes it can be legislative, sometimes it can be ensuring that accessibility statements are visible to the end user before, by a certain date and time, otherwise the clients up for a serious fine potentially.</p>
<i>Interviewer</i>	<p><i>Yes, that concentrates the mind a bit.</i></p> <p>It does, yeah.</p> <p>The most frustrating thing about the whole access statement thing that came in from the government was everybody had two years to sort it all out. It was announced back in 2018, the deadline was September 2020, everybody knew that, and then I started work for this company in the May, and it got to August and everyone goes "what are we doing about the access statements", and I'm like "You haven't done this yet?!" "Oh no, why? have you done it?" "Yeah." "Alright you can do all of ours then." "Right, thanks." I had 4 days to do all of those.</p>
<i>Interviewer</i>	<p><i>Oh, wow.</i></p> <p>So, there was no client engagement. There was no design. It was, it was a very flat HTML file that was produced on mass, and so you know that was, the limitation was set by the, by an external factor with serious financial implications.</p>
<i>Interviewer</i>	<p><i>Do you sometimes have to judge the risk of stopping, and advise the client to do nothing or to please continue with this because if we stop there's this risk?</i></p>

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Myself, personally, no, and I think because the risk in our, the risk that's present in our software is the multiple iterations, multiple versions of it that are out there.

So on a client basis, we've got 36 individual clients, and I think there's seven different versions and each version there are multiple iterations of those versions, so version 202 is currently in production but we still support version 185 for a particular client, which you know, 185 is 10 years old.

The client will not pay to upgrade their system and because they are a significant client the decision's been made, I suppose, higher up the tree than me, that we would rather retain the contract then risk losing it, so there's lots of stuff that comes in for that client that we have to try and bat away because the current production model that we're trying to implement is so far away from version 185 that if we start patching bugs, bug-fixes and stuff into 185 were potentially going to break something for higher up and the answer is to upgrade your system, but it's easy for me to say as the analyst, is not so easy for the operations director or the sales director to be able to pitch to said head of a council who is you know a significant player in the market.

Interviewer ***You might almost get to the stage where it's cheaper for you to upgrade them for free then it is to carry on?***

We are getting to that point, yeah.

We recently did an assessment, we are going to migrate onto a new Azure platform and stop physically hosting servers and moving to cloud-based environments, because we realised it was over a million lines of code, and 16% of that must be redundant, at least 16% of that is redundant.

So everything takes a long time, yeah. When a client's paying or suggesting they, you know, if it's a change request, I don't think anybody would ever say no don't do that, but I think if it's a bug fix it's easy to say no we can't do that.

Interviewer ***Okay, that's interesting.***

From a sales model, there's no money involved in a bug fix.

Interviewer ***Yeah, I guess, unless you lose future sales from not fixing it?***

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

	Yes potentially, yeah.
<i>Interviewer</i>	<i>When you're making choices early on, are you always aware that yeah this choice we're making is affecting the design or does sometimes things just kind of happen by default and it is only later that you realise actually there was a choice there?</i> Conscious, yeah. I'm very aware of choices I make influencing the design. I'm not, I am less aware of choices that developer might make, that inadvertently influence my design, or the design should I say. I do hold onto these things somewhat, and things do happen where they, where software is, a release is deployed to a customer and it's not exactly as I've designed because a dev thought it was better his way. That has happened.
<i>Interviewer</i>	<i>Are they right?</i> Ooh. that's an interesting question.
<i>Interviewer</i>	<i>Yeah, because sometimes they might be just randomly?</i> I would be reluctant to say yes they're right because it, that would almost sort of negate a lot of the work that I did in the initial design phase to make sure that I understood what the client wanted and therefore I was right. But I also don't want to be as arrogant to think I'm right, and therefore nobody else is right. I sort of try and take those instances as a potential, potentially I should have had an internal conversation there, with the dev earlier, yeah, to portray or give them an indication of what's coming and allow that conversation to happen, for the dev to inform my design at that phase, and I think that's where we've got to, more recently. When I first started I wasn't having those conversations and therefore those instances, of things getting out in the wild that weren't matching my design, occurred but now I think I've been able to pull the analysts and the devs much closer. Especially on the big projects where its wholesale change, inputs whole new areas of functionality, we're definitely a closer-knit team and therefore those instances don't occur as often.

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Interviewer

Okay that's good. If you get client requests of various different sizes, different complexities do you actually get more time to deal with a complex change or a complex request than a less complex thing or does it not necessarily work like that?

Oh yeah definitely get more time to work on the big stuff, and I think that's a real sort of kudos to my boss really, of identifying strengths in the analyst team. It keeps a lot of the, the more fiddly database complex SQL stuff away from me, and he gives it to [Name] because he knows that's what [Name] is really focused on. He's really into the SQL, very rarely uses our own back office to troubleshoot issues and bugs that come in.

He's straight to the code doing queries, and I just, I can't, it's not me, I can't do that, but I get all of the GUI user interface and front-end stuff, so that inherently brings with it a longer period of design, because there's more engagement involved. Because I tend to be building the thing from the ground up, I have to create, I have to construct the concept first, before I can actually build the thing, whereas other requirements could be "this is broken so can we fix this". The thing already exists, it just isn't working as it should be, or there could be an element of a vertical part of the system, that we're going to add a little bit of extra complexity into.

It already exists, so that the logic's already there, so it's easier for somebody to enhance upon that.

Some of the largest stuff I'm doing were I'm essentially building a whole new website from the ground up for a requirement for one of our clients, which is end-user facing, so our client isn't our end-user, the member of the public is the end-user, the client is the person in the middle paying for it essentially.

Well then that's, I know it's just it's a single Jira in our Jira environment for me to work on, just one item, but actually it's probably 48 hours' worth of design work because it doesn't exist, so I need to understand whose requirements am I meeting.

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

	<p>Am I meeting the requirements of the end user, a member the public here, or am I meeting our clients understanding of their end users requirement? So, it can be a difficult thing sometimes. Sometimes I'm designing for the client, the council, the stakeholder in the council who wants this thing, and sometimes I'm trying to understand what his or her understanding of their own user requirements are.</p>
<i>Interviewer</i>	<p><i>Oh right, okay yes.</i></p>
	<p>That sometimes I'm getting the user requirement second hand.</p>
<i>Interviewer</i>	<p><i>Why do they think this is the case, yes. Do you try to represent the end users in your design process to use things like personas or anything like that?</i></p>
	<p>Yeah, yeah, we try and work through use cases, and at the top and bottom of that scale you've got a single, member of the public, single occupancy household, one car, only going to use this tool once, and never come back to it again, or business, multiple scenarios for that business. So in this example I'm talking about applying for parking permits or on street permissions. So for a film company, is a real-world scenario. In Liverpool they've just been filming the new Batman movie.</p>
<i>Interviewer</i>	<p><i>Oh, right okay</i></p>
	<p>So, the film company involved had multiple on street permissions over the course of a few months in different parts of the city at different times, were different validity dates, so their user requirement is far more complex.</p>
<i>Interviewer</i>	<p><i>Yeah it's quite an interesting use case</i></p>
	<p>Yeah, far more complex than "Dierdre" who just needs to reserve the parking space outside her house for 4 hours on a Saturday, that's when the grandson comes. So, we do try and build the use cases, and I try and use real world examples too, rather than just try and create this scenario in my head.</p>

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

	<p>As part of my client engagement, a lot of the time it will be going back saying “you’ve asked for this thing but give me an example of”, “why have you asked me this”, what’s the problem you’re trying to resolve here, and that’s when you get the conversation about “Oh all the time we get complaints from the team who are answering their phones”, because people are constantly ringing up and complaining, so it’s always about solving the problem for somebody.</p>
<i>Interviewer</i>	<p><i>Do you try to tie the change request back to end user complaints and queries and people phoning the helpdesk, do you tie those together?</i></p> <p>Erm, Yes. I’m hesitant to say yes, because sometimes it depends whose helpdesk. So, we have our own helpdesk, our support desk, and a lot of the time there can be problems solved there that come in through our own support desk because an issue has been raised by the clients own helpdesk, because they’re getting a pain in the bum from members of public calling up and speaking to their frontline call handlers about a thing, so there can be more than one helpdesk involved.</p> <p>So fully understanding where the request is coming from sometimes is a feat in itself.</p>
<i>Interviewer</i>	<p><i>Yeah. Do you ever get to talk to their helpdesk staff?</i></p> <p>No, and actually we don’t encourage, we try not to from an analysts point of view, and the support desk are employed for their skills interpreting the data that is coming in from our clients, so there is a very strict structure around who we can and can’t talk to.</p> <p>If the analysts start going straight to client helpdesk users we’re almost subverting the support desks structure they’ve got in terms of handling calls and their reporting and the processes they’ve got involved that we don’t, we don’t actually get involved in.</p> <p>So yeah, we try and keep those lines of communication very clear.</p>
<i>Interviewer</i>	<p><i>Yeah, I guess you’ve got some confidentiality issues as well, with end user data and things between different helpdesks?</i></p>

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

	<p>Yeah, there will only be approved people who can speak to our helpdesk, there will be approved people who can speak back to their helpdesks, and you know if your name is not on the list you probably can't speak to the person anyway. It's good for me, and from my point of view as an analyst, because I then don't get bombarded by calls from A.N. Other person, from A.N. Other client at all times of day, asking me "why is the drop-down list green not blue".</p>
<i>Interviewer</i>	<p><i>Yes. Okay how sort of frequently are you pushing out new releases of software?</i> Quarterly.</p>
<i>Interviewer</i>	<p><i>Quarterly, right. So do things get batched up to come out in the quarterly release?</i> Yes awfully. It's terrible. It's the single most frustrating thing currently, and it's something that we will be rectifying when we move into our new Azure platform. The idea will be to switch to a more sort of DevOps type approach, and release little and often rather than, because the quarterly releases, by the time we get to sort of this time of the year now we're already looking at 2021.3 That's you know September next year, and that's already going to overrun. All this new stuff keeps coming in and it's all P1 priority. It gets put into the next release so then you're constantly shuffling. Here's a release for you know 2021.1 so February next year is already moved to .2 and then all the stuff that's running late this year is being put into 2021.1</p>
<i>Interviewer</i>	<p><i>Do you sometimes get to a release you already planned and find the world has moved on and that the features in that no longer match what people need?</i> Not yet, not in my experience, but we are in a situation now where something that is scheduled to begin development that I've designed, is already going to be superseded by the thing I'm working on now, so the requirement came in from one client for this thing. I designed and specified this thing, it's now in the dev queue and another request is coming from a different client for a better version of this thing, and I'm now designing it, so at the point at which the first version gets released the new version will be 1 release behind it.</p>

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

<i>Interviewer</i>	<p><i>Okay your configuration management must be quite fiddly then?</i></p> <p>I'm glad I'm not involved in it. We have a projects team, and they look after it all. Managing all the different flavours of the different iterations of the tool must be awful.</p>
<i>Interviewer</i>	<p><i>I do occasionally have some sympathy for Microsoft when I think about how many different versions they have to support but not a huge amount of sympathy I must say.</i></p> <p>I think the aim again is to move on to a more stable version, a more stable singular version of the tool, of the software, and make all of the features sort of more modular. The reason we have so many different versions of it at the minute is because of the different demands of the client but that's because none of the pieces of the puzzle are modular.</p>
<i>Interviewer</i>	<p><i>Right. Do you think that moving to a more sort of DevOps more continuous development approach will change the way you talk to stakeholders?</i></p> <p>Absolutely 100% yes. The stakeholders will start seeing the benefit of getting a much quicker turnaround from their requirement. Currently it can be 10 to 12 months from the point at which a paid-for change request is submitted to getting the thing released into a production environment, and that's a long time if the requirement has come about because it solves a problem that you got in your business, which is causing you a headache now. A year is a long time to wait for that headache to go away and then in the interim there's loads of workarounds that happen.</p> <p>That's then corrupting or subverting the clients own internal process, because we have to work around to get this thing to work.</p>
<i>Interviewer</i>	<p><i>Presumably if you're doing public sector stuff as well then you might suddenly have some change in regulations or primary legislation come along that throws a spanner in?</i></p>

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

	<p>Yeah. We deal with a lot of clients in and around London, and the low emission zone is actually being expanded to a new ultra-low emission zone, and that's legislative, so the impact on requirement would see demand on the system increasing from circa 1.6 million transactions a year to 16 to 17 million transactions a year.</p>
<i>Interviewer</i>	<p><i>Okay that's quite a big step</i></p> <p>Yeah and this was just kind of announced "oh by the way we were looking to expand the LEZ to the ULEZ which is going to then take in all the M25 ring. Can you accommodate this?" "Yeah no problem at all" from the sales team "of course we can, no problem at all". Then it's "can our current system handle that?". We've gone "no" because you just exponentially increased demand on the system overnight.</p>
<i>Interviewer</i>	<p><i>Okay so you are quite early on then in your sort of move to more agile more DevOps type approach to things?</i></p> <p>Yeah</p>
<i>Interviewer</i>	<p><i>Do you think you will be recruiting additional people?</i></p> <p>Absolutely. I can guarantee we will be recruiting more people yeah. I think we need two more on lists probably two or three more developers actually as well, soon because there's just there's enough work currently without us doing anything else for the next two years.</p> <p>So we're already having to having to stack work, back there, and obviously that has massive implications on new clients and winning new business, so yeah there will be recruitment drive and I would think in the early part of next year.</p>
<i>Interviewer</i>	<p><i>Well, that's a nice position to be in.</i></p> <p>Yeah hopefully more sort of user focused minds, a little bit like myself, I guess. Sometimes it can feel a little bit like I'm a lone voice, so just saying "come on guys we can make the user the champion in all of this".</p>
<i>Interviewer</i>	<p><i>Yeah, it takes a while to get your head around user centred design and what that actually means in practise for how you do things.</i></p>

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Yeah I think you hit the nail on the head when you were discussing in the webinar I watched, about how our software has been sold and it being very feature heavy, whereas obviously the landscape's changed now and people don't really necessarily need to have 164 widgets if they are only ever using one, and the one they currently use, they don't use fully because you don't really understand it, they just know enough to get by.

Interviewer ***The little digital voice recorder I use has a manual that's like a little book. I was just looking around to see whether it was on the desk here. It's literally a book, and I probably use about two pages of it.***

Yeah, it's the same with like your digital SLR cameras. The book that came with that is massive and it just stays in auto.

Interviewer ***There was a book about that. It's getting on a bit now, it's been out a while, by Alan Cooper. I don't think I've got it handy on the bookshelf, but "The Inmates are Running the Asylum" was I think the title.***

Yes, I've have noted that as well from your discussion.

Interviewer ***The starting point of that was talking about what was going on at the time he wrote it with companies trying to sell things based on features and coming up with these consumer devices with feature upon feature upon feature that didn't necessarily help so that's what motivated a lot of that, and he's done a lot of work since then.***

Interviewer ***Right okay so we talked a bit about mobilisation we've talked about how you engage with stakeholders, how you share that with the team, how you know whether you've got alignment across the team. I haven't said a lot about iteration, but I guess when you're producing prototypes you'll get feedback and produce more detailed prototypes, will you sometimes?***

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

Yes I will, yeah. So, I'll revise a prototype a couple of times: once, usually after I've demonstrated it to the close team, some other analysts, and the developers, sometimes I then have another internal demo where I'll get the wider team involved. I'll get all test team, and I'll get some of our sales team and the project team to have a look as well, so they've got an overview of what's coming.

That can often help to refine some of the design. Then it gets to a client engagement and demo again and that could also then iterate the design. Sometimes it can be three or four or so post vee-one tweaks. Yeah.

Interviewer ***Do you find that the sales team have an appreciation of the technical aspects of what they've asked for, the consequences of the things they said yes to?***

No. No. No. I don't know whether it's true of just this sales team in particular but just as there is zero concept of a technical requirement to do a thing, they are merely just out there selling, selling the software.

Interviewer ***Do they ever get to see the user journeys that you put together for how things are going to work from the user's point of view?***

They never used to. There is a guy actually in the sales team, who, me and him get on really well. I've been talking to him a lot about how I can help him sell better. It's all about client engagement and getting the client to buy into the thing, you know, to be part of the development process, to be involved in helping to scope the design of things, rather than just receiving something way down the line, after they've asked for it, and you know being part of that process, and he's really on board with it, and me and him have had a couple of client engagement discussions, where we've done prototypes, and I've given him the prototype and said "you run this" and I demoed it to him first and he's played with it and then he's been the one to drive the conversation with the client.

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

And that's been really beneficial because he's then seen how long it's taken me to get from initial request to a prototype and then I've demoed it to him and kind of tried to explain to him, why things are the way they are, so he's definitely better placed now to have a more educated understanding of the technical requirement for the thing that he's demoing to a client, definitely. It's generally all about just bringing our teams, our disparate teams close together, I think.

Interviewer ***Presumably at the moment you are all working from home and Zooming or using Teams?***

Teams, yeah. All working from home, I think across the board, we've all said it's actually made us communicate more. We've communicated more effectively since lock down because we all have a daily call. We never used to all talk together every day, because you know I had no need to talk to any of the test team, and I wouldn't have walked the three rows down the office to go and say hello to any of the guys down there because I didn't need to.

I know I was in my little analyst bubble. Whereas now we'll talk to each other, so we all have open conversations about things that are going on.

Interviewer ***Is that like at a fixed time every day?***

Yeah. Yeah, 9:30 every morning. So at 9:00 o'clock to 9:30 we have our daily catch up, and the boss goes through all of the team, well the heads of the teams basically, saying give me a little brief overview of where you are today, so we all get to overhear the problems that people have been dealing with and it's been surprising how many problems have been resolved because the devs have been able to go "oh, hand on a second that's because of this", "I've been working on such and such a thing" or I've been able to hear somebody discuss it and I've gone "I'm working on a change for that right now, so actually don't do anything, it'll be fixed".

Those conversations wouldn't have happened

Interviewer ***Yeah. So, you've all got more situation awareness just because you're part of that conversation.***

Table E.6: *Transcript of Interview Zoom-004 (cont.)*

	<p>Absolutely yeah. I think we've all got a more, holistic is a funny word but I suppose it would just fit here, we've all got a better holistic view of the product and the current state of play.</p>
<i>Interviewer</i>	<p><i>So I guess you'll stick with that. Do you do you imagine you'll go back into an office or is that going to change do you think?</i></p> <p>I don't think we'll be back in the office.</p> <p>Like I said at the top of the call, we were recently bought by a different company. They've got no real urgency to purchase office space for us in [City], so it's really being driven by our, he was our director, our business unit director, I suppose he's now our chief operating officer maybe, I don't really know what his status will be now, it's at his discretion really, he said he's got no interest in getting us an office space any time before the summer of next year and I think it's because we've all been working actually really effectively and profitably since March.</p>
<i>Interviewer</i>	<p><i>Right. Where were you all based? Are you all over the country?</i></p> <p>The bulk of the team's in [City], and there are a couple of guys in [Other City] so the project manager and the project director, they're both in [Other City], and there's a couple of guys who worked on there specifically for the base of doing client visits with our, with the big [Other City] clients, but the dev team and I know the analysts are all in [City].</p>
<i>Interviewer</i>	<p><i>Excellent okay right thank you that's that's quite interesting be interesting to see how things develop for you</i></p> <p>[Closing remarks and thanks]</p>

Table E.7: *Transcript of Interview Meet-001*

	[Intro and consent to record]
<i>Interviewer</i>	<i>A couple of up-front questions. How do you describe yourself normally, when you are telling people what you do?</i> Ooh.
<i>Interviewer</i>	<i>Do you call yourself a UX designer, or an interaction designer, or something else?</i> I wouldn't call myself a designer. If you ever saw the scribbles I've ever done you'll know why. I think, I think, my background, because my background's as a psychologist and ergonomist I always say I'm a user researcher.
<i>Interviewer</i>	<i>OK.</i> Yeah, rather than doing the design stuff. I guess the other way I'd describe myself is when it's like [Company] as a company, is that we used to say we were a group of contractors, we are now saying that we are an agency, because there's five of us so apparently we can, now there's five of us you can call yourself a kind of an agency. So what kind of doing that, so I guess, yeah, so I guess, and we'd probably say we dealt more with the people-side stuff, so yeah we have got people who can do the UX design stuff, but probably the other thing is, we're looking at service design, business analysis, change, digital transformation that kind of stuff. So we kind of, that's how we describe ourselves, wider, but me myself I would say user researcher.
<i>That's the ...</i>	
<i>Interviewer</i>	<i>Experienced in doing that, I guess though?</i> Yeah, yeah, yeah, so that would be the ...
<i>Interviewer</i>	<i>Do you often do things like this, have you participated in other people's research very often or not?</i> No, actually. We've kind of started to do that cause we're doing some work through it as you know, you met [Academic], with [University].
<i>Interviewer</i>	<i>Yes.</i> He's been doing some stuff with us so it's, it's probably stuff that we're looking for opportunities to kind of, do really.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

<i>Interviewer</i>	<i>OK, excellent.</i> Obviously, we'll see whether it's collaboration or being interviewed yeah.
<i>Interviewer</i>	<i>This is actually the first time I've used Google Meet. It seems to be working quite nicely.</i> Yes, yes, in Google Meet because we used the whole the GSuite thing and if you pay for business it allows you to (a) record and (b) you can stream, so you can set up a parallel meeting which is purely for streaming.
<i>Interviewer</i>	<i>OK</i> So you, so you and I could have a Google Meet which is you and I doing stuff and you recording and all of that, and then there could be another meeting which I might not be aware of, that it streamed to, so that's quite useful if you're doing webinars or online usability labs and remote research, because I wouldn't know that there's like 10 people observing me you would just say there are some people observing this and they will be taking notes.
<i>Interviewer</i>	<i>Interesting. Would be nice.</i> Yeah, so it's a ...
<i>Interviewer</i>	<i>Right, being an agency I guess you don't have quite so much control over what you do next. How do you choose what thing you do next, in terms of your next piece of work?</i> Yeah, actually there's two routes we have to market, and [Company] always has had these routes to market, so one is to bid for work either on our own or in collaboration with other people we will have a particular bit that we're saying "we can bring this, if you bring that" right? and the other thing when, that runs parallel to that, is to go and apply for contracting work as you would as a contractor, a self-employed person, so the partners, because we're partnership, can individually go and do that as well, so that's the two ways of getting work.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

I think the contracting stuff has been prevalent over the last four or five years because with a lot of the GDS projects that's what they want, and that's work that's been there and it's been, it's been easy to get because everybody in the partnership is highly knowledgeable and highly skilled, you know we're kind of skilled practitioners, so we tend to get, when we go for interviews for those kind of roles there's a good chance we will get them. The bidding is a different, it's a whole different thing, because you know, you bid for 10 things and you are lucky if you win one, really.

Interviewer

Yeah

But the other stuff we do as well which we're looking at to do more is, a third avenue we're wanting to break open more, is working as subcontractors to larger agencies. So they go and win the work because they're taking a whole pile of resources and leverage and capability, and then we fit a particular gap in that, and then it all depends how much we want to grow to be a bigger agency who could do that for ourselves to go and get bigger projects or whether we want to work on those sub-contracting relationships.

Interviewer

Right, so do you have like a wish list of things you would like to bid for, if they come up?

Yes, in terms of the type of work, yes.

Interviewer

Yeah.

So we want to get much more into the service design and digital transformation side, and to get ourselves I guess, . . . Yes. With a lot of the user research type stuff which we've concentrated on, we do everything from discovery to the endpoint, and stuff in it like qual and quant.

The issue for us is to get higher up in that process and further back so, which is almost doing service design type consultancy, digital transformation, management consultancy earlier in the process and further up. That's where we see ourselves.

Interviewer

Right, a lot more end-to-end sort of work?

Yes and more as well, I guess, being in at the start where you're doing a lot of helping people put the concepts in the ideas together and that initial very early discovery stuff.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

<i>Interviewer</i>	<p>OK.</p> <p>Because we, we've, [Company] in its history, previously did a lot of management development trying all that kind of stuff and strategy type work that disappeared in the recession of 2008 2009 2010 and that work just disappeared, so the issue is if you want, if you're getting into an agile project doing user research stuff an awful lot of design decisions have already been made by then.</p>
<i>Interviewer</i>	<p>Right</p> <p>So we'd like to get earlier and higher up in the process so we would be involved in that and then doing the delivery bit on, and that would move us from being screwdriver people – you've got a particular set of knowledge and skills, come with your toolbox, yeah – to be more consultancy type people.</p>
<i>Interviewer</i>	<p>Okay so do you have ...</p> <p>Or when a project happens we've helped build it, so we know when we're doing the user research or the UX design or whatever we know it's the right thing that's been looked at.</p>
<i>Interviewer</i>	<p>Right, it gives you a bit more confidence in the whole process.</p> <p>Yes, yeah.</p>
<i>Interviewer</i>	<p>Do you have particular favourite research techniques when you are gathering information at the beginning?</p> <p>Yeah, I think we go for the, from the kind of user centred design type stuff, particularly the GDS, we do a lot of government stuff.</p> <p>It's a lot more the kind of get out there, it's more the qualitative stuff, so the ethnographic stuff, go out and talk to people, watch people, understand the context of use, so that then you have a much more informed user journey. So there's some people who see that, some agencies see it as you get, you get the executives in the room, and you run two or three workshops, and then you do the Agile process. We want to actually talk to the actual real users on the ground floor, not just the chief executive wonks type people.</p>
<i>Interviewer</i>	<p>Yeah</p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

	<p>So, so yes, so much more, and I guess we therefore describe our approach as being much more about being emergent, so and grounded theory, so trying to go in without preconceptions of this is, these people need a brand new system X that will do X, Y and Z so let's go and to look for evidence that they need system X that does XY and Z. Let's go and have a chat with them and then build up from there.</p>
<i>Interviewer</i>	<p>Yeah.</p>
	<p>And then that builds into the kind of, you know, what are the user needs that have come out, what is the service design, all of that kind of stuff, to build on that.</p>
<i>Interviewer</i>	<p><i>So you're involving the actual end users, who else would you bring in? Who else do you talk to?</i></p>
	<p>I concentrate on the user research side, so probably be examples what [Colleague] did with a with a high level global legal firm, one of the magic circle ones, and that was a lot more involvement with stakeholders. So that's everything from talking to them about what they want and what they think should be happening, to also the schmoozing and pacifying type stuff which I will just say other people in [Company] are better at doing than I am.</p>
<i>Interviewer</i>	<p>Right</p>
	<p>Yeah I think you've met [Colleague], [Colleague] is really good at doing that. I'm much more the "No no you can't have that, that's a really stupid idea" that kind of doesn't ... [Colleague] is much more doing that, in a much more politically sound way.</p>
<i>Interviewer</i>	<p><i>Yeah, so once you've got your initial research data what do you do with it, how do you share it around the team?</i></p>
	<p>Well I think I think this is thing where we're taking how we've been working last few years within an Agile process and user centred design within our job particularly with government working to the GDS service design manual, which is which is pretty good for this kind of stuff, there is that thing of you know the brown paper and the stickies on walls type stuff.</p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

There's that or having digital versions of that, so that's still within the team, getting, we like to get the team, particularly if it's an Agile project where we're making the thing, where people are making the thing, and testing it, is to get everybody involved in that user research and interaction with users so they'll be coming along, and they'll either be observing and taking notes, maybe they're coming along to the ethnographic stuff, maybe they're watching videos and recordings afterwards, or there's some involvement, so that you don't get this which used to happen with the old fashioned usability type model, build a thing, get some users and test it and all of that, and then you'd write a great big usability report, which gets ignored because whenever you did do that kind of presentation you have a team of people sitting like this going "I think you talk to the wrong users", "well they must have been really stupid if they use ...", "if you talk to ...", "Oooh no", and of course because they've not been involved and then lands this doorstep of a report, that says basically "you got it all wrong you idiots", they kind of don't, they don't respond very well to that, because they've been coding hard for, you know.

That was the old-fashioned way.

The agile way is get them in there where you've made a prototype and hopefully a very kind of, it might be a high fidelity prototype, it's not linked to any back-end or anything, you've just tested all of that kind of stuff, that kind of front-end stuff, the information on how users work and all of those kinds of things. They've been involved in seeing all of those issues, and getting them to take part in the analysis with the kind of stickies and the affinity boards of things that came out and taking part in the note taking, so that, so it all makes it a lot more integrated and fluid process, rather than the great big report.

The other way is sharing stuff, I think the stakeholders link is really important with Agile, it's the show and tells.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

Sometimes on projects I've done my own user research show and tells, as well as the show and tell that goes on where you have a part in that, and do your own show and tell report which is again about 20 slides of stuff not a doorstep thing, but if you do that every Sprint that gets quite easy to do. We got some quotes in these things, and therefore because, you know, "we tested version two we found these kinds of things so we're going to make these kinds of changes and we're going to test this in version three".

The next report might, say so we showed this stuff to users, this new version three, we found these kinds of things, our view is now, with the team in service having discussed that, it is now good enough, "Yes there's one or two things however it's now good enough and we will move on to the next thing". Yeah, and that, if you do those enough, that's where you get that, I've heard it and I kind of agree with this, this kind of design golden thread working through an Agile project, so people have to know not what went in it, in at the start from the discovery from the user needs, all the things, and what's happened way before that, and people have decided particular things, how that has then iterated throughout and you have progressed, and therefore the final product looks like this, because it looks like this, for all of these reasons ...

Interviewer

Yeah

... that have come out, and then I think it's important therefore you're not giving people one great big thick doorstep report, you're giving people, from what's happened over that, a series of shorter things that show why that thing involved in a certain way, and always linking it back to that original user needs and service design, all that kind of stuff that was put together, and go "that's why it's all changed to this, that's why they now look like this" and "the original personas, we threw those out and put some new ones in", and all that kind of stuff and then that can go when it goes into live you get into that continuous improvement phase.

Interviewer

Yeah, so all the key people have been involved all the way through, they've actually seen the interviews and things.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

	<p>Yeah, they've seen all that stuff, they've got access to it, they've been invited to the show and tells, you might have, discovery tends to be where you finish, with the big discovery report, where several things are kind of put together, including any ideas for the service design, and the initial user needs and the personas, and all that kind of things, junk, kind of stuffed together, but then it's showing that you have continuously gone back and reviewed that stuff.</p>
<i>Interviewer</i>	<p><i>For people who can't actually be present during the user observations, do you have like a video debrief, or things like that?</i></p> <p>Yes, so you can create highlight clips from videos. Perhaps, we've just worked with as a subcontractor to company where we did user research stuff, and they actually paid for a professional TV documentary maker person to put the highlight clips together ...</p>
<i>Interviewer</i>	<p><i>Wow</i></p> <p>... to fit in with the report at the end. They pay, I think they paid him for like two or three days work, to take this scrappy stuff we had and make that up into something. So again, that's there for people to kind of look at, alongside all these other documents and it's done in the full presentation thing. So you watch the video and the slide comes up, therefore because "this" so we "then" and then people saying things and "therefore this is why that's like this" at the end.</p>
<i>Interviewer</i>	<p><i>When you are doing that initial phase do you try to anticipate the kinds of problems that people might have?</i></p> <p>Yes, and I think this is a thing that people in Agile go on about, particularly from discovery, the assumptions. It's very strong in the GDS methodology, so you have your user needs, and what are your assumptions: we assume that if users have this they will be able to use ... therefore we assume that, you know, if you give them a system like this, that will meet their need, and then you make that in a prototype, and then you go, you know what, all those assumptions we had, they were all wrong.</p> <p>So you need to this, this and this.</p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

So I think, yeah, I think it's very important to make those assumptions absolutely, when an agile project starts, absolutely crystal clear to everybody, and that they get this idea that because it is an assumption and we're going to be collecting evidence that will either support or not support those assumptions, that they, you know, understand the whole hypothesis testing thing that all that stuff might be junked. And, yes I think this is the hardest thing to get into the heads of people have come from a waterfall background where they're used to a systems analysis type document, and they go that's what we therefore go and build, and it will be right, you come out with a thing.

This is a collection of the user needs, this is some of things we think we can put together technically, which will fit that, so that's what we're going to have a go at building in the Alpha. Guess what, we built 10 things, five of them were completely wrong and off track, and so we had to redo some of the discovery stuff, and five of the things were more or less there, and now we've got something we can take into beta because we are more informed.

So I think it's making very clear what your informed assumptions are the beginning, but say they are still assumptions, that they just might all fall.

Interviewer ***Okay***

That's why, what you make in Alpha, the prototypes you will see in Alpha, it's not the stuff you will be in Beta, and that's to get into peoples' heads.

Interviewer ***Yeah.***

And I think that is that is probably the most difficult thing.

Interviewer ***Yeah. If you spot a potential issue what you do?***

I think, I'm thinking of some of that some of the government projects I've been on.

Right, so if it's an issue to do with service design, so you've got like these old customers, and they go "right we're building system X, but here there's a bottleneck because we're waiting for this Department to give information"

Table E.7: *Transcript of Interview Meet-001 (cont.)*

That's, you know, that this is something that goes, this is why you have to stakeholders involved, and you go "and therefore that goes ..." so this is, this project scope is to make this system X thing.

Above this is this whole customer user experience then and here are some bottlenecks which are nothing to do with system X, and you're making people do this, and then that. Well actually they need to do the that, before they do the this, but that's against the legislation so somebody's gotta go and talk to a minister, to go if you want it to work in a way that people can use it, you've gotta go and change the law somewhere.

Interviewer ***Right, wow. OK.***

Yeah, so it might be that stuff gets pushed all that way, or there's a big bottleneck between this department and that department, so if you don't solve that, whatever we build here as part of this system X that bottleneck will always be there, so you will always get this, I don't know, six weeks delay, before something moves on.

We cannot solve that six weeks, that's not the Agile project scope, we're making a better system or whatever ...

Interviewer ***Yeah***

... so somebody's got to go and do a project on that.

This is why I think it's important to have the stakeholders involved in all the show and tells and I've had that with a project where we had very senior people coming up from London to look at what we were doing, and they went "look guys that legislation will never change", you've got to do something to that design to make it work, or they go "ohh yeah, we will go and have a chat with", with somebody, we will go and have a chat with the minister, and go we need to look at this regulation because it's not working, there's no point, no, system X cannot solve the fundamental issue with this regulation or legislation, or whatever.

Interviewer ***So your system boundaries are quite fluid?***

Table E.7: *Transcript of Interview Meet-001 (cont.)*

I guess in one way that, quite, that the scope there, you know, Agile projects do have a scope because you are usually a small team of about ten people, but where the fluidity is, is having that freedom to kick stuff upstairs, which probably with waterfall everything's kind of come down on you, often like a bucket of [expletive] really.

You know what I mean?

It's like, you're asking us to make this thing, which is complete crap, yeah, but carry on making it because that's what's been signed off.

With Agile it's much more, this is a bucket of [expletive], it's not worth doing this, so the whole idea of an Agile project is that it might just stop.

That keeps you going. It's not system X that we want, it's a whole new service design, and then we want ..., you know, that's what it has to be prepared to do, so people don't spend 200 million pounds making a white elephant.

Interviewer

So a valid outcome from that project is you need to do a different project?

Yeah, and that's why you have the, particularly the discovery in the Alpha phases, it might not come out in discovery hopefully it will, but it might be in an Alpha where you start making the thing that all this other stuff comes out, and you go actually there's no point doing this because there's some other fundamental issues higher up, and the way the world works, that need to be solved, you know.

This is the service thing, that you need to go and solve first, before you even come back to make this system.

I might be that that just gets recognised and they go "well folks, we still need you to make a better system" and it shouldn't happen, but you can have it, particularly big corporate, big government projects where your Agile project is the proverbial putting the lipstick on a pig.

Interviewer

Yeah

Making the existing system better and usable and all of that, so that people can concentrate on getting this higher level change in, and they go "but we need this stuff sorted out as well" but you shouldn't really have many Agile projects doing that.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

	<p>If all your agile projects are like that, then there is something fundamentally wrong with what's going on in terms of the whole concept of service design.</p>
<i>Interviewer</i>	<p><i>Yeah. That's quite a lot of people involved in a lot of your work then so how do you know that you've all got the same understanding of what the problem is?</i> I think this is where the role of the product owner is central in an Agile project. The product owner and the senior product owner are the people who should be, as well as saying who should be invited to all the show and tells, should also be the people who are going out to these other stakeholders and other projects which are going on. So it's the product owners who should be making the links to other . . . , so within your project you doing all your kind of, you know, to make sure the technical architects, BA, or whatever, you should all be working very closely together, particularly with the user stuff and getting involved in them, so all that kind of thing, and the product owner's job is dealing with all of the upstairs stakeholder bit.</p>
<i>Interviewer</i>	<p><i>Right</i> And the other property owners doing other related projects and things and then the senior, you know, that's where they both shield the project from other stuff coming in, when there's too many . . . , but also they should be pushing out "this is what we're finding", "this is what we're doing", "this is what's happening". Also I think she's where the, it's like Spotify do the kind of like the tribes thing, is it, or whatever, but also like the user researchers here and the BA should also be having links with their professions. So it might be that I'll be talking to user researchers who, you know, go "we're finding this", "but we're finding that", how do we share that, how do you use our information, how do we bring your information in.</p>
<i>Interviewer</i>	<p><i>Right. So, you've got different communities of practise within the project?</i></p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

	Yes, and those communities are, yeah, should be linking into their other communities of practice, and then the product owner doing that more formal feeding up to the stakeholder, up and along.
<i>Interviewer</i>	<i>Yeah</i>
	Because there might be a series of agile projects going on.
<i>Interviewer</i>	<i>Right, so at some point presumably, you're generating user stories in some form?</i>
	Yeah.
<i>Interviewer</i>	<i>Do you challenge those stories?</i>
	Throughout, yeah. So when you do the user stories and the user needs start coming out of discovery, and then they get iterated with everything else, throughout.
	Yeah And it might be, you know I'm not a great fan of personas, but it should be soon as you go along you go you know what that persona we thought we had in discovery is "yes it's there but it's not the important one" because as we've had people come in, this other stuff has come out.
<i>Interviewer</i>	<i>Right</i>
	So this is where, and I think this is where old fashioned waterfall people will run a mile, when you go "we might have to go back and do some discovery stuff" because they go "ooh no you must keep going forward and don't change the system". The whole idea of Agile is you are prepared to go "whoops there's something we missed out here".
<i>Interviewer</i>	<i>Yeah.</i>
	We need to go and do a better discovery. It might just be, have you heard the Agile term "spike"? Go and do it, go and do a spike where you go and say we'll go and do two weeks work on this thing.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

	<p>Techie people use it quite a bit, if there is a problem we have to solve, we'll do a spike on it for two or three days, and I think you have to be able go "okay we need to drop out now and do a bit of discovery spike around this stuff" because we had some users come in last week and they told us some stuff and we thought "oh is this a new thing".</p>
<i>Interviewer</i>	<p>Yeah</p> <p>It's a new group of people, we better... So, the whole idea, unlike waterfall, is you don't just keep ploughing on relentlessly and deliver something that nobody wants and isn't relevant anymore. The whole idea is you keep ...</p>
<i>Interviewer</i>	<p>So, you can have a little excursion to do a very short Sprint just to pick up this issue?</p> <p>Yeah.</p>
<i>Interviewer</i>	<p>Right.</p> <p>Yeah, and I think this is important particularly when, you know, this whole idea, that's the only way you can do that continuous improvement in "live", yes you keep thing running in live, but issues come out, then you have to go out, you have to do that Discovery - Alpha - Beta type thing again. Push it back in, then it comes out again, it's all of that, it should be that completely rolling on. So, there's no such thing as a release. You don't have a version two, or version three, or version 4.</p>
<i>Interviewer</i>	<p>It's just the thing?</p> <p>The thing, that you keep making better and better, and then the next version is when you go "this isn't meeting anybody's user needs anymore", because the world changed so much after five or six years, so we need a whole new project.</p>
<i>Interviewer</i>	<p>Right</p> <p>But it's not a new version of it, yeah, it's that. Once you get that idea in your head, it's ...</p>
<i>Interviewer</i>	<p>Okay. Who actually takes ownership of the narrative, is there any particular person?</p> <p>That's the Product Owner.</p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

	<p>I think, so, it's a Product Owner's role to own that whole design rationale, and the design narrative, so that they can explain to the people above them and to the other product owners and stakeholders of them, why this thing looks like it does and does what it does.</p>
<i>Interviewer</i>	<p><i>Yeah, do they tend to become a bit of a bottleneck then, because they're like a communications hub for the whole project effectively?</i></p> <p>Yes, they can be, but then that is their job, so if you think of it, the delivery manager on an Agile project is doing the role where they're making sure all the tasks and things are moving forward on the Jira board or Trello or whatever's been used, the kind of tickets, and all that kind of thing.</p> <p>That's not the Product Owner's job.</p> <p>It's almost like the old fashioned waterfall project managers job has been split into two: the Delivery Manager and the Product Owner.</p> <p>The Product Owner owns product, the Product Owner understands why it's doing what it does, why it needs to do what it does, therefore why it looks like it does, and who it's for.</p> <p>And they understand the business requirements, and the business analyst side, the user research side, bringing the user needs, the UX design says "what is the art of, how can we make that look best" for both of those things, the technical architect is going "OK what's the art of the possible here because if you're only going to spend 50 million then you can't have ..., or if you're going to spend 200 million ..."</p> <p>Yeah?</p> <p>... and they're bringing all of that together and their job is to put that together and to communicate it up and out, and to bring other stuff that comes in, and then ..., and, you know.</p>
<i>Interviewer</i>	<p><i>Yeah.</i></p> <p>That is what their job is, is to own that product, to understand it intimately.</p>
<i>Interviewer</i>	<p><i>How do you know how much discovery is enough, what is it that limits the time you spend on it?</i></p> <p>Um, that's a really good question.</p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

I think, I think one of the important things that comes out of discovery is the minimum viable product, or the minimum viable service, some kind of idea for what that should be. And once you seem to have something like that, that can inform all that, then that's it.

A lot of discoveries are time bound anyway, so a lot of projects now don't want discoveries, because they're seen as being, um, basically navel gazing. They're seen by some people as superfluous, and that's because ... I was on one government product, it was on health, and a team had literally spent nine months doing discovery.

Interviewer

Wow.

And it was literally ex-agency types, you know, stroking their hipster beards, looking at lots of stickies on walls, and going well maybe we should go and interview these users. It shouldn't be that kind of thing.

It's not that, "let's go and understand all of the world" and understand ..., you know, let's do it.

It should be quite tight tightly focused.

It should be quite ..., because the way the projects come about, is work that's being done above it, where somebody's decided we need a new system X or we need a new thing, or this is a bit, this is a problem, and it shouldn't actually be.

And somebody there might say "oh so let's go and develop an app for that". This is where Agile is "let's go and understand the problem" and then we decide whether we need a technical solution at all.

So what should be coming into that discovery should be quite tight, we want to figure, we want to find out if these people really do have that issue, because from what we're looking at in the management side, we seem to have an issue.

Yeah?

Interviewer

Yeah, during discovery you've got your hypothesis that you're testing as well?

Yeah, yeah, and that should be, and for the project I'm thinking of, people had decided "okay well we'll go and solve all of health".

That's not what a discovery should be.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

It's like we should go and find out how do people with a particular thing, you know, long term conditions, what's the problem they're having finding information, or whatever. Okay, that's like ..., but what if it's longer ... but they've kept ..., yeah so ...

So, a discovery is generally, usually anywhere between eight and twelve weeks.

You should have enough information out of there to be able to make something, if the project's been scoped well enough going into that discovery, but it should not ever drag into months and months and months of agency types stroking their hipster beards in front of walls of stickies.

Interviewer

Do you try to judge the risk of stopping, if you identified some areas where you know there is some ambiguity or some uncertainties to the information?

It's not, with Agile I think it's not necessarily about stopping. You can carry on.

So if we go "we've got enough to start building" something in an Alpha, because we're only building very LoFi and HiFi prototypes, we're not ..., it shouldn't be a lot of effort, it shouldn't be linking into any big databases and all that kind of stuff, and so you can almost treat the Alpha ...

This is why we have to be clear that what comes out of discovery is a pile of assumptions still, and that's why you should treat Alpha as much like a discovery as a development thing, of we're starting to make something.

Interviewer

Yeah

This I think is a danger of Alpha where people go into Alpha thinking we're now building the thing, and what we build in the first sprint of Alpha is what will be going live in three months' time.

No, that's not the case at all.

At the start of Alpha you might still be doing co-design workshops and people working on paper and all of that, and that what you're getting in front of some users is some is some paper screens you . . . , well whatever, you know, very low, and people have to realise that, you know, Alpha is yeah, the first part of Alpha should, you should be going into that with a very discovery type head on.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

	<p>And then you start refining the designs in, you know, what I think we can start to put journey to, you know, we thought the journey should be this, this to this, and we started to put a lot of that together, we're going to change some things, and half of where you are going, okay we can start to . . . , we are putting something together that people can use.</p>
<i>Interviewer</i>	<p><i>Yeah, it's starting to make choices?</i></p>
	<p>Yeah, yeah, but it might be halfway through the Alpha you go "We're still all over the place with this".</p>
<i>Interviewer</i>	<p><i>Do you find that when people are making choices, they actually recognised that it is a choice that they are making or do things happen by default sometimes?</i></p>
	<p>If people have just moved to working in an Agile way, it tends to be the more default thinkers are still thinking like waterfall, so we have to build something and move on, we have to build something different and move on, we have to build on the next thing and move on, we have to . . . , and then it has to go into beta.</p>
<i>Interviewer</i>	<p><i>Yeah.</i></p>
	<p>Yeah, because they've got the old fashioned waterfall, and this is when Agile can become mini-waterfall, because each two week sprint becomes its own waterfall, and rather than the output, the ticket you produce at the end becomes like a milestone.</p>
	<p>You don't go "and therefore we go and make that, and therefore it . . ." No, it might be you go "actually we need another sprint" on this, because "Wow, that didn't work". Whereas if people go in with, and are used to Agile, and go in with an Agile mindset, they will be conscious that they are making choices, and they will be conscious that they are making choices which might go "Stop!".</p>
<i>Interviewer</i>	<p><i>Right</i></p>
	<p>Not this default Delivery Manager / Product Owner build something this sprint, build something else this sprint, build something else this sprint, build something else this sprint, ... We now have the user journey built to go into Beta.</p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

Interviewer

Do you have a way of actually capturing the fact that there was a choice there or is it just embodied in the prototype?

That should be in the show and tell stuff that you do. I think quite often Product Owners and Delivery Managers are also still doing documentation that feeds up into a programme management process. Because Agile is a project management process, so above that there is still the whole programme management process, and risk registers, and all those kinds of things going on. So that's the other thing the Product Owner and the Delivery Manager are feeding into.

Interviewer

Do you find that you're able to get more time if you discover it's a complex system, more complex than you expected, or do people still expect things on the original expected time scale?

There's still an expectation to make the original budget and time scale. I think that's still very strong, particularly people at ..., it depends where you are, but a lot of places it's still that, and that's what still happens. You'll be given a certain amount of money to do a certain thing, and all that.

I think it's the, what's important then, is that you scope the minimum viable product properly at the end of discovery, so it shouldn't necessarily be that discovery ends on a Friday and the Alpha starts on a Monday. There's got to be some point where everybody's able to think "Okay", you know, this is a minimum viable product, "What do we need?", you know. You need, and you might have some, you know. People don't do this, they think on that following Monday you can start building, I think.

Probably, if you are going straight into Alpha, it's like you realise you might have two sprints of Alpha where you're going "So what is it we're doing then?"

If this is a minimum viable product that came out of discovery, what minimum viable, what is it we should be starting on to make first? There is some time needed before the UX designer and everything is starting to make things. It's probably going to be a sprint or two going "so where should we be starting".

Table E.7: *Transcript of Interview Meet-001 (cont.)*

<i>Interviewer</i>	<p><i>So, do you find the retrospectives and reviews don't always have the desired effect or are they too curtailed?</i></p> <p>Yes, probably they're curtailed.</p> <p>If you've got a 12 week discovery the last two sprints should be putting all the stuff together, the discovery report, which will include, you know, the scoping in terms of the minimum viable product, the minimum viable service, whatever, and the service user journey in them, so all that.</p> <p>That, putting that together, is going to, and it could be a bit difficult with some projects because you sit down with them and go well you realise with this project it might take us 6 to 8 weeks to identify the users and get them to agree to being talked to, particularly on some of the government projects where it's sensitive, but I guess that can happen on commercial ones and stuff like that, and then you need a month at the end too, so you realised guys we're going to have a week where everybody agrees to be kind of interviewed and collect data.</p> <p>Do you know what I mean, because this is I think is the big issue with discovery, is that unless work's being done beforehand, if you are going to say to people go and find out who the users are, we got some idea who the users are, go and negotiate with them access and collecting data, and using it, that could easily take 4 to 8 weeks depending on who these people are where they are.</p>
<i>Interviewer</i>	<p><i>Yeah.</i></p> <p>Well, like I did some work with the government department that deals a lot with farmers, and it's like well hill farmers you can't talk to between March and April, because they've all got their hands up ewes bums basically, because it's lambing, you know what I mean, you know, and then you can't talk to arable farmers in July and August and September, because they're all harvesting.</p>
<i>Interviewer</i>	<p><i>Yeah.</i></p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

You know, and you can't, you know, and like in health, if you want access to clinicians and stuff like that, they're always busy, but you know you got the Christmas periods, and I've worked with the department for education, and when can you go and talk to teachers, not between April and July because it's exam time, yeah, exam preparation, all of that, marking and all that kind of stuff, and people sometimes forget this with the discovery thing, is that you know it's not your user researcher walks in on the Monday, and he or she has started interviewing people by Thursday / Friday. It takes time, well, as you know.

Interviewer ***As I'm discovering, yeah.***

Access and agreements and all of that kind of stuff, and then you need that month at the end to pull all this stuff together, into this is what we think the minimum viable product, minimum viable service is, and this is what the journey should look like, this is our high level assumptions, and this is what we think the user needs are etcetera.

Interviewer ***So, do you think the processes you have would continue to work if you had a much more complex system to deal with, do they scale?***

I think that's, that's an interesting question, because there's still a lot of projects where old fashioned waterfall is used, and I think those do tend to be the complex things.

Interviewer ***Right.***

So, you know, you couldn't make a nuclear submarine using Agile, yeah?

Interviewer ***Not sensibly, no.***

Yeah, you know, it's not that, I think it's very good for the web stuff and app stuff, and I think if you were doing a very hard-line, you know, hardware, databases, all of that, no.

That's got to be, still, a lot of waterfall.

I would still like to hope that wherever you are going to have an interface hanging off something, and users doing lots of stuff, particularly where its members of the public, then it is Agile. And I think internal stuff when you just need that flexibility of being able to throw stuff away .

Table E.7: *Transcript of Interview Meet-001 (cont.)*

When you are saying about complex systems, if you mean complex in terms of techy engineering, hardware, you know, that, that I think is still waterfall.

So if you're looking in terms of the complexity of a human being and all their contributions and kind of variability, and all of that kind of stuff, then it is Agile, because I think in terms of complex, if you're looking at, like, the idea of, you know, complex problems and systems in terms of, like, the more wicked problems to solve, and how people work or don't, all of that, I think Agile is fantastic for that, because that's what it's there to, kind of, deal with.

Interviewer ***The uncertainties?***

Yeah, yeah.

It's not saying I'm going into this perfectly understanding the world, it goes I'm going to go into this with a real, real shonky understanding of it, and by getting people involved and communicating with them and getting them interacting with designs, and stuff like that, we will work out a best fit thing, that most of the time deals with this complex weirdness of the human being.

Interviewer ***How about very large, very diverse user populations, because that's a different sort of complexity in itself really but do the methods really work when you start needing to deal with that sort of diversity?***

If you have ...

Right, I think this is where the user research stuff from my background, the kind of ergonomics type, applied psychology background comes in, because you could never design for everybody, because it will always be a complete balls-up basically, where nobody ends up being happy.

What you have to say is, what is our priority here, so yes you have a diverse complex population, out of all of that who were the key people that you need to make happy, and that's the group you should be concentrating on. And if people up here start whining and moaning about, you know, the interface and stuff like that, maybe that's not important, because these are the key people.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

I'll give you an example where we did that, this was like when I was working, and I was a Civil Servant and was out-sourced to EDS. This was the first job centre kiosk, for job search. People walking up and pressing a button, and at that time, that was 20 years ago, people in that population didn't have mobile phones, there weren't smart phones, that didn't have computers, they didn't necessarily even know how to use a cash point. We were still kind of in cash. They might not have bank accounts. They could probably use a TV remote, yeah?

Interviewer

Yeah.

So that's how we made this touch screen something so simple, if you could ..., yeah even then there were one or two issues, so the fact that if a skilled IT professional or whatever has gone in to search for job, and gone well this boring, and there's too many steps, and I have to put it in again, I didn't give a crap about it. The issue was somebody who had no technical knowledge, went through step by step by step, choosing from a list of things, and then they saw the jobs that came up or not, and then to restart that search you just put restart and you went through that step again.

Interviewer

So you were addressing the most compelling need?

Yeah, yeah, and that worked. The fact that, you know, professionals or white collar workers if they went and used that, would have found it as boring as hell and gone this is tedious, I want to type something in, and then type another thing – didn't care because the main user population was these people.

So I think that, I still feel that we are not going to design for everybody, we have a broad range of people, but who are key users here that we want to make happy.

That's why you have to concentrate. Who could we afford to upset? Yeah? That's one way.

The other way of thinking is, because quite often I think when you get like waterfall staff, they have this idea of edge cases, the idea is edge cases are the people who you ignore, because they're an edge case.

Table E.7: *Transcript of Interview Meet-001 (cont.)*

Quite often those “edge case” people have a lot of complex needs, so it might be accessibility issues, digital exclusion, it might be all kinds of things. If you make the thing, asking, is

...

If you make some of those edge cases your centre and you solve their problems there’s a good chance that you solved a lot of problems for an awful lot of people.

So somebody with digital exclusion issues because they have low levels of literacy and comprehension, so you change all the language to suit them, then somebody else who’s not like that but who will be at times in a hurry and needs to pick up information really, really quickly, the fact you’ve written this now so it’s simple information that can be picked up really quickly, do you know what I mean?

So you can start solving lots of problems.

So the other way is to say who are the people who have traditionally been the edge cases, let’s put them in the centre. Let’s solve for them. If we’ve solved it for them, we’ve solved it for everybody.

Interviewer ***That’s the principle of universal design isn’t it really?***

Yeah.

Interviewer ***Okay, thank you. I’ve gone over time a bit, apologies for that.***

No, no, that’s fine I’m happy to chit chat away.

Interviewer ***Is there anything you’d like to ask me about what I’m doing or anything else?***

Yes because you’ve told me a bit about it, and it’s just wondering really how your stuff’s going, how we can kind of share some of that with you, and what you were doing at the moment, so that, really.

Interviewer ***Okay yeah, well there are sort of two threads to what I’m doing at the moment. Firstly trying to get a handle on what current practise actually is because there aren’t too many people in the UK making the effort to find out and actually write peer reviewed papers on what UX practice in the UK looks like. Right.***

Table E.7: *Transcript of Interview Meet-001 (cont.)*

<i>Interviewer</i>	<p><i>So we've got people in the states doing it, we've got people in Scandinavia doing it, but here there's tumbleweed.</i></p> <p>Yes and, yes it's interesting because in the UK there's a lot of people doing it, which is interesting. We've got one person who's working at [Retailer] in [Location]. She's just down the road from you really, isn't it.</p>
<i>Interviewer</i>	<p><i>Yeah, only [X] miles away.</i></p> <p>Yeah and there they've modelled their Agile setup on [Big Company], so it might be worth you having a chat with some of the people there actually, because they've been very open to do presentations.</p> <p>Send me an email and I'll have a look at that. all other things Then you've got, I think, various agencies in Leeds who too were doing some really interesting stuff, and you got the various agencies in Manchester and stuff as well, yeah so so near you there's a lot of really interesting stuff going on in the North of agencies or companies during agile So, in Manchester you've got On the Beach, and Rental Cars, and all kinds of things, doing stuff.</p>
<i>Interviewer</i>	<p><i>Yeah, this is why I've spent so much time at UX meetups.</i></p> <p>Yeah, yeah.</p>
<i>Interviewer</i>	<p><i>To see what's going on, because I don't want to assume that the way people are doing it here is the same as everywhere else because we might be coming up with new great techniques that are staying within the Northwest or the North of England generally and aren't necessarily the same as what's happening in London or the States or anywhere else.</i></p> <p>There's a lot, there's a lot of exciting stuff going on because in Liverpool you got Shopify and a few others and then you've got a lot of the government departments up North as well, who are following the GDS service manual to differing levels of authenticity and success, is what I would say of different government departments.</p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

<i>Interviewer</i>	<p><i>Yeah, I spoke to somebody from [Department] last week, and I'm hoping to talk to people from other departments.</i></p> <p>Right, yes. Yes I worked in [Department] for 10 months. I can tell you about [Department]. [aside about possible contacts]</p>
<i>Interviewer</i>	<p><i>Yeah, they'd be useful contacts to have. I guess they are quite busy at the moment!</i></p> <p>Yes, yes, but they might be happy to have a chat. A couple of them had a chat to [Academic] about stuff. So yeah there is some really yes it's interesting people doing Scandinavia as the collaborative resources process I looked at 10 years ago, in the Scandinavians always been big on this stuff right from when they did something at Volvo and participatory design and more human manufacturing. US of course with all that but yeah so the UK is doing a lot of stuff</p>
<i>Interviewer</i>	<p><i>And then the second thread to my research is well okay how can we help people to anticipate problems so that they can cope with more complexity, more diversity, without just going into melt-down, because I know people are always very busy.</i></p> <p>I think, that's really interesting because I went to presentation at [Meetup], from it was a financial institution and they said about all the issues they had with Agile, and how they solved them and for an hour they presented this thing, and I literally at the end wanted to stand up and scream at them congratulations you've just turned Agile into waterfall because, which is what they had just built in and I've seen other places do this, built in all these kind of controls, because they've seen Agile as people went a bit wild and span off in all kinds of trouble, and they just literally built in all these design committees and boards, and all this sort of sort of stuff again. They put whole pile of waterfall bureaucracy around that, and I thought "you've just destroyed it".</p>
<i>Interviewer</i>	<p><i>I can imagine that happening in a lot of the highly regulated industries</i></p>

Table E.7: *Transcript of Interview Meet-001 (cont.)*

Yeah, but you don't need that, you just need people in the team to know what those regulations are, and can call on subject matter expertise, and are involved in the show and tells and stuff like that. I did stuff with [Organisation] and we had people coming to us from [Government] to see the show and tells, and they'd go can't do that mate, can't do that because of regulation that, that law is never changing, you cannot do that. Okay, and then other times they'd go ooh we need to go and tell somebody that has to change, you know what I mean, that's where that should happen. You don't need a pile of committees and authorisation and working parties of sub committees of the main design, because that'll just kill the thing.

Interviewer ***Yeah, you just need people who know what they're doing and a bit of trust.***

Yes! I think that, that sums it up.

People who know what they're doing and trusting the team, that's a whole idea of an Agile, semi-autonomous team, because you are trusting them to produce the thing, and if you get the right people coming in, then you shouldn't have these issues.

So I think that's because you can do complex systems. The thing is, I think people think Agile's not for that.

I think it's about the complexity of dealing with the world and human beings, the whole wicked problem weirdness that goes on, whereas the other complexity side, the technical architect aspect is "How do I get this box to talk to that box" would be some middleware at so many mega whips a second, and all that, that technical stuff, waterfall's great for that bit.

Interviewer ***Up to a point.***

Up to a point, yeah. It cannot deal with this bit.

Interviewer ***What got me into all of this was working in aviation, where I was doing airworthiness assessments, and more often than not it came down to the human factors: are you presenting this information in a way that people can understand quickly enough.***

Table E.7: *Transcript of Interview Meet-001 (cont.)*

Yeah, and you either have massive specifications on font size, I mean so many inches from the screen, which are just murder to do, but still good to have. The other thing is you make a prototype and you put it in front of people: and they go I can't read that.

It happened at [Example] didn't it, they did the thing of the font size should be so much, so they did that, and then they realised with the new systems people sat much further back to look at all the screens, so they couldn't see a thing, so he was like [intake of breath].

Interviewer

I was involved in some of the prototyping for [Example], ...

The one I think of for aviation is the one where that, it was in Britain wasn't it, that windscreen blew out, and somebody had to hold the pilot so he didn't disappear, I can't remember the airline, British Airways I think. They now do that cognitive interview, so not blaming people, that just kind of talking to people about what they've done and what happened

[Aside about BA 5390 incident 10 June 1990. Relevant AAIB report 1/92 G-BJRT]

Yeah, and that I think Agile deals with, if you've done the actual discovery in the natural way, how do people do this work, what's the reality, don't tell me what the rules and regulations are, let me spend two or three days seeing you actually doing your job, you go and watch, "Oh right, so this happens". Yes. "I'm forever going", this is why ethnographics stuff works, [reference to incident details]

All, you know, all of that kind of thing will come out. All that story would come out, so when you say can Agile deal with complexity, that's a complexity that Agile deals with, that side of it, which waterfall has always been awful at.

[Closing remarks and thanks]

Table E.8: *Transcript of Interview Meet-002*

	[Intro and consent to record]
<i>Interviewer</i>	<i>What actually is your role within GDS?</i> I'm a service designer and design trainer at GDS so my team that I was on has recently been dissolved so I'm a little bit between roles at the moment so I'll tell you about what I was doing which probably makes more sense so I was part of the [team] who aim to support and grow the user centred design capability across central government but also kind of reaching out to local government and more broadly public sector and international and we do that support and growth through things like, community building things and capability things really, capability building things like training, guidance, meetups, Google groups, slack groups, newsletters, case studies, shadowing programmes, mentoring programmes, sort of, lots and lots and lots of different things like that, but my focus has been mostly around training and then also um diversity and equity and inclusion issues in user centred design, so how that impacts who gets into the industry, and how teams work, and then also in the actual services that we deliver, so I guess my interest is in how people from marginalised groups experience the sort of UX problems that you're talking about differently or more than other groups.
<i>Interviewer</i>	<i>Yep</i> Yes, does that answer your question?
<i>Interviewer</i>	<i>Yeah, it gives me enough of an idea.</i> My background before being on that team was working as a service signer and interaction designer on projects at GDS, on products and services at GDS, and across government, so I worked with [List of Government Agencies, Departments, etc], lots of different organisations across government, and prior to GDS I was a UX practitioner, and prior to that I was a researcher and designer, and I started my career as a usability consultant, although that was before we had the words UX.
<i>Interviewer</i>	<i>Yeah</i> Just for context, at GDS and across, and in most, on the DDAT framework, we don't use UX as a profession, so we divide that area into researchers and designers.

Table E.8: *Transcript of Interview Meet-002 (cont.)*

	There are lots of reasons behind that but ...
<i>Interviewer</i>	<i>Yeah, well UX has come to cover pretty much everything including the kitchen sink hasn't it so it is less useful as a term.</i> Exactly, and the idea of user experience, of creating good user experiences, firstly it's not so relevant for government, we're not so much about experience, we're about delivering services that people need, but also a technical architect might make a decision which means everyone has a horrible user experience, so there's no reason why we should just have one person on a team who's responsible for UX, and all of the thought about it, so that's some of the rationale behind it.
<i>Interviewer</i>	<i>Have you done things like this before, have you been interviewed by research students before?</i> Erm, yeah, a few times, over the years.
<i>Interviewer</i>	<i>Awesome. Right, Okay, so in the sort of role you've been doing do you have much control over what your next piece of work is or are you called in by other people? How does that work, how do you sort of get mobilised to go and do stuff?</i> That's a that's a good question. So the type of work I do is pretty unique in government, and possibly anywhere, whereas there's the kind of the kind of work that designers and service designers across government and GDS tend to do. Which of those would you like to hear about?
<i>Interviewer</i>	<i>I don't mind, but what I'm mostly interested in what current UX practice is.</i> Maybe I'll give you more of, sort of, what happens for most designers and service designers and researchers across government, which is that you don't have that much ... That is an interesting question! So, there are lots of different ways that pieces of work start in government. One very common way is that a minister makes a promise or commitment, probably publicly, and then the Department needs to scramble to make that happen.

Table E.8: *Transcript of Interview Meet-002 (cont.)*

Another very common way is that a policy is set, or changed, and the Department needs to again work out how to implement that. Another very common thing is for a piece of legacy software, or legacy tech, to fall over, or for a really expensive contract to be coming up and the Department of government needs to work out how to continue to deliver services after that piece of tech stops.

So those are all, those are three quite common things that happen. It might not be just Ministers who make their promises, it might be other stakeholders within government, but sort of more senior people, and often separate to the digital teams who sort of decided how things should be. And then, the way we would like to see things happen, is that user research uncovers user needs or uncovers behaviour change in users or uncovers changes in how people are using or needing services, and then that leads to a better understanding of user needs and ideas about how to meet user needs differently or better, which leads to new or different services being developed, and that is a not a very common way of pieces of work starting, but it is how we would like to see more pieces of work starting.

It's how I think people dream about government working, and if research and design and service design could work closer with policy to help inform how policy is decided, I think that would make that more of a reality, and that is something that we're seeing happening more and more across government and across public sector with things like policy labs, user centred design, user centred policy design becoming more of a thing. There's lots of different sort of policy reform projects which are trying to bring more UCD practices into policy making and policy setting.

Interviewer

Okay, so ideally, what sort of user research practices would you like to see, or have you seen, what sort of things are people doing to get that understanding, get that data to inform their understanding?

Table E.8: *Transcript of Interview Meet-002 (cont.)*

Mixed methods, so things like collecting information, collecting data and usage, on existing services, is always useful and most services that go live have some elements of analytics and feedback loops, and then ongoing qualitative user research with audiences is really important, although that doesn't happen nearly as much as it should for live services and once they've gone into live, but there should be a continuous loop between services that are live, collecting data and having qualitative research done around them, feeding back into kind of discovery type pieces of work, to start new services, retire old ones, iterate existing services, join up services across government.

Interviewer

So, who would be involved in that, who would actually get drawn into those discovery activities?

If you're lucky there's a full service team working on a live service and monitoring it and researching it, and that would include at least one user researcher, at least one designer, maybe some service designers, product owner, delivery manager, content designer if you're lucky.

This is kind of an ideal, an ideal vision for how this would work, in reality there's very, very rarely a full team working on a live service, it's often handed over to a business-as-usual kind of operational service delivery team, and that might have user research attached to that team, that look after a suite of products, if they're lucky, but often not.

Yeah, feedback often comes through call centres, and fall-backs for services.

Interviewer

So, what happens to the data afterwards, does it become owned by the operational side, or is there a library of user research that you can draw on, or where does it go?

Table E.8: *Transcript of Interview Meet-002 (cont.)*

I think many people have tried to start libraries of user research. Probably some teams in some departments have libraries or archives or some kind of repository for user research, but mostly it would just belong, probably, in contact management systems or spreadsheets and Google Docs, but yeah, it would be great if there was a library of user research across government, finding patterns of user needs and changing behaviours that would be amazing, doesn't exist but yeah.

Interviewer ***So, once you start to actually interpret what you've learned from that, how do you share that understanding across the team?***

How do user researchers share the insights that they've gathered? Oh, that varies hugely.

Again, in an ideal world, the team would be a properly functioning Agile team, which has stand-ups and show and tells and retrospectives, and a rhythm, and all those sorts of things, and they would be co-located. If not, ooh what's the equivalent of co-located in remote terms, meeting and working collaboratively a lot of the time in remote ways, and so hopefully, again this is all an ideal view of the world, the user research, the rest of the team would be involved in user research, so it might mean coming along to sessions or helping do analysis or interpreting the findings, or at least hearing findings in playback sessions or show and tells, and then sort of acting on that, as part of their planning and design processes.

In reality, I don't really know how, it works in so many different ways on every team.

If you have user research on the team I hope, I hope they are feeding it back, I hope they're making personas and journey maps, and highlight clips, and whatever else it is that the team listens to, but often not.

Interviewer ***I guess the answer to that, as to a lot of questions is, it depends.***

It depends, yeah.

Interviewer ***Do you try at that stage to anticipate the sort of problems you're going to have, or do you wait for them to emerge With people using a service?***

Table E.8: *Transcript of Interview Meet-002 (cont.)*

Yeah

Definitely we would want to find out what the major problems are with going to be with the service before it goes live, and so that's one of the main aims of having a phased approach to service delivery, so that Discovery / Alpha / Beta / Live phases that we have.

Also one of the main reasons we have assessments, at GDS and in government, we sort of assess services before they are allowed to move on to the next phase of that life cycle, and part of that is to make sure that research is happening, that you know all the technical tests are happening that need to happen, that the team is operating the right way to try and make sure that if there are going to be big problems like that that we find out about them as soon as possible.

For me, the core of Agile really is fairly fast, so if you've got a problem, how quickly do you find that out and how quickly can fix it.

So yes, it's one of the things that we're looking for and trying to encourage in teams across government is embracing the idea of uncovering the problems as early as possible and minimising the risk as quickly as possible.

Interviewer

So, is that mostly focused on actual usability tests with real people, or do you try to extrapolate a bit and anticipate what might go wrong?

We would definitely try to anticipate.

We use, for actual interface design we have the gov.uk design system, so a lot of patterns that, I mean, most government services are forms, so we know how to do forms really well, so you can avoid a lot of basic problems by using the patterns and by tapping into the knowledge across government, so the sort of mailing lists and groups that I mentioned earlier, one of the main uses for them is people saying "has anyone done something like this before", "has anyone come across a problem or design problem like this before", "how have you approached it",

Table E.8: *Transcript of Interview Meet-002 (cont.)*

and someone will post that question and then get three or four different people from across government saying I had something like that a few years ago, this is what we did, or we tried that and didn't really work, so we did this, and trying to draw on that community of knowledge across government can help you anticipate what the problems are going to be, and stop them from happening in the first place.

Usability testing is absolutely a big part and accessibility testing is a big part of designing a service and getting it from kind of beta to live, but in a discovery phase, that would be probably too early for usability testing so we wouldn't expect there to be high fidelity prototypes that are in a state for usability testing in the discovery phase, I would imagine.

So discovery is much more about testing the concept, making sure you understood the user need, make sure you're solving the right problem, make sure you tried lots of different approaches to solving a problem, and you've picked the best one, and I think a lot of problems with services and products come because you've built the wrong solution from the very beginning, not just because like a usability issue with buttons being in the wrong place for example.

Interviewer ***So, if you identify an issue right at that early stage, what happens next, do you just note it as an avenue you're not going to pursue, or ...?***

Yes, I mean, this would depend largely on where the piece of work came from. So if it's an absolute sort of dead end problem, complete failure of all service and product efforts, you would want to be trying very hard to convince stakeholders that this was the wrong approach to take, and there have definitely been cases where people have tried to have that argument, and it has failed, and services which have little to no value have been launched because a stakeholder has really wanted it to be so, but then very often if you can provide the right evidence to the right people and prove that it is going to be a waste of public money then, yeah, you can change direction and drop ideas that are bad ideas.

Interviewer ***Okay, so once you've got some understanding of the problem across the team, how do you know that you've all got the same understanding?***

Table E.8: *Transcript of Interview Meet-002 (cont.)*

	Of a problem?
<i>Interviewer</i>	<i>Yeah, so you might have some stories established, how do you actually challenge those stories and make sure you all really are on the same page and not just assuming you are?</i>
	That that really taps into how well your Agile team is working, I think, and how closely they're working. So if you have a team who are really engaged in the user research, are you know analysing sessions with you, etc, they won't need convincing because they will have seen the problem and they will understand it, and probably have ideas about how to fix it.
	If you have a team that isn't really engaged and is just doing user research as a tick-box activity for their own assessment, you might have a harder slog in trying to get them to understand the problem, and to be honest you don't really need everyone on the team to understand every single problem, or to have a shared vision even, as long as the right people make the right decisions and problems get turned around.
	I don't really care if every single developer understands why I need a project to be changed as long as the person who makes the decision understands and agrees.
<i>Interviewer</i>	<i>Right. Have you found over the last few months when I guess most of you are working from home that you've had to do things differently?</i>
	Yeah, definitely.
<i>Interviewer</i>	<i>So, rather than just distributing itself slightly differently, if your actual methods needed to change as well as the, sort of, means of communication?</i>
	In terms of user research methods?
<i>Interviewer</i>	<i>Yeah</i>

Table E.8: *Transcript of Interview Meet-002 (cont.)*

Yes they, oh, I'm not really sure, I mean, for a lot of user research and Agile methods there is a direct online equivalent, so usability testing can be done remotely, interviews can be done online, surveys can be done online, workshops can be done remotely, we can use tools like Mural and Miro to Jamboard to help us run things collaboratively, so I think the main the main difference is sort of screen fatigue, and sitting still fatigue, and zoom meeting fatigue, and then also not having the physical space, the physical shared space to sort of put things up on walls and talk about things is a big difference, but I think most teams have found ways to do the same activities and achieve the same results remotely.

Interviewer

So how have you found things like virtual whiteboards and things, have you found that they are as effective as sticking things on a wall?

They're different. There are pros and cons, so they definitely have features that physical spaces don't have, you're typing and drawing and zooming in and out, and getting people to follow you around a whiteboard, and having multiple tabs for a whiteboard, these are all things that are much harder to achieve in a physical space, but then again there's definitely benefits to having physical space, so the physicality of post it notes can be easier than little squares on the screen, and you know lots of different things.

I think it's just different. I think there are pros and cons and I think once we get back into the office there are some things that we will continue to use online tools for, and some things that we will go back to the physical tools for.

Interviewer

You mentioned about online fatigue. I can certainly sympathise from having done some teaching online back in April. Do you find generally that the intensity of activity is different when you are working online, are you doing more in a shorter time?

Table E.8: *Transcript of Interview Meet-002 (cont.)*

	<p>Not necessarily more in a shorter time. I think in government we've been doing more in a shorter time because there's been a crisis on, and people have needed government services to be live in a much shorter time than before, but that's not because we're remote, that's more because of the global pandemic that we're having.</p>
<i>Interviewer</i>	<p><i>So this is not just the sort of shorter time window of being online that's forced you to be more intensive, just the nature of the beast I suppose.</i> Yeah, absolutely.</p>
<i>Interviewer</i>	<p><i>Do you have a feel for when you've done enough discovery, how do you recognise that point?</i> Yes. You know that point when you know what decision you're going to make next, when you have enough data to be confident on what your next decision is, that that's enough to move on.</p>
<i>Interviewer</i>	<p><i>Okay</i> The research and understanding never stops, so it's never your last chance to find something out or to ask a question, so when you don't have to, there's a lot of fear about that exact question that you're asking, is how do I know when I've done enough or how do I know when I'm confident enough and that's kind of predicated on the idea that discovery is the only time where you're finding things out, and it's the only contact you have with users, and any decision you make now will be it forever, but the way that we would really like teams to work is that research and design and iteration work happens all the time, and it's never too late to ask a new question or to find that new information or to even change the direction of a product or service so as long as you have done enough information gathering to know what you want to try next, or what direction you want to go in next, you know, for the time being, that is enough to move on.</p>
<i>Interviewer</i>	<p><i>Much more of a continuous process, less of a phase?</i> Exactly. Not the bottom of the waterfall, it's continuous.</p>
<i>Interviewer</i>	<p><i>So typically, what limits the time that you're able to spend on discovery?</i></p>

Table E.8: *Transcript of Interview Meet-002 (cont.)*

Stakeholders and deadlines, stakeholders making promises to deliver things by September or governments promising to leave the EU in December and you know those sort of hard deadlines, are what limits the time, or contracts coming up. Contracts ending on a certain date, that's often a firm deadline, and I guess budget as well as it could be you only have funding for a certain amount of time. While in digital service delivery we understand that Agile doesn't have timeframes that work in that way, Civil Service planning has, and finance and Treasury have not moved on in the same ways, and they still believe in deliverables that happened by certain deadlines, so that's where a lot of the sign-off times come from.

Interviewer ***You mentioned knowing when you've done enough because you're able to decide what your next thing is, do you structure things as like a hypothesis?***

Yes, absolutely. We should do, yes. So again, this is the ideal vision, everything, every design idea should be a hypothesis and every research question should have a hypothesis behind it.

Interviewer ***So do you have like a backlog of hypotheses?***

Yeah, ideally, yeah, you would do, and your research backlog, and your design and prototyping backlog would be all hypotheses, and every design that you do should be a test of an idea.

So that's kind of how you would embody the idea of failing fast in your design and research process. So you don't ever think of yourself as designing the final product, you're only ever designing your latest hypothesis, which may or may not work.

Interviewer ***Suppose you start on something and realise what this is really complex, how easy would it be to say this is really complex, we need more time, do you get that flexibility or is it hard cheese if you discover it's really complex?***

Table E.8: *Transcript of Interview Meet-002 (cont.)*

It depends who you are. So for me, I'm quite happy to tell people this is really complex we need more time or this is impossible, stop it, but obviously if you're not very senior or you don't have the confidence or you feel like it's outside of your role to do that, that's increasingly hard to say or to do. It is definitely something that needs to be said more than it is said, and yep we often see teams biting off more than they can chew, but one of the main aims of a discovery phase is to scope the piece of work, which is to understand what the big, big picture is and then workout how much you can achieve within what you've got.

Interviewer ***Do you ever try to quantify for your stakeholders what the risk of stopping now would be if you find you're constrained in time?***

Yes, definitely. Stakeholders like numbers like that, so yeah, if we can if we can turn things into, if we can turn perceived UX risks into monetary risks, or you know numbers of deaths or whatever it happens to be then, yeah that definitely would help make those arguments.

Interviewer ***There's lots of choices, some of them are made quite early in the design process, and the life of whatever it is you're doing. How aware do you think people are that they're actually making a choice or do things sometimes just happen by default?***

Yes, things often happen by default, and I think stakeholders and policymakers often make choices about how service, or what a service is and how is delivered, without realising that they're doing that, or without realising that there are other choices, other than the one that they've made.

Yeah, I think that happens a lot, and then I think designers often make choices without realising that there are other options as well, but one of the skills of a designer and a researcher is to try and interrogate what assumptions have we made, what choices have been made, and what alternatives there were that could be explored or are yet to be explored.

Interviewer ***Do you try to capture those in some way? Do you sort of note down decision's, so you can see where things came from?***

Table E.8: *Transcript of Interview Meet-002 (cont.)*

	<p>Yeah, definitely so, ideally again, this is an ideal world, but a good team that's functioning well would keep track of the design decisions that have made been made, the research that has led to that decision, and possibly what some of the other options were they have been explored or put aside. They'll often track things like that in, I've seen slide decks or confluence used for that, I've seen lots of different tools used to track that sort of thing.</p>
<i>Interviewer</i>	<p><i>Does that end-up getting embedded with the prototypes and things or does it stand separately?</i> It can do sometimes. It can be part of prototype sometimes, it can just be part of a team's documentation, or a service's documentation. Sometimes it can live on the designer's hard disc and fade away when that computer falls over. It varies largely.</p>
<i>Interviewer</i>	<p><i>Does that have an impact on how you bring people into the team if you're needing to on-board someone new, does that mean it's sometimes difficult to give them the information or ...?</i> Yeah, definitely. So, one of the main reasons that we really encourage people is to document that kind of thing is for onboarding and for knowledge preservation, when the team's changed. [Closing remarks and thanks]</p>

E.2 Phase 2 — Coding

See [Data coding](#).

Summary statistics

Table E.9: *Interview summary statistics*

Interview	Recording	Date	Duration	Pages	Codes
Zoom-001	200616_0019	16 June 2020	00:42:15	11	138
Zoom-002	200706_0020	6 July 2020	00:38:57	12	88
Zoom-003	200729_0023	29 July 2020	00:37:59	11	87
Zoom-004	201110_0028	19 November 2020	01:02:02	17	83
Meet-001	200803_0024	03 August 2020	01:06:17	21	91
Meet-002	200819_0026	19 August 2020	00:36:46	10	70
			04:44:16	82	455*

*Ignoring repeated or unused codes or topic codes used for navigation.

Interview extracts and coding

Table E.10: *Extract coding in interview Zoom-001*

Extract	Code
business analyst	business analyst
work for a client for a period	fixed term contract
deliver almost business analysis services	service delivery model
freelance	freelance
quite long contracts, like a year or two or three years	multi-year contracts
doesn't move around too fast	slow contract churn
takes time to look for another contract	contract pursuit takes time
like a sales job really to try and do that	contract capture is a sales effort
public sector	public sector
can only sometimes agree funding for like almost like a financial quarter at a time	fragmented funding
having to renew contract documents about every quarter	quarterly renewal pursuits
current one I mean is really unusual it's actually about two months into a 12 month long so that's good	fragmented funding
commonly um the clients I have, have products, usually software products or business processes that they are trying to improve or maintain	Backlogs are improvement driven
they've got a backlog of things that we want to do with this product or a system or process	Backlogs involve products or processes or systems
from an agile approach, which is the most common thing I see these days for the kind of clients I work with	Agile approach is the most common
it's a backlog of here's the thing we'd like to do or here's a really detailed spec of what we want to do	Backlogs range from aspirations to detailed specifications
there can be differing levels of detail	Backlogs have differing levels of detail

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
it's a prioritised list, so the top things are the things that you kind of go in you know what do I need to do next	Backlogs prioritise what I need to do next
I'm just going to take the top three things off the list and then you just keep that list prioritised	Backlogs prioritise what I need to do next
if something new comes in, you work out where it goes in the list	Backlog additions are inserted in their priority position
Every now and again you have a look at it and go we don't need that anymore let's move that up or let's move back down and you kind of shuffle things around a bit and then you keep refining the detail	Backlogs are periodically revised and refined
the stuff that's on the top, you are saying, here is the, here is what I want to do, here is my spec, here is my description of what I want	Backlog top items are ready to go
You don't do that for the ones at the bottom of the backlog because you might never get to them and it might be a long time till you get to them and the idea of agile is that your organisations need might well have changed by the time we get to the top of the list	Backlog low priority items are less refined
so you keep at the top of the list, you refine them more and more and more detail as we get towards the top of the list so the ones that are just ready to go are the ones that you just pick off the top	Backlog top items are ready to go
often it's not exclusively the product owner but often the SME's as well to iron out the detail but almost by keeping the product owner in the loop	Product Owners and Subject Matter Experts are the direct points of contact
That is a million dollar question I would say	What the problem is is a million dollar question
what's useful to have, is kind of a range of techniques to choose from and use	Discovery involves a range of techniques
the most important thing is to understand what the issue is, and then that often involves a range of things	"

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
reading what's already written about it	Discovery includes literature review
talking to a person who's experienced it	Discovery includes narrated experience
documenting and testing back what they've said	Discovery includes approved denaturalised transcripts
understanding it first then, and then maybe finding out more information about it to elaborate	Discovery includes iterative elaboration
whether that's in an interview situation or emails or again sharing documents	Discovery includes interviews
	Discovery includes email exchanges
	Discovery includes sharing documents
not just one thing it's a whole range of things	Discovery involves a range of techniques
choosing your methods according to the situation	Discovery methods are tailored to the situation
use the right tools for the case	"
there's no point you have it all in your head and the person you're trying to do it for doesn't understand it	Discovery requires a negotiated understanding
has got a different idea in their head about what it is that you think we talked about	"
range of methods of documenting things to choose from	Discovery produces a range of artefacts
drawing out a process	Discovery artefacts include drawing out a process
bullet point list of "here are the main points I think this covers it"	Discovery artefacts include point briefs
data definitions and a data model with entities and relationships	Discovery artefacts include data definitions and data models

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
there really is a set of models	Discovery artefacts include a set of models
process model	Discovery artefacts include process models
list of requirements	Discovery artefacts include requirement models
with every requirements document I do or set of requirements I will really try and think what is it that is going to give that clearest picture	Discovery artefacts are chosen to give the clearest picture
choosing the right kind of method of checking that the understanding is right	Discovery artefacts are chosen to validate understanding
you really need a kind of a common language common deliverable that your kind of product owner or your SME your Business Contact can say yeah that's what I meant	"
you can then pass that on and explain it more to the people who are then delivering what the business change needs to be	Discovery artefacts are used to communicate understanding
the first thing he did was document what we've got at the moment	Discovery includes documenting the current state
which things appear on which page	Discovery includes information architecture
show them altogether in a kind of an easily not kind of a bamboozling way	Discovery artefacts are chosen to give the clearest picture
mark them in a way that we could easily kind of reorder them and know what we've reordered and where they've gone	Discovery artefacts should support traceability
having a method of documenting it that allows you to exchange that information and check the understanding with somebody else	Discovery artefacts are chosen to validate understanding
understand what the changes were trying to do so we can document that change as well which isn't always easy	Discovery includes documenting change

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
challenge at the moment is doing it remotely	Remote discovery is a challenge
you're not even standing at a whiteboard or something like that	Remote discovery tools are different
you have to often do things with documents	Remote discovery communication is often indirect
wave your hands on a zoom call	Remote communication may literally be hand-waving
I've got loads of diagrams here which are often throw away diagrams	Discovery artefacts are often ephemeral
I will draw a diagram with arrows and bits of text and then, at the moment, kind of scan them in and take a photo and just share it	"
say look "point - point - point" is what we're thinking and then often just throw it away	"
as a rule of thumb, if I find myself drawing the same diagram again and again for different people, then I'll write it up then share it	Repeated artefacts are worth capturing for reuse
if you kind of try and follow good practise then you're kind of avoiding issues to start with really	Following good practice as a problem avoidance strategy
If you know a lot of standard ways of documenting things work because, and you can be trained in those documentation methods like process models, they work because people can easily follow them so they kind of work pretty well	Methods work best if they are easy to follow
the agile approach is often a good approach because the Agile kind of Scrum methodology where you are developing or changing in short bursts means that actually you are seeing changes straight away really, or really quickly, and learning from them	Agility allows rapid learning

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
going “was that right, was that wrong, do we move on, or do we change what we just did” and so it makes it less important to anticipate, I would say	Sprint reviews mitigate lack of anticipation
it makes it more important to deliver something, and then check whether it was right, because the anticipation only takes you so far, and even the documentation only takes it so far, because it’s still an approximation of what the final result is going to be	Uncertain requirements are validated with hindsight
good documentation and quick checking is a good combination that works in practise	Good documentation and quick checking is a good combination
with those kind of things, it would be more, um, yeah, depending on what you are doing, really, you know	Harm avoidance strategies are context dependent
if it’s a piece of software, you are doing more testing, you’re doing more user acceptance testing, as well, you’re doing more time on mock-ups or wire frames that help to visualise the, are we all speaking about the same thing	Harm avoidance by more negotiation of meaning
Even if we’ve all got the same idea, when we get it close to the implemented state, does it still look right	Validate again after building
it’s an appropriate amount of effort for the time it would take to actually do the work	Pre-build validation effort should be commensurate with build effort
it can be that it takes more effort to test it um than it does to just do it and get it wrong	"
if it has a bigger impact then you need to do that more carefully	Products with greater impact require greater care
documented more, and do a lot more kind of test, test checkpoints along the way, through the process	More impact requires more checkpoints

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
<p>I mean often if you've written it, a good way to challenge is to get somebody else to read it, so often somebody who's not been involved in it is good, another SME is good, a tester is often really good for giving it a good push and poke</p>	<p>Assumptions challenged by independent peer review</p>
<p>"</p>	<p>Code testers are good at challenging assumptions</p>
<p>you can review things almost with a very a purist kind of a approach so if you're looking at a data model for example and going have I got my data definitions right in my relationships right you can do some kind of basic checking of or maybe an easier example is like a process model kinda see where the process starts and ends is everything linked up is it clear what the conditions are for going one way or another there are some really basic stuff that kind of means what you're really doing is checking it against the quality standard um too you know and that's one way of challenging it so either you kind of almost internal checks against an external standard or you're just getting more people to look at it and think</p>	<p>Using checklists to make people look at it and think</p>
<p>I found a really useful tool is just talking somebody else through it. By articulating it you almost immediately as you're saying it you can be thinking well that doesn't make sense does it which you know you might have written it down already and thinking this all makes sense this all sounds fine, as soon as you say out loud and you start to realise you're adding little caveats and changing the wording coz you don't feel like what you're really is clear, then that's a really good way of testing what you've written is and what you've documented is understandable in itself, by explaining it to somebody else.</p>	<p>Verbal explanation as self-challenge</p>

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
<p>I really enjoy doing certifications. I think, again, it's good to have a set of tools and techniques to draw on and it gives you a bit of confidence and it gives the people you're talking to a bit of kind of "oh this guy knows what he's talking about" but I think certainly it only takes you so far</p>	<p>Certification as confidence building</p>
<p>the experience you have of trying and failing and trying again and getting it right are the things that kind of embed the shortcuts to the right answer and the ability to then communicate that on to somebody else as well</p>	<p>Experience as shortcuts to the right answer</p>
<p>good reading and experience in the practice, the theory in the practise as a combination really matters</p>	<p>Important to have theory and practical experience</p>
<p>it's a combination of demonstrated skills and experience of I've done this and I've done this and have done this and often what I found really useful with the client is to kind of understand first what they are looking for and then tailor that story to say I've either got a lot of experience in that or less in that but I can but my transferable skills in that area are this and it's customising the message to the client really but you need to understand what they're looking for first, so it's probably good BA skills to use really in the selling yourself to a client</p>	<p>personal narratives as a sales pitch</p>

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
It's interesting, I feel like um it's been the role I've headed towards through my career really. So I started off as a, did a Maths degree, started off as a young developer in a very small software house in a converted jam factory by a disused railway line in Blackburn and ah kind of moved from business to business always in IT uh and then did a bit of project management work and then kind of actually found that all of that kind of analyst/developer/project manager to try and deliver things, actually the role I kind of settled into and realised this was a good match of skills in terms of the kind of people skills and the not so much technical skills but the analytical skills, the business analyst was a really good fit for that really	business analysis combines people skills with analytical skills
I started contracting and almost took the first contract I could get really that seemed to be a good fit, and it was. I rolled up on the first day in a room full of 20 other BA's all with a different idea of what a business analyst should do, so I kind of, that was a good proving ground for what it is that I felt I could offer as a service really	no common definition of business analysis as a service
Every organisation I work for has a different idea what a business analyst does as well. That makes the first week really interesting	"
Okay. Yeah it's hard isn't it	Judging sufficient discovery is hard
Again that kind of agile approach helps you get a sense of, again a test of, is it going to be that I could ask more questions but is it going to be quicker to do, and do and check, rather than check check check and then do	Preference for Agility over anticipation
her brain was full of stuff you feel like you don't know where you are	information overload uncertain of own understanding
do I know enough or have you got there	Judging sufficient discovery is hard

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
just make a list and like an initial requirements list and it's by doing that you realise where the gaps are in the knowledge, where the questions are	Written explanation as self-challenge
you can start to almost like shape the scope of what the work is that you're trying to do, and what's in and what's out, and where the gaps are, and so it then gives you the ability to kind of um close the funnel down a little bit rather than it just opening and opening, it allows you to build a boundary, and kind of see where the jigsaw is missing pieces	Bounding discovery by self-challenge
then you just need to judge uh depending on what it is you're trying to deliver, um is it going to be more work to, like I say, check more than it is just to do and test that it is okay afterwards	Judge anticipation versus validation effort
very often what you're doing is you're working with the constraints of an existing design of a system, and it is difficult you know when you're dealing with a lot of small changes it's difficult to almost say, I can see that this isn't a great way to do it but actually we've got a whole backlog of changes we want to make, if we spend a lot of time doing a, kind of um redesign, we're not going to get to the other things we want, so it's about choosing your priority really as an organisation, what is it that's going to make the most difference to you.	Gradual change not seen as an opportunity for discovery
"	Preference for road-map over research
The big the big thing around whether or not we need to spend, where it's kind of it's and there's enough of a business case if you like, to do the user experience kind of, um you know, investment, is dependent on the, your, kind of, user base for a system I would say	Business case for user research depends on user characteristics

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
<p>very often what we're doing is we're writing systems. Some of them are internal systems that are going to be used by a small set of staff who are really well trained and kind of specialist, and actually if the system is a bit clunky, not easy, actually most of the, most of the detail is in what the what they're doing with the data, rather than what they are doing with the system, if you like, so it's, and a lot of things you can get around with a bit more training.</p>	<p>Expert users are expected to cope with clunky</p>
<p>"</p>	<p>Bad design is mitigated by training</p>
<p>what the reasons, what do you do next, following a process, all of those things, are where you really get a benefit from mapping that user journey</p>	<p>Less expert users seen as benefiting more from journey mapping</p>
<p>this is a disparate group of people who may have done it once, may have done it 100 times, you know, may have done it lots of times before, or never before, and really you need to make it very intuitive, very easy for them to follow what it is that they need to do throughout the process, to get it right, because what you're really trying to do as well is avoid barriers being put up</p>	<p>Avoiding barriers to adoption prioritised for infrequent or inexperienced users</p>
<p>so you're trying to remove the barriers and make it easy</p>	<p>Avoiding obstacles to the job to be done is prioritised</p>
<p>it's not a perfect solution but it's getting rid of that and making it, you know, what would stop them doing that next step and how can we avoid that being a barrier for them</p>	<p>"</p>

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
<p>there was a customer relationship management system and that was hammered by a lot of contact centre as well as the kind of back end provisioning departments and customer service and billing departments, so teams and teams of people, and that was, yeah that was a lot of users, um the main challenge there was about maintaining, I suppose business continuity now, the kind of operational effectiveness, really, and the operational continuity to make sure that whatever changes you made it didn't stop the wheels turning on the, on the, the juggernaut that you were in as it was thundering ahead</p>	<p>At large scales the priority may be continuity rather than quality</p>
<p>Less about "how can we make it easy for them", but more about "how can we just make sure" that we can maintain this scale of transactional throughput really.</p>	<p>At large scales the priority may be throughput rather than ease of use</p>
<p>there are options of what you can do, there are pros and cons of them all, it makes you really say what is it that's important to what it is we're trying to do and the way that we're trying to do it, what we're trying to achieve, is it that we need to do it faster or more accurately, you know, these things are often a trade-off and it made you kind of have to check, um and get right I suppose</p>	<p>Performance trade-offs may depend on scale of operation</p>
<p>Thinking about the earlier bit of our conversation about, um, how do you know when you've done enough, it really makes you think is this going to be, is this going to be the right thing, and if it's not the right thing how do we make it that we know earlier that it's not the right thing, as early as possible.</p>	<p>Know you've done enough discovery if you can validate your approach as early as possible</p>
<p>the wheels will still turn after we've done this</p>	<p>Outcomes must include continuity</p>

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
<p>what you really doing is saying what's the difference between the standard treatment and the extra things that we're going to do as part of their study, so they are trying to quantify the delta of the standard treatment versus the research treatment, if you like</p>	<p>Quantitative comparisons between alternatives to assess benefits</p>
<p>it was a really difficult thing to actually bring in all of the inputs and kind of logically take them to a conclusion and actually more of a hypothesis approach I think, it was what kind of given enough of the research that was done, it was more proposing some options and then kind of modelling them and kind of taking people through the scenarios and, kind of, go in if we did this how would this work what would be the problems and what would be the improvements, and having a few different scenarios, almost a few different hypotheses I suppose</p>	<p>Modelling several different hypotheses</p>
<p>then it was a very informed decision to go with, you know, what was the best way there wasn't just one critical success factor</p>	<p>Experiments to inform decision making Multiple factors to consider</p>
<p>It's almost like you didn't need to define it too much, other than you know come up with some good options, good informed options, without knowing for sure what would work and what wouldn't, and then just testing I suppose</p>	<p>Options only need to be possible not precise before testing</p>
<p>The hard bit was a lot of stakeholders with a lot of different opinions and different agendas and different aims from the work really. Also a lot of different, what the other thing that we had to do was get past quite a lot of that, this had been going on for a long time really, years, and getting past a lot of "so this happened, now we're doing this"</p>	<p>Long history of poor stakeholder alignment</p>

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
<p>So, like, putting the past in the past, saying this is what we are bringing forward from it and now we're focusing on the next steps, really, to, otherwise we were always just talking around the same, same old issues, really, without ever moving forward, but yeah it was, it was a really good challenge, if that answers your question.</p>	<p>Hypothesis testing approach helps team to move forward</p>
<p>So this was the thing, I suppose, it's not so much in terms of shared understanding but more of a consensus, I suppose that, anyway, a shared understanding was necessary</p>	<p>Consensus is different to shared understanding</p>
<p>So what I did was I did lots of separate interviews and then I kind of fed back what had come from all these things to the wider group, so we kind of identified the kind of decision makers in the group, and, but there were lots and lots of aspects of it, and what we couldn't do, but I think what we kind of realised fairly quickly was every time we got this big group together, they talked and talked about the same issues and we never got to a conclusion</p>	<p>Difficult to reach a conclusion</p>

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
<p>And with, err, consensus cards you basically, each of you in the room, hold up a, you kind of define your benchmark to say if it's this good it's like a two, if it's this is an 8, or something like that and then everybody privately chose what the number would be, and then all at once held up the card, and what that let you do was kind of go "it looks like most of us are doing fives and eights, you've chosen a 2 and you've gone for a 13, why did you choose that, and could you tell us ..." so it allows you to kind of go for the outliers, everybody else's at consensus so that's great, you don't need to say why did you agree with everybody else, you've kind of got it, and what it means is you can then inform the group by these other people who have a different perspective on it to say why did you think that was more complicated or why didn't you think that would work and then they can then establish a, we just then revisit the consensus and you get a pretty good consensus, a broad brush consensus, which was a massive step forward, so that was a really good, that was a really good technique that was useful with a set of people who needed to agree and hadn't agreed for years.</p>	<p>Consensus poker was a massive step forward</p>
<p>I tend to find, I think to, kind of, set some basic kind of factors you know, what we're trying to achieve, what would what would this mean if we have this, those kind of things, a little bit of kind of envisaging what the future might look like in very broad terms, and then actually a kind of revisiting and elaborated I would say, so eliciting the kind of, you know the, what's the requirements behind what is expressed really</p>	<p>General approach of probing what an outcome would mean to establish the requirement</p>

Table E.10: *Extract coding in interview Zoom-001 (cont.)*

Extract	Code
I tend to just find a quick way in and then it just builds from that usually, and if you've got whiteboards, it depends on what you're doing, if you're doing the process you can often map out a process quite easily, but you still are often better starting with something basic, you need a little bit of kind of good groundswell of fact and information, and then you can come up with a draft, and then you can elaborate it a bit more, I would say	General approach of starting simple and building momentum
Interestingly because, you know, with the clients I'd worked with in the last six months, two different clients, and I didn't always go into the offices, you know, so I work from home probably 60% of the time	Significant remote working before pandemic
certainly the video conferencing has gone up, the client I had like a year ago, everybody had cameras turned on by default. The client I had, I mean now, it's only in the last few weeks, even, with a move to Microsoft Teams, it is actually, that they've gone there just recently, and everybody's cameras started to be switched on because I think there's a need to have that kind of a human contact a bit more, and to see the, you know, a bit more body language as well, so I think that really does help.	Remote workers wanting more visual contact during pandemic
I think we found that does help, um and not just relying on emails or voice, really, you can see whether somebody is smiling or looking a bit askance or you know, or just down right mad, and you deal with it then can't you, really rather than second guessing whether or not they really liked what you said or they really didn't like what you said	Facial cues aiding understanding in video meetings
the bandwidth of information you get from seeing each other is so much more	"

Table E.11: *Extract coding in interview Zoom-002*

Extract	Code
Some anticipation happens on a on a micro-level	Anticipation happens on a micro-level
there was a whole sort of growth of the idea of behaviour change through interaction design	Interactions designed for anticipated behaviour change
you could call that maybe 1st order anticipation because that's extraordinarily tight time scales. We're talking, you know, if I click this, what's the system response. We're talking seconds and minutes of anticipation	Interactions designed for very short term user response
you can say there's some anticipation that we think, okay well if we do that we will hit our KPI or growth target of 'this' because people will sign up and they won't churn	Business financial performance outcomes are anticipated
Other than that first order anticipation is practically nil in the practitioner space	Longer term user outcomes are not anticipated
I mostly blame agile and lean start-up for this	Lean start-up mindset works against anticipation
Particularly the lean advocates, have convinced us that we live in a state of such flux, the technology is so magically radical and different than anything that came before it, that it's a waste of time to predict	Lean advocates argue that anticipation is impractical
That ergo the only valid way to anticipate the future is to build it, so we have this deeply empiricist ideology of build - measure - learn build - measure - learn which has all sort of problems in it	Unconstrained empiricism is problematic
It completely disenfranchises design as a activity and as a job role	Unconstrained empiricism disenfranchises design
it also deprioritises any attempt of moral imagination or ethical anticipation of what might happen	Unconstrained empiricism deprioritises ethical safety

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
the entire world becomes a multivariate test, where you ship something, and if people die you change it	Design reduced to a multivariate test
you ship something, and if people die you change it	User harm reduced to a change request
Tesla's autopilot is a multivariate test, live pilot, with people's lives	User harm reduced to a change request
Waymo on the other hand are doing absolutely the right thing they've seen videos of people falling asleep in the cars, so they are not releasing anything to the public until it's Level 4, so you could argue that they are doing some anticipation on the social consequences of their innovation	Identification of harm should delay release
it's a hard job to convince a lean start-up ideologist that, actually, we can anticipate	Anticipation is outwith the empirical mindset
you can never anticipate 100% of the unintended consequences of your decision	Cannot anticipate every consequence
Nevertheless you can get some, and so I think we have a moral obligation to try, and to mitigate any risks and to exploit any opportunities that come from that anticipation	Moral obligation to anticipate and mitigate what we can
But the lean folks will say there's no way we could possibly know, we just need to have a hypothesis, we need to build, then we need to validate whether the hypothesis was true, and then we roll that data back into our second round of experimentation	Unconstrained empiricism treats all outcomes as neutral data
So that's an extraordinarily difficult mindset to shift	Empiricist mindset is difficult to change
I think there is a little bit of progress in shifting that mindset	Some signs of empiricist mindset changing
So I worked for [Company] for three years 2012 to 2015 and [it] essentially lost its way, well, it decided that, it decided to replace product strategy with experimentation	Strategy replaced by experimentation

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
the CEO turned round one day and said anyone can ship any experiment to anyone, up to 1% of users, and that's, you know, that's 3 million people	Significant human population co-opted into experiments
some terrible things started to happen to the product, and it lost any kind of coherence, if anything moved the needle then, you know, it shipped to 100%	Design lost coherence to empirical drivers
So it sort of scaled but it scaled from [Company] existing belief of what they thought users were, which was west coast, technically literate people and some of those folks did quite nicely from the tests, because they gave them features that they could understand and that they wanted	Outcomes designed for privileged users
there's no evidence it had any impact on global growth so it didn't seem to have any effect on usage rates in Middle East, North Africa, you know, Japan, etc	Outcomes ignored for non-privileged users
It is a very global company, so I think as a proposal, I think that's probably fairly accurate	Testing alone does not scale to large diverse populations
I think, if you ask a purist researcher they will say that's absolutely not my job, I'm just there to report on behaviour, you are asking me to speculate and hypothesise and that is fundamentally not something that we do within this scientifically predicated body of work that we do	Purist user researchers will not like anticipation
there is a, almost a puritanical streak I think in a lot of design research in order to practise design research, in that they view design research as sacrosanct	"

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
to sort of have almost, shrink wrapped behaviourism, right, and we're not interested in anything else other than observed behaviours, so they look at market research with deep suspicion because that's all hypotheticals, it's all propensity to buy, if this were to happen would you do X, so you get some researchers, generally I think not necessarily the very good ones, would say we don't need it, that's not something we would ever look at	"
I think the more sophisticated researchers who have a slightly more, kind of, blended approach who understand more different more techniques and approaches and mentalities and yes ideologies when it comes to research would say you know what, yeah, there is something we can take from market research particularly trends research which I think is fascinating in the field is totally ignored and maybe we can use some of those to start to stretch the time horizon, essentially saying okay it's not just we saw their sets and we think there is something happening around this particular behaviour on a longer term basis or that may become something we need to participate in our product work	More experienced user researchers may be more open to extending the time horizon
I would like to think a more sophisticated researcher will be open to that	"
My experience of most UX researchers in London is that they would run a mile from it	User researchers will run a mile from anticipation
I don't think that the quality of the data matters. I think it's an ideology thing	Objections to anticipation will be ideological
I think it's a "this is my process". I mean you know if you hung around with UX people long enough, right, they are extraordinarily process orientated, they are convinced that their process is the one true way	Designers perceive UX people to be process oriented

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
So having richer data is not really going to help One parenthesis to that is data science. Richer quant data will, well should, help to lend colour to the research process	Richer data only helps if it is quantified
a lot of user researchers are sceptical or fearful of quant data, and of data science as a movement generally, partly because they don't understand the statistics, but also they see it as undermining the qual value that they bring	Designers perceive user researchers to be sceptical of quantitative data
"	Designers perceive user researchers to lack statistical training
they see it as undermining the qual value that they bring, and rightly so actually because it does, in a lot of companies, undermine it	Quantitative data is perceived as undermining qualitative data
a sophisticated company that treats research as a broad church I think would have data science and research under one roof. The only company I know that does that is Spotify, who have a combined insights team that bring those two together	Combined insights from qual and quant support deeper understanding
I've not heard of a single other company that does that. Data science is always in engineering, and research is always in design or product	Qual and quant analysis are separated in most organisations
Potentially richer data could, richer quant data could help researchers. It informs models, right, here are segments, groups that are exhibiting interesting shifts in behaviour, now let's dig deeper on why that's the case. So you don't diminish any value or agency of the qual work there	Quantitative analysis can prime questions for Qualitative research

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
richer data in terms of having more interviews and more diary studies and whatever it is, for the researchers alone isn't going to make any difference, until there's that breakthrough or until they sort of snap out of that model of I'm just here to you know be a neutral passive observer of behaviour	Designers perceive user research to be passive observation
What I'd love to do is drop a couple of trends researchers into a classic UX research team because it would just blow their minds. They wouldn't know what the hell had hit them and I just think that would be fascinating. You'd sort of you know plant it, then stand well back	Trends research techniques would expand UX research thinking
So you could argue that would be rich data coming in because those folks would be looking for different patterns but that's more of a you know injecting a different role and a different perspective than injecting more data	Anticipation requires different patterns and perspectives
There's essentially two ways that you can anticipate this sort of stuff, right. You can do a priori – you can do sort of it step by step – or you can do it by looking at existing risk categories and try to map backwards from that and both of those I think are entirely valid	Anticipation can work step-wise towards a jeopardy or backwards from one
they say okay well you know what is the chance of this system being used for disinformation or abuse and harassment or whatever it is, and so once you have those predefined categories, yes you can have a relatively fruitful conversation and say here's the known risk, does this apply to us, as you say, do we have evidence that the system is designing that out, somehow, do we have protocols and systems and interfaces that will mitigate and so on	Backward chaining from a known risk uses categorisation

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
Of course the down side of that or the potential weak spots of that for emerging technologies is that is a static list, and although the threat model itself tends not to change that much, you find stuff slipping through the gaps a little bit because you have all these unanticipated emergent properties of technology which you just didn't, you didn't realise that this system would ever be used for social communication	Static categories cope poorly with emergent problems
I like to do that kind of backcasting but I also like to do it, okay, step by step: what could this cause, what could this cause, and then suddenly or in some pretty unanticipated territories of optimism far-out territory, so I'm trying to do it	Forward chaining from actions may find more unanticipated problems
I'm not aware of many other companies doing it other than those that have read ethical, who have looked at the Ethical OS website or who were sort of have some literacy in this sort of responsible design field, but not many, yet, not many yet	Adoption of anticipative methods is currently low
I'm going to take it as read that they already have relatively good mechanisms for feeding design research and behavioural research information in to inform product strategy and interface design and things like that. That's a big assumption as actually a lot of companies don't have that, like they have the researchers and then there's this wall, you know, you create a bunch of docs and then designers ignore it and design whatever they were going to design in the first place	A lot of companies communicate research findings poorly

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
<p>When that's done well, I see it as a parallel stream, what I don't like is commissioned research for specific projects. So I think an anti-pattern or failure state essentially is "okay we want to build X well let's research it first and then let's design it" and so on because the problem is again lean and agile will always try to compress that and omit the research, so that's why that doesn't work</p>	<p>Research gets compressed unless it is a parallel work stream</p>
<p>So ideally the communication method there is a parallel, ongoing stream of work that yes you can spin up different foci within and then feed that across. um and I would probably be looking for researchers to sit in on design critique sessions so that essentially they can stop some downstream leaks you know where things have been going against, you know, where the designers are designing in a way that contravenes what they put in research and then the researchers can say "well hang on if you refer back to this set of research we did" this is a problematic way to approach the problem</p>	<p>Design sessions need to involve researchers to uphold findings</p>
<p>I think if you leave it just to the research function to be this sort of the arbiters of that ethical risk and ethical sort of anticipation, or that user safety risk, then I think, I don't think it's going to work as well as if you involve a wider set of people</p>	<p>Ethical safety requires a multidisciplinary approach</p>
<p>I mean, for example, I would love every designer in Silicon Valley to do a tour of duty within the user safety team. I had a little bit of interaction with user safety when I was at [Company] and you know it's the dark underbelly of humanity, you know. It's abuse, it's child pornography, it's, you know, it's absolutely horrible stuff, and once you've been exposed to some of how people are trying to use your platform for terrible things that doesn't leave you</p>	<p>Designers need to see the lived experience of users of their product</p>

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
<p>you immediately from that point on, you recognise every decision I take has the potential to be used to harm others and I think it's that realisation that needs to happen. So this is why I want designers to be involved in it. Once they see, you know, the negative consequences of some of their decisions, then they're trained to look for those, and to consider them on the sketch board, let alone before shipping the product</p>	<p>Designers need to see the negative consequences of their decisions</p>
<p>How I would do that, yes push them into user safety teams. Training is obviously a good part of it, and so this is, a lot of the work I do is training designers to do that kind of work, and then this is another reason why I'm trying to lean on the futures toolkit and speculative design and things like that because there are existing techniques to anticipate potential consequences of technological decisions, and so helping people to use some of those in their design process will help to shift their mentalities</p>	<p>Designers can be helped to anticipate problems by training to broaden their mindset</p>
<p>I'm not so interested in will they for this particular problem, anticipate the correct consequence and mitigate it, because the chances of actually landing on the right one are pretty small, but it's training them to think that way so that they apply it naturally in all their designs from that moment on</p>	<p>Chances of anticipating and avoiding a specific problem are pretty small</p>
<p>Increasingly aware. The landscape is shifting. Ask me five years ago and, definitely not</p>	<p>Designers are increasingly aware of the impact of their choices</p>

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
In 2015 and before we were still in this sort of halcyon era of technological exceptionalism and cyber libertarianism, and everything we do is beneficial and positive and transforming the world, disruption, etc, and so there was this a glossy veneer over every design decision. Obviously since 2016 to today, the techlash and so on, I think companies recognise now that there is, there are dark implications from some of the things they do	The Techlash has forced designers to consider the impact of their choices
I think some of them only believe that or any realised that because they are getting sued and because they are getting dragged in front of congressional hearings, etc So I don't think it's sort of from heart, it's more of a "we're going to get our asses kicked if we don't do this stuff" It is more of a risk aversion thing. I think designers are most sensitive to this	Consideration of impact is driven more by fear of retribution than personal ethics
It's folks like me, I think, my sort of level of experience, you know 10, 15, 20 years are probably the most attuned to this stuff because they made the mistakes before and they've seen the problems that they can cause with careless design	More experienced designers are more attuned to their impact
it is true I think that say you're 20 early 20s designer is more values driven	Recently graduated designers are more values driven than previous generations
So for me there's kind of this U curve that the senior folk like me get this and the junior folk get it, it is the people in the middle who kind of get it but don't really care because they are climbing the corporate ladder, you know	Mid career designers are the least impact sensitive

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
<p>they're like okay I want the senior manager position or I want to be promoted to staff designer rather than senior designer or I've gotta save for a deposit for my house, things like that, so I think they are more invested in, not necessarily towing the company line, but not rocking the boat too much</p>	<p>"</p>
<p>You know if you go to Silicon Valley, even if you step into Facebook, the average age of a software engineer that might be 27 or something like that so you know half the team is fresh out of Harvard or Stanford Oregon and bless them they're ridiculously intelligent people and generally quite nice people but they haven't got the world experience to understand the world, you know, they haven't travelled much, they've sat in front of screens for most of their young lives, so they don't necessarily see the impacts or they're not trained to understand what the impact might be on people who aren't like them because they haven't met that many people who aren't like them, I suppose</p>	<p>Young designers lack the life experience to understand impacts on people unlike themselves</p>
<p>designers believe themselves to have little power, because they look at mostly the product managers but to an extent software engineers who overrule them and they say "ah well poor me I actually don't have the power"</p>	<p>Designers do not realise the relative power they have over users</p>
<p>you get to create the future, and so you know you're imbued with enormous power, and then with that comes responsibility, but yeah I generally I think that there's not much literacy in the topic of power I think in these organisations other than corporate power in typical political hierarchies but that's all internal</p>	<p>Designers do not recognise the responsibility they have to users</p>

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
Folks that have been paying attention to Black Lives Matter and things like that are probably better setup for those conversations but obviously those aren't uniformly or universally popular in Silicon Valley companies, there's a lot of backlash against that kind of thinking as well	Social justice discussions are not always welcomed by corporate management
things like the futures wheel, I bring that out quite a few times when I'm training	The Futures Wheel is helpful for identifying consequences
the actor triangle, which is from Nordkapp's actionable futures toolkit, is basically a triangle that allows you to anticipate who might be sort of hidden stakeholders in the system beyond just the user	Actor triangle from actionable futures toolkit helps identify hidden stakeholders
Doteveryone had this consequence scanning framework you may have come across, so you know things like that, but those are very micro exercises	Consequence scanning works at a micro level
In the broader sense, no I can't	Broader methods for anticipation activities are lacking
there has to be an appetite for it. Usually from my experience, there's a designer, reasonably senior enough that they're listened to, who starts to say "hey we've got to start taking this stuff more seriously" and then they convince the rest of their team through a process of either lending books or giving brownbag lunches or something or just advocating for the issue and then eventually they get some budget and they bring someone in	Ethical safety efforts require a champion within the company
So it's not tools so much as one or two mobilised people speaking up and grouping together and saying hey we're not going to let this lie until eventually one caves and then throws money actually trying to address the problems	Mobilised people are more important than tools

Table E.11: *Extract coding in interview Zoom-002 (cont.)*

Extract	Code
[DesignOps] is essentially kind of an accelerationist perspective, but saying what we need, the answer to all our problems, is more user centred thinking, more effectively, more often	DesignOps has an accelerationist perspective
if we say the answer is just to do what we're doing but more efficiently, then we'll make mistakes more efficiently as well	Doing the same things more efficiently makes the same mistakes more efficiently too
unless there is a fundamental recasting of the role of design, I don't think it helps in any way	A recasting of the role of design is needed
Right, yeah. Yeah, I certainly recognise that pressure, for sure	Coffin corner analogy for time and complexity pressure recognised
a lot of my clients now are kind of big consulting groups and so they need, it's not necessarily sort of audit and risk kind of mentality, but they want to see rigour to this	Clients want to see rigour in the process
I have to frame it as there's actually a structured way that we can start to anticipate some of these things	Structured framework helps sell the process
I can see the value in mindset shift as well but I also think good tools properly applied in the process can create that mindset shift as well. It can force it through you know	Good tools help shift mindset
Software people don't see risk in what they do. You know, they think software is soft, it's malleable, it could be remade at will, and to some extent that that is true	Software people don't perceive risk in what they do because so easily changed

Table E.12: *Extract coding in interview Zoom-003*

Extract	Code
it tends to just come down from whatever the Minister says they want, which isn't always the thing that people want the most, it seems that there's somethings are just things ministers want, somethings are put in manifestos and then we have to do them regardless of whatever else happens	Product mobilisation driven by most senior stakeholder
it's like a completely different thing once you're in a service, we would use a mixture of user research data and business requirements to try to work out what had the most value	Service mobilisation driven by user research
if something is really, really high on a user need list, but costs a fortune, we have to balance it out and work out what we can do for, to be cost effective	Needs balanced with cost
they're all traditionally paper or PDF forms or post office visits, things like that, and they've got a backlog of what they want to move online, and I think they've probably scoped that based around, like, transaction levels and how many users use them, and how bad the service currently is, so they've got a wish list, but they don't necessarily have massive say over when they start to do that work	Backlogs define priority but not necessarily timing
they probably had a plan for this year and then COVID happened, and we stopped a lot of their work and put people in emergency COVID stuff	Plans can be overtaken by external events
so yeah there's backlogs, but there's other stuff can come and attack your backlog at any point	"
Actually, I tend to do whatever the user researcher advises me to do	User researchers advise on method choice
we tend to do a variety of stuff, from workshops with stakeholders and policy, to mapping sessions, user interviews, and going to observe people just doing their jobs	Observations and interviews and workshops are key user research methods

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
We have an aim to try and get everyone involved in research so it's normally the researcher, but they never do anything on their own. It's normally the researcher and one other person	Cross-disciplinary involvement in user research
in teams it's normally like 50% research and design but every now and again the designer will step out, and there'll be a developer or an architect or delivery manager	Developers and managers sometimes included in research
That's the theory. It doesn't always happen but most people are on board and want to go and do research. There's some people that don't seem to want to much, but for those people that researcher will normally playback research sessions, either in a video or with a presentation	Whole team positively engaged in research activity
it depends on the researcher. I think most of the ones I've worked with give presentations, I've worked with a couple that have had recordings and if they can share, they do	User research recordings shared with team when data protection allows
it depends on how sensitive the service is as well, what can and can't be shared	"
I think you can't really go wrong with the presentation and some quotes, and no one's name underneath it, is normally the easiest way of doing it	Data digested into a presentation is favoured dissemination approach
Yeah, we try to, in places that have, [Location-1] office has a lot of walls and we have, most of them are covered in stuff, so the [Team-2] teams have got research walls up, and post it notes, and research sessions	Research data walls are used where wall space is available
I used to pin up, like, early prototypes on paper and just have feedback comments, like, stuck on each page for, like, one colour for positive, one colour for pain points, or something	Paper prototypes can be used to gather feedback
It's really a bit dependent, it depends what office space you've got. It's harder in [Location-2] because they haven't got any walls, they're open plan, but they have a lot of virtual boards	Virtual boards are used where offices lack wall space

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
<p>Mostly through presentations, in those research teams that I've worked with. If we have a Sprint where we've done a design and research sprint then that will get fed back to the whole team. Usually the researcher leads some kind of presentation or the designer will talk through the prototype and why things have changed</p>	<p>Shared understanding achieved via presentations and prototypes</p>
<p>If we have a Sprint where we've done a design and research sprint then that will get fed back to the whole team</p>	<p>Some sprints are design and research only</p>
<p>The BA is actually really involved in research as well so they are quite good at bridging the gaps sometimes with developers and updating tickets as we still have quite a reliance on Jira so a lot of stuff gets fed back into Jira as findings from research and stuff like that</p>	<p>Business Analysts are good as a bridge to developers</p>
<p>We have different ways to save feedback in the prototype as well because we have ever changing prototypes and we're trying to work out the best way of saving that research insight says that we know why we made decisions without ending up with a mammoth prototype just with too much stuff in it so we've trialled a few ways of doing that</p>	<p>Prototypes also used as a repository for feedback</p>
<p>Yeah because it's difficult, because prototypes should be things you can throw away shouldn't they. You do an approach like we learn from it then throw it away but then we often go and pick something back up again six months later or the teams change a lot. So a different team will look at something and go "Why is that, like that" and then they have to ask questions and dig around and see if someone still here. So I kind of think the prototype should be throw away but we do need to document somewhere how we ended up where he did and what we tried</p>	<p>Traceability of decisions achieved by annotating the prototype</p>

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
I've got like a Trello board for onboarding designers. It has like various stuff in like introductions to government and civil service, introductions to designing, [Department] resources, and there is always two columns at the end for like the project they are joining and where the delivery manager and teams can put links to their Google drives or their SharePoint drives and share their research and stuff. So there should be stuff whenever we bring someone new in there should be hand-over period in this	Trello boards used to collate resources for onboarding new team members
In theory they get a Sprint to just shadow existing team members as well so that they can learn before they have to jump in	Job shadowing used to introduce new team members
The stuff can be different places and some teams are using Google drive, some people are using SharePoint, some people are using Microsoft online	Diverse platform mix complicates data sharing
it would be good if we had just one thing but we can't find one thing that works for everyone	Data platforms deficient in different ways for different people
normal meetings really, I think, walkthroughs, demos and prototypes and then people just asking questions	Understandings shared in walkthroughs, demos and meetings by asking questions
In theory, the daily stand-ups should give us a hint if we have strayed from the same path	Daily stand-ups help test alignment of understanding
I think retros are good at that to make sure everyone's in	Sprint retrospectives can identify poor alignment
When we do prioritising and planning for the next sprints and make, if we're all agreeing on what the next most important thing is for the next Sprint, which we don't always do	Sprint planning is a useful alignment activity

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
I think it used to be just because we were all in the same room as well – we had co-located teams. I think it’s a bit more difficult now that we are remote but hopefully the retros and ceremonies help with that	Alignment is harder with remote working than with co-located teams
Yeah. Yeah, which is making things more difficult for stuff like that	Home working during a pandemic makes alignment harder
I don’t know if we have a standard way of challenging them, but if its something that you don’t think is needed, we tend to try and use actual research or data to prove or disprove stories	Challenge is via appeal to research findings
if you actually don’t agree with something try to back it up with facts, otherwise it becomes a war of opinions and it doesn’t really ever end well does it	Facts are valued over opinions
It’s weird because we have to estimate every project in a really water-fall way but we don’t actually work waterfall because discovery is, the whole point of discovery is you don’t know, do you, until you’ve done it, you don’t know what’s going to happen next	Agile working hampered by fixed up-front funding
Government just isn’t built to work like that, so we have to estimate for a Discovery and an Alpha and a Beta, so that there’s money in the project to last that long	Time-boxing constrained within a funded project duration
if we don’t estimate for the whole thing then we can’t get people to do the whole thing	Team membership constrained within a funded project duration
If you have to recruit someone to do a project and then we stop at Discovery, because it’s the right time to stop and think about Alpha, then we’d have to lose that team	Inflexible staffing limits time available to stop and think

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
discovery [endpoint] is that it should be like, you've got a clear problem to solve or a clear statement that you either want to prove or disprove	Discovery endpoint linked to clarity of goals
people normally come to us with "we want this" so discovery tends to start off with like, why do you want that, and will it actually achieve your goal, or what is your goal	Clients enter discovery with a solution in mind but unclear goals
once you know enough to have a rough idea of how you could test something in Alpha then you've moved to an Alpha or you've stopped completely	Testing starts as soon as understand how to
I don't think it's ever actually finished, like once the discovery phase stops and you move to Alpha, discovery just still kind of carries on in the background	Discovery varies in intensity but never really stops
most of our discoveries tend to stop because that's when the project said that they would stop, and which is the wrong way of doing it	Satisfactory discovery endpoint not always reached in time allowed
as long as research carries on I think it's OK but yeah roughly we try and stick to, I think that the recommended GDS time frame I think was like 8 to 12 weeks or something like that	Expected time frame for discovery is 8 to 12 weeks
we do get a lot of push back sometimes of how much is it necessary, can we do a shorter one	Duration of discovery is contested
I've seen people push for four-week discoveries which I think is intense to try and learn something in four weeks because you are coming at it from a blank canvas	Four week discoveries feel intense when starting from scratch
discovery is just to understand enough, or to even try and uncover the real problem you're trying to solve	Discovery is just to understand the problem not solve it
Alpha is to try and think of how you might solve that problem	Alpha testing is when try to identify solutions

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
It's hard to box that into any kind of time frame, it just depends doesn't it when you feel confident that you have a real problem to focus on	Aim of discovery is being confident have a real problem that can focus on
one project did get stopped in discovery, like mid-discovery for budget reasons, and we did have to produce a document to sort of show like we've stopped early and this is your risk, because we knew we had a bunch of users we hadn't even spoken to yet, so I think in the discovery report we had to highlight the facts that we'd only actually like done 50% of the work and there is a huge risk that the user groups we hadn't made contact with would be a large part of the Alpha, and it could make the whole Alpha invalid	Risks of stopping early are identified
we tend to get if we can the whole service team to be involved in some early workshops trying to highlight like what is the biggest risk or the riskiest assumption from this from the discovery and try and work out how we could solve that, but yeah it should be a team effort with maybe a couple of workshop sketching sessions	Design workshops start by challenging riskiest assumption identified in discovery
I was involved in a sketching session a few months back with the [Team-2] team, so we just kind of all given sort of a little worksheet instead of set tasks and trying to draw out what we thought something could be to fix a very certain like small slice of a problem	Thinking structured but not dictated by worksheets
if Alpha is like a way to start as the first time you think about how you're going to fix this problem, there should be like five or six really different ideas that come out of an Alpha	Initial solution generation happens during Alpha
It tends to be just an online, especially in Government sometimes, it's an online form and we always kind of know that before we start Alpha, then maybe we just spend a lot time looking at different sequences of questions for the online form	Some aspects of the solution are self evident or given

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
I don't know how much time we spend looking at different ideas, we should probably do more I think	Time spent looking at alternatives probably too little
Usually slide decks from early alphas, where we would try and record like sketching sessions and have a kind of a step by step of the project. It ends up being in GitHub a lot of the time if we move to a coded prototype we have the GitHub repo with design decisions kind of logged in it, but every team across [Department] I think does that differently	Decisions recorded but method varies between teams
Usually it's a clickable prototype of something, with a cover or page of cover on it, with links to different sprint versions. Sometimes it's done in tagging, so you can just tag your repo at certain points, and have it saved where you were at, but I've seen other people just have a cover sheet that literally has Sprint by Sprint what they worked on, links to Jira tickets, what they did, and then they have versions of prototypes, they just end up with multiple folders, and call them like "Sprint one" folder, "Sprint two", so you can link to different instances of the prototype and see how it's evolved	Evolution of the prototype can be narrated in detail
Yeah, you should be able to just roll back to the previous one	Version control used for alternate solutions
It's a hard thing to scale, the only thing that I could say that we do consistently to make sure that we don't have gaps from people who might need specific, people with access needs, to try and use that to get a broad user base, and make sure we've got everything as accessible as it can be, but people from different backgrounds and stuff like that is difficult to recruit	Diversity in usability test participants can be hard to recruit for

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
<p>an inclusive design model, would be to think about the worst possible scenario and if you can make it work in that context then it will work for everybody else rather than designing for the 80% and then thinking over the edge cases</p>	<p>Start with the most constrained users rather than treat as an edge case</p>
<p>the rural programmes probably have to do that more because they have to anticipate [Users] in really remote locations potentially having awful Internet connection and a lot of the services that we aim at them tend to have a lot of data and maps on them because we want to understand like where the [User Location] is and it just doesn't work because as soon as their internet cuts out they lose everything</p>	<p>Designing for hard to reach users benefits from anticipation</p>
<p>personas are rolled around a base user of someone with really poor internet connectivity in a remote place and how can it work for them, and then if you have got a good connection and it's just, it's a progressive enhancement rather than treating them as an add-on at the end</p>	<p>Progressive enhancement from the constrained case is easier than trying to augment the nominal case</p>
<p>We tried to have a mix of real people, and then from every possible background, and I think from the [Team-1] ones we put together for a [Team-1] tracking project it was looking at people who would have different perceptions of what we're doing, so I think we had some people he would just sceptical about the whole service and we had to factor in how they would be thinking</p>	<p>Different attitudes can be anticipated from prior work</p>
<p>I'm never really sold on personas massively as a thing that they're really helpful but then people get too fixated on fictional people</p>	<p>The fictional nature of personas can be an obstacle</p>
<p>We had some, we had a sceptic persona in the [Team-1] team, that was just like "it'll never work, you can't do this, it is not possible" type because that task was a really difficult service and a difficult task</p>	<p>Awkward behaviours can be captured in a persona</p>

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
Not sure how that went down with the business, they thought we were just trying to be particularly difficult, but it was like the quotes we used for him were true, they were things that people did say, but when you put it all together in a persona people kind of think that you just made it up to be awkward	Abstraction of real data make them seem less real
Every persona has a real life quote and so that's how it works in [Team-1] anyway, so it was like this is based on fact, this is a real thing someone said, they're just given him the fake picture and a name but it's basically a real feeling that came through	Personas may voice inconvenient truths
We do have content designers looking at forms. Just for the, most of the forms that we have that haven't been worked on yet, have got a lot of content like explaining each bit of the form and using just language that people just don't understand so, yeah, we try to	Explanatory material needs content design
So, every service I've worked on has hired a content designer as well, yeah	Content designers are routinely used for material explaining services
I'm interested in how other people do this because you have, like, there's loads of books on theory but I've not worked anywhere yet where anything relates even remotely to theory and books because it's just like life and people	Text books rarely reflect work as practised
we've all got little pockets that do really well, but for every area that's doing really well like [Team-2] is really quite far in its journey of becoming user centred and becoming Agile, for every [Team-2] there's another bit of [Department] that jumps out of nowhere that's just literally never heard of design, has no idea why we're here, so it's kind of, I think this is almost too big an organisation to even know where we are at	The future is not evenly distributed

Table E.12: *Extract coding in interview Zoom-003 (cont.)*

Extract	Code
I think everyone, every org that I've spoken to, is like that they've got good bits and they've got bits they haven't started work on yet	Progress on user centred design is patchy

Table E.13: *Extract coding in interview Zoom-004*

Extract	Code
I suppose it's more a response to client requests and the client requirements in terms of projects that surface, so I work as one of the analysts in a team of four, and we basically respond to either new client requirement which is a paid for a change request or responding to issues and problems and things, bug fixes basically	Mobilisation is client request driven
when I first started, that the concept of a user interaction or user interface and things being designed for that, didn't really exist. What was being provided and sold to clients at the time was "here's what the system can currently do, let's try and mould your expectations to what we can currently do"	Past attitude was to mould customer expectations to what we wanted to sell
I don't work like that. I'm very much a visual learner, and I'm very much a visual designer, and my past has always been, I've got a sort of E-Commerce background, so my past has always been how can I make the path to purchase as simple as possible for somebody who maybe isn't as IT literate as me	E-Commerce attitude is more about making the path to purchase as simple as possible
when I'm trying to solve the problem, that involves a lot of me working out how a system works, what it is currently capable of doing, but also what I believe the solution is for the client, in the first step	Solutions are considered right from the first step
I'm much more comfortable speaking with the client, and not necessarily trying to achieve what they've asked for, but it's more about trying to understand what their problem is, because those two things are a lot of the time very different	Client request is often an imagined solution not what they actually need
I find a lot of the time the client has presumed the solution, so has asked for "give me this" rather than allowing me to understand what their problem is and solving that for them	"

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
I was working for an E-Commerce company, a small E-Commerce company selling [Product] online, answering the phones, and I was just doing it to earn a bit of money. The boss at the time needed somebody to look after their website so I sort of taught myself WYSIWYG HTML quite quickly, and started managing her product range on the website for her, and then it just progressed from there	Route to current UX role was self-taught
I stepped into a couple of different companies, incrementally bigger each time, in terms of turnover and size of product range and that sort of stuff, and that gave me really good understanding of the things you could do to directly influence profit margin, you know, and bottom line, by making the path from landing page to completion of baskets as easy as possible	Career developed by performing similar E-Commerce role in progressively bigger companies
I've met a lot of developers along the way who really do shy away from, can't stand any contact with the outside world, very happy just in their own little development bubble, you know, and not wanting to engage with the client directly, but I'm very happy with that	A lot of developers are uncomfortable with customer contact
I'm trying to sort of swing us more towards a very customer client focused development company as opposed to being just responsive and being a database architecture company	Proactive user centred design is still a work in progress
Obviously, it can't be face to face now so Teams meetings has become the new norm, and actually I found them quite productive because it helps to structure the conversation in a way that you wouldn't really get if you are all sat around the table	Remote meetings help structure the conversation
I often find that sitting around the table, sometimes the conversations can fly off on tangents quite quickly	In-person meetings are more prone to irrelevant tangents

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
everyone just kind of jumping straight in because now you've usually got three or four stacked up through the course of the day so you just need to get on	Firm time allocation of remote meetings encourages sticking to the agenda
Early client engagement with the stakeholders, usually that's after a requirement document has come in. Our sales team will have been contacted or support will have been contacted in the first instance by their client. So if it's a bug, it's support. If it's a new requirement it'll be from the sales team	Initial requirements come from sales team
Sales team really don't fully understand what it is that we have, that we offer, because they are sales, and so they just say yes to everything and then hand over to us to work out what it is that the client actually wanted	Initial contact is not with people who understand the technical product
so once I've sort of understood as much as I can from the initial client requirement documents, I then start putting that down into something that I think is what the client actually wants, and then we have a client engagement discussion. Sometimes that can be with a very early wire frame or even a prototype depending on how well documented the initial requirements is	Actual need is reverse engineered from client requirement then discussed
Most of it is, yes. Usually, it's not well formed at this stage. It can be something as simple as it as a one-liner or something is broke and needs fixing, but we don't know what, or it can be something very, very general, very high level, like "we would like a public facing map that displays all of our street bays and furniture"	Initial requirements are generally written but often vague
so then, you are then into the refinement period of, you know, trying to help the client refine their own requirements	Second step is discussion to refine the requirement

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
I always build the prototype and I always offer, there is a supporting document that goes with that, and the aim there really is to, I start with the prototype first, I build out what I think the journey of the end user is going to be, based on my understandings, that helps me to ask a lot of initial questions of myself and my understanding of the architecture that sits behind it all	Prototypes used to understand the user journey and document it
Once that prototype is sort of built, that then informs the written specification document, and it's then that I start testing my theory against the actual structure of the database, and the information, and it helps me to pin down where, where am I getting this bit of data from, in this data field, on this screen, rather than it all be just ethereal it's actually now becoming a bit more concrete	Prototype used to inform the written specification
something I'm trying to harness going forward is a closer relationship between analysts, sales and analysts, analysts and devs, analysts and testers, because I feel like an analyst is a bit of a conduit between the different parts of the development process for a project	Analysts have a boundary role in the team
Having a conversation with the developer, not just, doesn't just help me to understand the capabilities of the code and the things that are already there because, that was it, you have to spend a lot of time reworking code that already exists, so what I don't want to do as an analyst is create this concept with something that is then going to mean a developer's got to rewrite thousands of lines of code for me to be able to achieve the thing that I've, you know, promised to the client	Conversations with developers used to understand technical impact of design changes

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
<p>So having the conversation with the dev really helps me to inform my design because there is always another way of thinking about something, so there's always another way of solving something, so it's great to get their input in that, and they also, they buy into it nice and early then, rather than them just receiving a document cold on their desk one day, or in their inbox, saying build this, they are already involved</p>	<p>Cross-disciplinary conversations with developers inform design</p>
<p>They've been involved in the design process from an early stage so I found that's been, and some of the feedback I've got from the developers is, this is a great way of working and can we have more of it please</p>	<p>Developers like to be engaged in the design discussions</p>
<p>I suppose a very recent example is there's been a big shift towards using the dot.gov styling for some of our front-end portals and we've been trying to replicate some of the functionality of some of the existing front end portals. There's been a real disconnect between what's currently there and what the dot.gov styling says you should be doing on screens like this, and so they've posed a lot of design issues. Not issues but potentials for learning shall we say, where, yeah we've had open, I've pulled dev's and analysts onto a call, we've all had just an open discussion</p>	<p>Discussions around inclusivity centred on perceived best practice</p>
<p>I already know what the system is capable of doing, but we, I believe we need to change, and here's my suggestion, and I'll get, and then try, and we have just an open discussion with analysts and dev's about what's the best solution, isn't it really, and so yeah, it's much more collaborative</p>	<p>Collaborative design between analysts and developers</p>

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
<p>From a client point of view, all they get is the flat screen in front of them. What happens behind that is black magic and they don't need to know. All they're interested in, is what surface, what comes to the surface, so we would only then go back to the client at the point at which we'd sort of solved that problem, or pre-empted the questions around the issue, and had a solution for it, and then I'm going to go back to them</p>	<p>Only the user observable system behaviour needs discussion with the client</p>
<p>We've got a new client, they are huge for us in terms of scale of work and income, but also demand on time. I think they epitomise a new breed of clients who are employing a lot of very talented educated people straight out of University who are trying to do things by the theory book rather than from experience, so if it's kind of forcing us to, I hate using the phrase "to be like the Amazon of" but people use kind of Amazon as almost this benchmark of E-Commerce and, you know, functionality or something, so there's always kind of "Oh, you know, like Amazon do" is kind of something we deal with quite a lot but it tends to be because, it really is a very high expectation of what a user should experience from the service, the tool, the thing that there into, whether that's the member of the public using a public facing web portal, whether it's the person on the street with a hand held device [using Application], or if it's the client user in their office using our back office system</p>	<p>Clients have expectations from global service platforms that are hard to match</p>
<p>We are sort of battling on three fronts a lot of the time, and so when it, when our clients are especially the, like I say, the sort of the younger employees of the client who been brought up in a completely digital world, so their expectation is already at the Facebook / Twitter / Amazon level of what is a norm</p>	<p>The FAANG companies create unrealistic expectations in our users</p>

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
I think that's the understanding document that comes back from a developer	Shared understanding is what it says in the documents
So once, the steps I'm trying to implement are that once we get the requirements in and we have the very early client engagement meeting, that's where I need to make sure that I fully understand the client requirements, and the client requirement is fully formed at that point, that instantly is your first measurable	That the client requirement and our understanding of it are fully formed is the first measurable
When it gets delivered to the client way down the line, if anything is different than was agreed at the start then obviously I failed [OB?], and our development process has failed	Delivery must match what was agreed at the start
If anything comes back from the client at that point so, you know, "though this isn't what we meant" it's kind of almost the clients issue passes, I say it hesitantly, but if the client has signed off at that early client engagement point "yes you fully understood my requirements" and then something new comes out of the bag later down the line, you kind of, there we can't mitigate for that	Cannot mitigate misunderstood requirements once they've been signed off
a digital prototype that you can walk through, and it's got clickable steps, and it's not like a fully formed web thing, you can't really give it to the end user, to the client to use, but it's a series of interactive screens where you can walk through the user journey	Low fidelity prototypes to support discussion of user journey with clients
it's been hugely beneficial in terms of our understanding and assessing the clients expectations because then when it comes out of the development cycle and it's released it looks like the prototype	Helps our understanding and client expectations that deliverable looks like the prototype
So what they've seen and played with a little bit is what they get delivered so there's no surprises	Contact with prototype avoids surprises when product is delivered

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
I think I challenge others more than they challenge me in terms of assumptions	I challenge others assumptions more than they challenge mine
So, I do a lot of the challenging, but I do believe now the other three members of the team that I'm working are, I'm encouraging them to challenge me more, you know. The other three guys are the first people I will then take an early prototype to, knowing full well it's going to go through the vacuum pressure test of let's crush it and see what comes out the other side	Internal challenge of the prototype build confidence that needs are genuine
The two lead guys are obviously very much "why're you doing that", "this is weird", "we don't currently do that", "what're you doing that for" and so it really helps to make sure that I understand, that I've got really good reason why it is that I'm putting in the thing that I'm asking for	"
we very rarely got out of a meeting where there weren't further actions. A lot of the time there was scope creep and we are always very conscious of that, but also they did raise some good points along the way	Challenges from clients cause scope creep but can be useful
If we'd had eight or nine calls about the same issue, and had been a very torrid sort of back and forth over "we want this" and "you've also asked for this" so you're actually in direct conflict with yourself here "which of these things would you like to proceed with" or "we want them both", "you can't have both because one is taken away from the other" so which one wins? So if that happened, so 9 Teams meetings later, and probably 20 hours spent in discussion, when the stakeholder finally conceded "okay we will have that then", there's no more work for me. That's it. line drawn under that said thing, let's do exactly what they've signed off on	Discovery is complete when it is signed off

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
<p>there are obviously also internal time constraints, there are considerations given to other work, from other quarters, that's come in, that is waiting, so sometimes the case of "[Name] you gotta get this box off by next Friday" and that's it, that's as much design time as you've got, you've got until Friday and that's it. So obviously that then really hinders my idealistic approach to really holistic and involved client engagement project, and designing for the user, and all that good stuff I really want to drive home. I tend to find that's the fat that gets cut when the when the clock is ticking</p>	<p>Holistic client engagement is the fat that gets cut when time is short</p>
<p>Meeting deadlines. Sometimes it can be legislative, sometimes it can be ensuring that accessibility statements are visible to the end user before, by a certain date and time, otherwise the clients up for a serious fine potentially</p>	<p>Time available to spend on design discussion is deadline driven</p>
<p>The most frustrating thing about the whole access statement thing that came in from the government was everybody had two years to sort it all out. It was announced back in 2018, the deadline was September 2020, everybody knew that, and then I started work for this company in the May, and it got to August and everyone goes "what are we doing about the access statements"</p>	<p>Deadlines don't always concentrate the mind early enough to meet them</p>
<p>So, there was no client engagement. There was no design. It was, it was a very flat HTML file that was produced on mass, and so you know that was, the limitation was set by the, by an external factor with serious financial implications</p>	<p>"</p>

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
The client will not pay to upgrade their system and because they are a significant client the decision's been made, I suppose, higher up the tree than me, that we would rather retain the contract then risk losing it, so there's lots of stuff that comes in for that client that we have to try and bat away because the current production model that we're trying to implement is so far away	Can get to the point where cheaper to offer a free upgrade than continue maintenance on legacy code
From a sales model, there's no money involved in a bug fix	Nobody will pay to fix a bug they already know about
Conscious, yeah. I'm very aware of choices I make influencing the design	Very aware of choices influencing the design
I am less aware of choices that developer might make, that inadvertently influence my design, or the design should I say. I do hold onto these things somewhat, and things do happen where they, where software is, a release is deployed to a customer and it's not exactly as I've designed because a dev thought it was better his way	No visibility of choices made by developers when they embody the design
I would be reluctant to say yes they're right because it, that would almost sort of negate a lot of the work that I did in the initial design phase to make sure that I understood what the client wanted and therefore I was right	Reluctant to think developer has better solution than one agreed with client
I sort of try and take those instances as a potential, potentially I should have had an internal conversation there, with the dev earlier, yeah, to portray or give them an indication of what's coming and allow that conversation to happen, for the dev to inform my design at that phase, and I think that's where we've got to, more recently	Try to have conversations with developers early enough that no need for them to second guess

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
When I first started I wasn't having those conversations and therefore those instances, of things getting out in the wild that weren't matching my design, occurred but now I think I've been able to pull the analysts and the devs much closer	When wasn't having early conversations second guessing happened more
Sometimes I'm designing for the client, the council, the stakeholder in the council who wants this thing, and sometimes I'm trying to understand what his or her understanding of their own user requirements are	Sometimes hearing the requirement second hand adds to complexity
That sometimes I'm getting the user requirement second hand	"
we do try and build the use cases, and I try and use real world examples too, rather than just try and create this scenario in my head	Prefer real-world use cases to personas
As part of my client engagement, a lot of the time it will be going back saying "you've asked for this thing but give me an example of", "why have you asked me this", what's the problem you're trying to resolve here, and that's when you get the conversation about "Oh all the time we get complaints from the team who are answering their phones", because people are constantly ringing up and complaining, so it's always about solving the problem for somebody	Some changes come from help desk calls
sometimes it depends who's help-desk	multiple levels of help-desk complicate response
we have our own helpdesk, our support desk, and a lot of the time there can be problems solved there that come in through our own support desk because an issue has been raised by the clients own helpdesk, because they're getting a pain in the bum from members of public calling up and speaking to their frontline call handlers about a thing, so there can be more than one helpdesk involved	"

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
So fully understanding where the request is coming from sometimes is a feat in itself	"
there is a very strict structure around who we can and can't talk to	Firewalls between analysts and client help-desks
If the analysts start going straight to client helpdesk users we're almost subverting the support desks structure they've got in terms of handling calls and their reporting and the processes they've got involved that we don't, we don't actually get involved in	"
Quarterly. It's the single most frustrating thing currently, and it's something that we will be rectifying when we move into our new Azure platform. The idea will be to switch to a more sort of DevOps type approach, and release little and often rather than, because the quarterly releases, by the time we get to sort of this time of the year now we're already looking at 2021.3 That's you know September next year, and that's already going to overrun. All this new stuff keeps coming in and it's all P1 priority. It gets put into the next release so then you're constantly shuffling	Big infrequent releases are harder to manage than small frequent ones
we are in a situation now where something that is scheduled to begin development that I've designed, is already going to be superseded by the thing I'm working on now	Scheduled builds can be overtaken by current designs
I designed and specified this thing, it's now in the dev queue and another request is coming from a different client for a better version of this thing, and I'm now designing it	"
Absolutely 100% yes. The stakeholders will start seeing the benefit of getting a much quicker turnaround from their requirement	DevOps and Continuous development expected to deliver quicker turnaround for client requests

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
Currently it can be 10 to 12 months from the point at which a paid-for change request is submitted to getting the thing released into a production environment, and that's a long time if the requirement has come about because it solves a problem that you got in your business, which is causing you a headache now. A year is a long time to wait for that headache to go away and then in the interim there's loads of workarounds that happen	Long turnarounds cause additional complexity due to workarounds adopted
"Yeah no problem at all" from the sales team "of course we can, no problem at all". Then it's "can our current system handle that?". We've gone "no" because you just exponentially increased demand on the system overnight	Sales promises can run ahead of system capability
we're already having to having to stack work, back there, and obviously that has massive implications on new clients and winning new business, so yeah there will be recruitment drive and I would think in the early part of next year Sometimes it can feel a little bit like I'm a lone voice, so just saying "come on guys we can make the user the champion in all of this"	Staffing can be a bottleneck to product evolution
I'll revise a prototype a couple of times: once, usually after I've demonstrated it to the close team, some other analysts, and the developers, sometimes I then have another internal demo where I'll get the wider team involved. I'll get all test team, and I'll get some of our sales team and the project team to have a look as well, so they've got an overview of what's coming	User centred attitudes are not universal
That can often help to refine some of the design. Then it gets to a client engagement and demo again and that could also then iterate the design. Sometimes it can be three or four or so post veone tweaks	Prototypes are revised and presented to multiple audiences
	Designs are refined three or four times after version one

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
<p>there is zero concept of a technical requirement to do a thing, they are merely just out there selling</p>	<p>Sales people do not understand the concept of requirements</p>
<p>There is a guy actually in the sales team, who, me and him get on really well. I've been talking to him a lot about how I can help him sell better. It's all about client engagement and getting the client to buy into the thing, you know, to be part of the development process, to be involved in helping to scope the design of things, rather than just receiving something way down the line, after they've asked for it, and you know being part of that process, and he's really on board with it, and me and him have had a couple of client engagement discussions, where we've done prototypes, and I've given him the prototype and said "you run this" and I demoed it to him first and he's played with it and then he's been the one to drive the conversation with the client</p>	<p>Getting sales people to present prototypes to the customer is really beneficial</p>
<p>that's been really beneficial because he's then seen how long it's taken me to get from initial request to a prototype and then I've demoed it to him and kind of tried to explain to him, why things are the way they are, so he's definitely better placed now to have a more educated understanding of the technical requirement for the thing that he's demoing to a client, definitely</p>	<p>"</p>
<p>It's generally all about just bringing our teams, our disparate teams close together, I think</p>	<p>Sales engagement with prototypes can bring teams closer together</p>

Table E.13: *Extract coding in interview Zoom-004 (cont.)*

Extract	Code
Teams, yeah. All working from home, I think across the board, we've all said it's actually made us communicate more. We've communicated more effectively since lock down because we all have a daily call. We never used to all talk together every day, because you know I had no need to talk to any of the test team, and I wouldn't have walked the three rows down the office to go and say hello to any of the guys down there because I didn't need to	Frequency and quality of communication increased during lockdown and remote working
I know I was in my little analyst bubble. Whereas now we'll talk to each other, so we all have open conversations about things that are going on	Remote working got us out of our bubbles
we all get to overhear the problems that people have been dealing with and it's been surprising how many problems have been resolved because the devs have been able to go "oh, hand on a second that's because of this", "I've been working on such and such a thing" or I've been able to hear somebody discuss it and I've gone "I'm working on a change for that right now, so actually don't do anything, it'll be fixed". Those conversations wouldn't have happened	Better shared situation awareness allows problems to be solved more easily
we've all got a better holistic view of the product and the current state of play	More holistic view of the product when have shared situation awareness
I don't think we'll be back in the office	Remote working will be a permanent change
he's got no interest in getting us an office space any time before the summer of next year and I think it's because we've all been working actually really effectively and profitably	No interest in office space as working so well from home

Table E.14: *Extract coding in interview Meet-001*

Extract	Code
<p>there's two routes we have to market, and [Company] always has had these routes to market, so one is to bid for work either on our own or in collaboration with other people we will have a particular bit that we're saying "we can bring this, if you bring that" right? and the other thing when, that runs parallel to that, is to go and apply for contracting work as you would as a contractor, a self-employed person, so the partners, because we're partnership, can individually go and do that as well, so that's the two ways of getting work</p>	<p>Mobilised as either an agency bidding for a contract or individual partners applying for jobs</p>
<p>contracting stuff has been prevalent over the last four or five years because with a lot of the GDS projects that's what they want, and that's work that's been there and it's been, it's been easy to get because everybody in the partnership is highly knowledgeable and highly skilled, you know we're kind of skilled practitioners, so we tend to get, when we go for interviews for those kind of roles there's a good chance we will get them</p>	<p>Skilled practitioners readily employable on public sector contracts</p>
<p>The bidding is a different, it's a whole different thing, because you know, you bid for 10 things and you are lucky if you win one, really</p>	<p>Public sector bidding hard for small agencies to win</p>
<p>But the other stuff we do as well which we're looking at to do more is, a third avenue we're wanting to break open more, is working as subcontractors to larger agencies. So they go and win the work because they're taking a whole pile of resources and leverage and capability, and then we fit a particular gap in that, and then it all depends how much we want to grow to be a bigger agency who could do that for ourselves to go and get bigger projects or whether we want to work on those subcontracting relationships</p>	<p>Subcontracting to larger agencies is easier way to be in winning bids</p>

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
The issue for us is to get higher up in that process and further back so, which is almost doing service design type consultancy, digital transformation, management consultancy earlier in the process and further up	Business strategy to be involved higher-up and earlier
being in at the start where you're doing a lot of helping people put the concepts in the ideas together and that initial very early discovery stuff	Business strategy to be more involved in early concept development and discovery activities
the issue is if you want, if you're getting into an agile project doing user research stuff an awful lot of design decisions have already been made by then	Need to be involved earlier or key choices already made
So we'd like to get earlier and higher up in the process so we would be involved in that and then doing the delivery bit on, and that would move us from being screwdriver people – you've got a particular set of knowledge and skills, come with your toolbox, yeah – to be more consultancy type people	Business strategy to be higher up the value chain
Or when a project happens we've helped build it, so we know when we're doing the user research or the UX design or whatever we know it's the right thing that's been looked at	Earlier involvement in project definition increases confidence in process
It's a lot more the kind of get out there, it's more the qualitative stuff, so the ethnographic stuff, go out and talk to people, watch people, understand the context of use, so that then you have a much more informed user journey	Favour qualitative ethnographic approach to discovery
some agencies see it as you get, you get the executives in the room, and you run two or three workshops, and then you do the Agile process. We want to actually talk to the actual real users	Want to start with users not stakeholders
so trying to go in without preconceptions of this is, these people need a brand new system X that will do X, Y and Z so let's go and to look for evidence that they need system X that does XY and Z	Start with evidence of peoples needs

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
Let's go and have a chat with them and then build up from there	Start with a conversation
And then that builds into the kind of, you know, what are the user needs that have come out, what is the service design, all of that kind of stuff, to build on that	Establish the needs before think about services
everything from talking to them about what they want and what they think should be happening, to also the schmoozing and pacifying type stuff which I will just say other people in [Company] are better at doing than I am	Stakeholder management is a different skill to user research
working to the GDS service design manual, which is which is pretty good for this kind of stuff, there is that thing of you know the brown paper and the stickies on walls type stuff	Data sharing on walls is a pretty good approach
There's that or having digital versions of that, so that's still within the team	We do data sharing within the team using digital versions of stickies on walls
we like to get the team, particularly if it's an Agile project where we're making the thing, where people are making the thing, and testing it, is to get everybody involved in that user research and interaction with users	We like to involve the whole team in interacting with users
they'll be coming along, and they'll either be observing and taking notes, maybe they're coming along to the ethnographic stuff, maybe they're watching videos and recordings afterwards, or there's some involvement	Actively involving the team and immersing them in the data
you don't get this which used to happen with the old fashioned usability type model, build a thing, get some users and test it and all of that, and then you'd write a great big usability report, which gets ignored	Active involvement avoids huge but unread usability reports

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
<p>whenever you did do that kind of presentation you have a team of people sitting like this going “I think you talk to the wrong users”, “well they must have been really stupid if they use ...”, “if you talk to ...”</p>	<p>Developers can be sceptical of inconvenient truths they didn’t observe</p>
<p>they don’t respond very well to that, because they’ve been coding hard for, you know. That was the old-fashioned way</p>	<p>Emotional investment in fully developed solution makes it harder to accept change</p>
<p>The agile way is get them in there where you’ve made a prototype and hopefully a very kind of, it might be a high fidelity prototype, it’s not linked to any back-end or anything, you’ve just tested all of that kind of stuff, that kind of front-end stuff, the information on how users work and all of those kinds of things</p>	<p>More agile to test interaction using a prototype or mock back-end</p>
<p>They’ve been involved in seeing all of those issues, and getting them to take part in the analysis with the kind of stickies and the affinity boards of things that came out and taking part in the note taking, so that, so it all makes it a lot more integrated and fluid process</p>	<p>Involving whole team in discovery makes it a more integrated and fluid process</p>
<p>Sometimes on projects I’ve done my own user research show and tells, as well as the show and tell that goes on where you have a part in that, and do your own show and tell report which is again about 20 slides of stuff not a doorstep thing, but if you do that every Sprint that gets quite easy to do</p>	<p>Show-and-tell presentations in every sprint are easier to do than a huge report</p>
<p>We got some quotes in these things, and therefore because, you know, “we tested version two we found these kinds of things so we’re going to make these kinds of changes and we’re going to test this in version three”</p>	<p>Linking findings to actions for next sprint helps</p>

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
<p>if you do those enough, that's where you get that, I've heard it and I kind of agree with this, this kind of design golden thread working through an Agile project, so people have to know not what went in it, in at the start from the discovery from the user needs, all the things, and what's happened way before that, and people have decided particular things, how that has then iterated throughout and you have progressed, and therefore the final product looks like this, because it looks like this, for all of these reasons</p>	<p>Continuous discovery and presentation provides a design golden thread through the project</p>
<p>I think it's important therefore you're not giving people one great big thick doorstep report, you're giving people, from what's happened over that, a series of shorter things that show why that thing evolved in a certain way, and always linking it back to that original user needs and service design</p>	<p>Continuous discovery needs a continuous narrative of findings</p>
<p>we've just worked with as a subcontractor to company where we did user research stuff, and they actually paid for a professional TV documentary maker person to put the highlight clips together</p>	<p>Highlight clips can provide a documentary of the design</p>
<p>It's very strong in the GDS methodology, so you have your user needs, and what are your assumptions: we assume that if users have this they will be able to use ..., therefore we assume that, you know, if you give them a system like this, that will meet their need, and then you make that in a prototype, and then you go, you know what, all those assumptions we had, they were all wrong</p>	<p>Identifying and challenging assumptions is a core part of the method</p>

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
it's very important to make those assumptions absolutely, when an agile project starts, absolutely crystal clear to everybody, and that they get this idea that because it is an assumption and we're going to be collecting evidence that will either support or not support those assumptions, that they, you know, understand the whole hypothesis testing thing that all that stuff might be junked	Important to recognise and test assumptions made
I think this is the hardest thing to get into the heads of people have come from a waterfall background where they're used to a systems analysis type document	Culture shock for people used to a waterfall model of development
This is a collection of the user needs, this is some of things we think we can put together technically, which will fit that, so that's what we're going to have a go at building in the Alpha. Guess what, we built 10 things, five of them were completely wrong and off track, and so we had to redo some of the discovery stuff, and five of the things were more or less there, and now we've got something we can take into beta because we are more informed	Needs an expectation of trying some things that turn out to fail
it's making very clear what your informed assumptions are the beginning, but say they are still assumptions, that they just might all fall	Assumptions are things to be tested not shortcuts
Well actually they need to do the that, before they do the this, but that's against the legislation so somebody's gotta go and talk to a minister, to go if you want it to work in a way that people can use it, you've gotta go and change the law somewhere	Sometimes legislation assumes an acceptable means of compliance that makes an innovation illegal until the law is changed

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
<p>it's important to have the stakeholders involved in all the show and tells and I've had that with a project where we had very senior people coming up from London to look at what we were doing, and they went "look guys that legislation will never change", you've got to do something to that design to make it work, or they go "ohh yeah, we will go and have a chat with", with somebody, we will go and have a chat with the minister, and go we need to look at this regulation because it's not working</p>	<p>Good stakeholder engagement can address embedded assumptions</p>
<p>Agile projects do have a scope because you are usually a small team of about ten people, but where the fluidity is, is having that freedom to kick stuff upstairs, which probably with waterfall everything's kind of come down on you</p>	<p>Agile approaches can make requirements easier to challenge</p>
<p>and that's why you have the, particularly, the discovery and the Alpha phases, it might not come out in discovery, hopefully it will, but it might be in an Alpha where you start making the thing that all this other stuff comes out, and you go actually there's no point doing this because there's some other fundamental issues higher up, and the way the world works, that need to be solved</p>	<p>Prototyping essential for validating the concept as early as possible</p>
<p>I might be that that just gets recognised and they go "well folks, we still need you to make a better system" and it shouldn't happen, but you can have it, particularly big corporate, big government projects where your Agile project is the proverbial putting the lipstick on a pig</p>	<p>Momentum of a running project can make it hard to stop even when that is the right choice</p>

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
I think this is where the role of the product owner is central in an Agile project. The product owner and the senior product owner are the people who should be, as well as saying who should be invited to all the show and tells, should also be the people who are going out to these other stakeholders and other projects which are going on	Role of the Product Owner to ensure shared understanding of the problem
I think she's where the, it's like Spotify do the kind of like the tribes thing, is it, or whatever, but also like the user researchers here and the BA should also be having links with their professions	Communities of Practice within the organisation can also help share understandings
So when you do the user stories and the user needs start coming out of discovery, and then they get iterated with everything else, throughout	User Stories should be challenged and iterated the same as everything else
I'm not a great fan of personas, but it should be soon as you go along you go you know what that persona we thought we had in discovery is "yes it's there but it's not the important one" because as we've had people come in, this other stuff has come out	Personas can be a prompt to challenge user stories
if there is a problem we have to solve, we'll do a spike on it for two or three days, and I think you have to be able go "okay we need to drop out now and do a bit of discovery spike around this stuff" because we had some users come in last week and they told us some stuff and we thought "oh is this a new thing"	Discovery spikes can be used to address surprises
you don't just keep ploughing on relentlessly and deliver something that nobody wants and isn't relevant anymore	Issues need to be addressed as they arise
So, there's no such thing as a release. You don't have a version two, or version three, or version 4	There's no release, it's just the thing.

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
it's a Product Owner's role to own that whole design rationale, and the design narrative, so that they can explain to the people above them and to the other product owners and stakeholders of them, why this thing looks like it does and does what it does	The Product Owner owns the design rationale and narrative
The Product Owner owns product, the Product Owner understands why it's doing what it does, why it needs to do what it does, therefore why it looks like it does, and who it's for	The Product Owner understands why, what, and who
I think one of the important things that comes out of discovery is the minimum viable product, or the minimum viable service, some kind of idea for what that should be	Discovery should identify the scope of the minimum viable product
A lot of discoveries are time bound anyway, so a lot of projects now don't want discoveries, because they're seen as being, um, basically navel gazing	Discoveries can be seen as navel gazing
It should be quite tight tightly focused	Discovery should be tightly focussed
This is where Agile is "let's go and understand the problem" and then we decide whether we need a technical solution at all	One output of discovery should be whether we need a solution at all
It's like we should go and find out how do people with a particular thing, you know, long term conditions, what's the problem they're having finding information, or whatever	Discovery questions should be specific not general
So, a discovery is generally, usually anywhere between eight and twelve weeks. You should have enough information out of there to be able to make something, if the project's been scoped well enough going into that discovery, but it should not ever drag into months and months and months of agency types stroking their hipster beards in front of walls of stickies	A well scoped discovery takes between 8 and 12 weeks

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
with Agile I think it's not necessarily about stopping. You can carry on	Having enough to start building does not mean stopping
we have to be clear that what comes out of discovery is a pile of assumptions still, and that's why you should treat Alpha as much like a discovery as a development thing, of we're starting to make something	Discovery outputs still embed assumptions that need testing in Alpha
This I think is a danger of Alpha where people go into Alpha thinking we're now building the thing, and what we build in the first sprint of Alpha is what will be going live in three months' time. No, that's not the case at all	Alpha should be a discovery prototype
it might be halfway through the Alpha you go "We're still all over the place with this"	Still on a discovery learning curve during Alpha
If people have just moved to working in an Agile way, it tends to be the more default thinkers are still thinking like waterfall, so we have to build something and move on, we have to build something different and move on, we have to build on the next thing and move on, we have to ..., and then it has to go into beta	People used to Agile approaches make more intentional choices and fewer by default
Whereas if people go in with, and are used to Agile, and go in with an Agile mindset, they will be conscious that they are making choices, and they will be conscious that they are making choices which might go "Stop!"	"
We now have the user journey built to go into Beta	The output of Alpha should be a prototype embodiment of the user journey to go into Beta
That should be in the show and tell stuff that you do	Design choices captured and shared in show-and-tell presentations

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
I think quite often Product Owners and Delivery Managers are also still doing documentation that feeds up into a programme management process	Product Owners also note design choices to share with stakeholders
There's still an expectation to make the original budget and time scale. I think that's still very strong, particularly people at ..., it depends where you are, but a lot of places it's still that, and that's what still happens. You'll be given a certain amount of money to do a certain thing	Budget and timescales remain rigid when unexpected complexity discovered
what's important then, is that you scope the minimum viable product properly at the end of discovery, so it shouldn't necessarily be that discovery ends on a Friday and the Alpha starts on a Monday	Time needed after discovery to scope the MVP according to findings
Yes, probably the curtailed	Retrospectives and reviews are too limited to be effective
Access and agreements and all of that kind of stuff, and then you need that month at the end to pull all this stuff together, into this is what we think the minimum viable product, minimum viable service is, and this is what the journey should look like, this is our high level assumptions, and this is what we think the user needs are etcetera	Operational constraints on user research and sprint planning can be time consuming
I would still like to hope that wherever you are going to have an interface hanging off something, and users doing lots of stuff, particularly where its members of the public, then it is Agile	Agile approach works well with highly interactive products
And I think internal stuff when you just need that flexibility of being able to throw stuff away	Products for organisations internal use need flexibility to drop ideas that don't work

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
It's not saying I'm going into this perfectly understanding the world, it goes I'm going to go into this with a real, real shonky understanding of it, and by getting people involved and communicating with them and getting them interacting with designs, and stuff like that, we will work out a best fit thing, that most of the time deals with this complex weirdness of the human being	Can cope with complexity if recognise uncertainties and actively negotiate understanding
you could never design for everybody, because it will always be a complete balls-up basically, where nobody ends up being happy	Universal design disappoints everyone equally
What you have to say is, what is our priority here, so yes you have a diverse complex population, out of all of that who were the key people that you need to make happy, and that's the group you should be concentrating on	Inclusive design needs to focus on a key group
somebody who had no technical knowledge, went through step by step by step, choosing from a list of things, and then they saw the jobs that came up or not, and then to restart that search you just put restart and you went through that step again	Simple enough for least capable user even if boring to most capable
we made this touch screen something so simple, if you could ..., yeah even then there were one or two issues, so the fact that if a skilled IT professional or whatever has gone in to search for job, and gone well this boring, and there's too many steps, and I have to put it in again	"
The fact that, you know, professionals or white collar workers if they went and used that, would have found it as boring as hell and gone this is tedious, I want to type something in, and then type another thing – didn't care because the main user population was these people	Addressing the most compelling need worked well enough for everyone

Table E.14: *Extract coding in interview Meet-001 (cont.)*

Extract	Code
<p>Quite often those “edge case” people have a lot of complex needs, so it might be accessibility issues, digital exclusion, it might be all kinds of things. If you may the thing asking is If you make some of those edge cases your centre and you solve their problems there’s a good chance that you solved a lot of problems for an awful lot of people</p> <p>So somebody with digital exclusion issues because they have low levels of literacy and comprehension, so you change all the language to suit them, then somebody else who’s not like that but who will be at times in a hurry and needs to pick up information really, really quickly, the fact you’ve written this now so it’s simple information that can be picked up really quickly, do you know what I mean?</p>	<p>If centre the people with the most need then satisfy the majority as well</p> <p>”</p>
<p>People who know what they’re doing and trusting the team, that’s a whole idea of an Agile, semi-autonomous team, because you are trusting them to produce the thing, and if you get the right people coming in, then you shouldn’t have these issues. So I think that’s because you can do complex systems</p>	<p>Agile can cope with complexity provided you trust each other</p>
<p> </p>	<p> </p>

Table E.15: *Extract coding in interview Meet-002*

Extract	Code
Just for context, at GDS and across, and in most, on the DDAT framework, we don't use UX as a profession, so we divide that area into researchers and designers	UX too broad to describe a role
the idea of user experience, of creating good user experiences, firstly it's not so relevant for government, we're not so much about experience, we're about delivering services that people need	Good experiences are less important than delivering needed service
a technical architect might make a decision which means everyone has a horrible user experience, so there's no reason why we should just have one person on a team who's responsible for UX, and all of the thought about it	Avoiding term UX makes it clearer that all roles impact design
One very common way is that a minister makes a promise or commitment, probably publicly, and then the Department needs to scramble to make that happen	Product mobilisation driven by most senior stakeholder
Another very common way is that a policy is set, or changed, and the Department needs to again work out how to implement that	Team mobilisation driven by top level goal changes
Another very common thing is for a piece of legacy software, or legacy tech, to fall over, or for a really expensive contract to be coming up and the Department of government needs to work out how to continue to deliver services after that piece of tech stocks	Team mobilisation driven by technology availability changes
It might not be just Ministers who make their promises, it might be other stakeholders within government, but sort of more senior people, and often separate to the digital teams who sort of decided how things should be	Senior stakeholders have authority in different chain of command to technical design authority

Table E.15: *Extract coding in interview Meet-002 (cont.)*

Extract	Code
the way we would like to see things happen, is that user research uncovers user needs or uncovers behaviour change in users or uncovers changes in how people are using or needing services, and then that leads to a better understanding of user needs and ideas about how to meet user needs differently or better, which leads to new or different services being developed, and that is a not a very common way of pieces of work starting, but it is how we would like to see more pieces of work starting	Aspiration to mobilise on basis of changing user needs or behaviour
It's how I think people dream about government working, and if research and design and service design could work closer with policy to help inform how policy is decided, I think that would make that more of a reality, and that is something that we're seeing happening more and more across government and across public sector with things like policy labs, user centred design, user centred policy design becoming more of a thing	Aspiration to have user centred policy design
There's lots of different sort of policy reform projects which are trying to bring more UCD practices into policy making and policy setting	Pilot projects exist supporting user centred policy design aspirations
Mixed methods, so things like collecting information, collecting data and usage, on existing services, is always useful	Mixed methods are used to collect data on existing service use
most services that go live have some elements of analytics and feedback loops	Analytics and feedback are collected for live services
ongoing qualitative user research with audiences is really important, although that doesn't happen nearly as much as it should for live services and once they've gone into live	Some qualitative research is done with live services
"	Aspiration is to do more qualitative research on live services

Table E.15: *Extract coding in interview Meet-002 (cont.)*

Extract	Code
there should be a continuous loop between services that are live, collecting data and having qualitative research done around them, feeding back into kind of discovery type pieces of work, to start new services, retire old ones, iterate existing services, join up services across government	Aspiration to leverage more knowledge from existing services in discovery for new ones
If you're lucky there's a full service team working on a live service and monitoring it and researching it, and that would include at least one user researcher, at least one designer, maybe some service designers, product owner, delivery manager, content designer if you're lucky	Aspiration for service teams to include both user research and design roles
in reality there's very, very rarely a full team working on a live service, it's often handed over to a business-as-usual kind of operational service delivery team, and that might have user research attached to that team, that look after a suite of products, if they're lucky, but often not	Typically service teams are focussed on operational delivery and share a user researcher with other services
feedback often comes through call centres, and fall-backs for services	Feedback often pushed by users rather than pulled by teams
I think many people have tried to start libraries of user research. Probably some teams in some departments have libraries or archives or some kind of repository for user research, but mostly it would just belong, probably, in contact management systems or spreadsheets and Google Docs	Research repositories are a common aspiration but rarely implemented beyond ad hoc data collections
it would be great if there was a library of user research across government, finding patterns of user needs and changing behaviours that would be amazing, doesn't exist but yeah	Aspiration for libraries to find patterns of changing needs and behaviours
How do user researchers share the insights that they've gathered? Oh, that varies hugely	Sharing of research insights varies hugely

Table E.15: *Extract coding in interview Meet-002 (cont.)*

Extract	Code
in an ideal world, the team would be a properly functioning Agile team, which has stand-ups and show and tells and retrospectives, and a rhythm, and all those sorts of things, and they would be co-located	Aspiration for co-located Agile teams sharing insights in person
If not, ooh what's the equivalent of co-located in remote terms, meeting and working collaboratively a lot of the time in remote ways, and so hopefully, again this is all an ideal view of the world	Aspiration for insight sharing via remote collaboration sessions where not co-located
the rest of the team would be involved in user research, so it might mean coming along to sessions or helping do analysis or interpreting the findings, or at least hearing findings in playback sessions or show and tells, and then sort of acting on that, as part of their planning and design processes	Aspiration for whole team to engage with the analysis and interpretation of findings
In reality, I don't really know how, it works in so many different ways on every team	Sharing of research insights varies hugely
If you have user research on the team I hope, I hope they are feeding it back, I hope they're making personas and journey maps, and highlight clips, and whatever else it is that the team listens to, but often not	Aspiration for user researchers to share personas and journey maps and highlight clips
Definitely we would want to find out what the major problems are with going to be with the service before it goes live, and so that's one of the main aims of having a phased approach to service delivery, so that Discovery / Alpha / Beta / Live phases that we have	Phased testing and release used to identify problems early after building

Table E.15: *Extract coding in interview Meet-002 (cont.)*

Extract	Code
we sort of assess services before they are allowed to move on to the next phase of that life cycle, and part of that is to make sure that research is happening, that you know all the technical tests are happening that need to happen, that the team is operating the right way to try and make sure that if there are going to be big problems like that that we find out about them as soon as possible	Reliance on testing and approved process to avoid problems
one of the things that we're looking for and trying to encourage in teams across government is embracing the idea of uncovering the problems as early as possible and minimising the risk as quickly as possible	Focus on uncovering problems not anticipating them
We would definitely try to anticipate. We use, for actual interface design we have the gov.uk design system, so a lot of patterns that, I mean, most government services are forms, so we know how to do forms really well, so you can avoid a lot of basic problems by using the patterns and by tapping into the knowledge across government	Passive anticipation by using patterns validated by past experience is encouraged
trying to draw on that community of knowledge across government can help you anticipate what the problems are going to be, and stop them from happening in the first place	Shared lessons and social learning support passive anticipation
Usability testing is absolutely a big part and accessibility testing Is a big part of designing a service and getting it from kind of beta to live, but in a discovery phase, that would be probably too early for usability testing so we wouldn't expect there to be high fidelity prototypes that are in a state for usability testing in the discovery phase	Discovery considered too early for usability testing
discovery is much more about testing the concept, making sure you understood the user need, make sure you're solving the right problem, make sure you tried lots of different approaches	Discovery is about testing the concept not the solution

Table E.15: *Extract coding in interview Meet-002 (cont.)*

Extract	Code
I think a lot of problems with services and products come because you've built the wrong solution from the very beginning, not just because like a usability issue with buttons being in the wrong place for example	Problems are embedded early and the wrong solution built from the start
So if it's an absolute sort of dead end problem, complete failure of all service and product efforts, you would want to be trying very hard to convince stakeholders that this was the wrong approach to take, and there have definitely been cases where people have tried to have that argument, and it has failed, and services which have little to no value have been launched because a stakeholder has really wanted it to be so, but then very often if you can provide the right evidence to the right people and prove that it is going to be a waste of public money then, yeah, you can change direction and drop ideas that are bad ideas	Stronger evidence needed to stop than to continue
So if you have a team who are really engaged in the user research, are you know analysing sessions with you, etc, they won't need convincing because they will have seen the problem and they will understand it, and probably have ideas about how to fix it	Shared understanding is assumed if there is agreement
to be honest you don't really need everyone on the team to understand every single problem, or to have a shared vision even, as long as the right people make the right decisions and problems get turned around	Shared understanding less important than right decisions and progress
I don't really care if every single developer understands why I need a project to be changed as long as the person who makes the decision understands and agrees.	"
yeah definitely	Working from home changes methods used

Table E.15: *Extract coding in interview Meet-002 (cont.)*

Extract	Code
for a lot of user research and Agile methods there is a direct online equivalent, so usability testing can be done remotely, interviews can be done online	Many user research methods have a direct equivalent online
the main difference is sort of screen fatigue, and sitting still fatigue, and zoom meeting fatigue, and then also not having the physical space, the physical shared space to sort of put things up on walls and talk about things is a big difference	Communication burden of remote working makes it more tiring
I think most teams have found ways to do the same activities and achieve the same results remotely	Ways were found to achieve the same outcomes online
they definitely have features that physical spaces don't have, you're typing and drawing and zooming in and out, and getting people to follow you around a whiteboard, and having multiple tabs for a whiteboard, these are all things that are much harder to achieve in a physical space	Virtual spaces have some functional advantages over physical space
the physicality of post it notes can be easier than little squares on the screen	Physical artefacts can be easier to use
I think once we get back into the office there are some things that we will continue to use online tools for, and some things that we will go back to the physical tools for	Some virtual methods will continue others will revert to the physical tool
Not necessarily more in a shorter time. I think in government we've been doing more in a shorter time because there's been a crisis on, and people have needed government services to be live in a much shorter time than before, but that's not because we're remote, that's more because of the global pandemic that we're having	Greater intensity of working is pandemic related not remote working
You know that point when you know what decision you're going to make next, when you have enough data to be confident on what your next decision is, that that's enough to move on	Discovery is sufficient when confident of next decision

Table E.15: *Extract coding in interview Meet-002 (cont.)*

Extract	Code
the way that we would really like teams to work is that research and design and iteration work happens all the time, and it's never too late to ask a new question or to find that new information or to even change the direction of a product or service so as long as you have done enough information gathering to know what you want to try next, or what direction you want to go in next, you know, for the time being, that is enough to move on	Aspiration to move mindset to continuous discovery
Stakeholders and deadlines, stakeholders making promises to deliver things	Discovery time limited by stakeholder imposed deadlines
While in in digital service delivery we understand that Agile doesn't have timeframes that work in that way, Civil Service planning has, and finance and Treasury have not moved on in the same ways, and they still believe in deliverables that happened by certain deadlines, so that's where a lot of the sign-off times come from	Timescales driven by funding mechanisms
this is the ideal vision, everything, every design idea should be a hypothesis and every research question should have a hypothesis behind it	Aspiration to hypothesis driven empirical design
Yeah, ideally, yeah, you would do, and your research backlog, and your design and prototyping backlog would be all hypotheses, and every design that you do should be a test of an idea	Aspiration to strongly hypothesis based empirical approach to research and design
So you don't ever think of yourself as designing the final product, you're only ever designing your latest hypothesis, which may or may not work	"
It is definitely something that needs to be said more than it is said, and yep we often see teams biting off more than they can chew, but one of the main aims of a discovery phase is to scope the piece of work, which is to understand what the big, big picture is and then workout how much you can achieve within what you've got	Discovery should also inform the achievable scope

Table E.15: *Extract coding in interview Meet-002 (cont.)*

Extract	Code
Stakeholders like numbers like that, so yeah, if we can if we can turn things into, if we can turn perceived UX risks into monetary risks, or you know numbers of deaths or whatever it happens to be then, yeah that definitely would help make those arguments	Stakeholders like quantitative measures of risk
Yes, things often happen by default, and I think stakeholders and policymakers often make choices about how service, or what a service is and how is delivered, without realising that they're doing that, or without realising that there are other choices, other than the one that they've made	Not all choices made are recognised as such
one of the skills of a designer and a researcher is to try and interrogate what assumptions have we made, what choices have been made, and what alternatives there were that could be explored or are yet to be explored	Designers and researchers should interrogate assumptions and choices
a good team that's functioning well would keep track of the design decisions that have made been made, the research that has led to that decision, and possibly what some of the other options were they have been explored or put aside	Aspiration to have traceable options and decisions
one of the main reasons that we really encourage people is to document that kind of thing is for onboarding and for knowledge preservation, when the team's changed	Traceability encouraged to support onboarding

Interview codebook at completion of coding

Table E.16: *Interview codes at completion of extract coding*

Tag	Code
002	business analyst
003	public sector
004	Agile approach is the most common
005	Backlogs are improvement driven
008	talking to a person who's experienced it
009	Discovery artefacts include process models
010	tighter deliverable
011	certifications
012	blow your own trumpet
013	customising the message
014	selling yourself to a client
015	don't use them very often
016	national systems
040	fixed term contract
042	multi-year contracts
043	slow contract churn
044	contract pursuit takes time
045	contract capture is a sales effort
046	fragmented funding
047	quarterly renewal pursuits
048	Backlogs involve products or processes or systems
052	Discovery involves a range of techniques
055	bullet point list of "here are the main points I think this covers it"
057	write it up as a bit more of a definite kind of tighter output
062	service delivery model
064	Backlogs range from aspirations to detailed specifications
065	Backlogs have differing levels of detail
066	Backlogs prioritise what I need to do next
067	Backlogs additions are inserted in their priority position
068	Backlogs are periodically revised and refined
069	Backlog top items are ready to go
070	Backlog low priority items are less refined
071	Product Owners and Subject Matter Experts are the direct points of contact
072	What the problem is is a million dollar question

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
073	Discovery includes literature review
074	Discovery includes narrated experience
075	Discovery includes approved denaturalised transcripts
076	Discovery includes iterative elaboration
077	Discovery includes interviews
078	Discovery includes email exchanges
079	Discovery includes sharing documents
080	Discovery methods are tailored to the situation
081	Discovery requires a negotiated understanding
082	Discovery produces a range of artefacts
083	Discovery artefacts include drawing out a process
084	Discovery artefacts include point briefs
085	Discovery artefacts include data definitions and data models
086	Discovery artefacts include a set of models
087	Discovery artefacts include requirement models
088	Discovery artefacts are chosen to give the clearest picture
089	Discovery artefacts are chosen to validate understanding
090	Discovery artefacts are used to communicate understanding
091	Discovery includes documenting the current state
092	Discovery includes information architecture
093	Discovery artefacts should support traceability
094	Discovery includes documenting change
095	Remote discovery is a challenge
096	Remote discovery tools are different
097	Remote discovery communication is often indirect
098	Remote communication may literally be handwaving
099	Discovery artefacts are often ephemeral
100	Repeated artefacts are worth capturing for reuse
101	Following good practice as a problem avoidance strategy
102	Methods work best if they are easy to follow
103	Agility allows rapid learning
104	Sprint reviews mitigate lack of anticipation
105	Uncertain requirements are validated with hindsight
106	Good documentation and quick checking is a good combination
107	Harm avoidance strategies are context dependent
108	Harm avoidance by more negotiation of meaning
109	Validate again after building
110	Pre-build validation effort should be commensurate with build effort

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
111	Products with greater impact require greater care
112	More impact requires more checkpoints
113	Assumptions challenged by independent peer review
114	Code testers are good at challenging assumptions
115	Using checklists to make people look at it and think
116	Verbal explanation as self-challenge
117	Certification as confidence building
118	Experience as shortcuts to the right answer
119	Important to have theory and practical experience
120	personal narratives as a sales pitch
121	business analysis combines people skills with analytical skills
122	no common definition of business analysis as a service
123	Judging sufficient discovery is hard
124	Preference for Agility over anticipation
125	uncertain of own understanding
126	information overload
127	Written explanation as self-challenge
128	Bounding discovery by self-challenge
129	Judge anticipation versus validation effort
130	Gradual change not seen as an opportunity for discovery
131	Preference for road-map over research
132	Business case for user research depends on user characteristics
133	Expert users are expected to cope with clunky
134	Bad design is mitigated by training
135	Less expert users seen as benefiting more from journey mapping
136	Avoiding barriers to adoption prioritised for infrequent or inexperienced users
137	Avoiding obstacles to the job to be done is prioritised
138	At large scales the priority may be continuity rather than quality
139	At large scales the priority may be throughput rather than ease of use
140	Performance trade-offs may depend on scale of operation
141	Know you've done enough discovery if you can validate your approach as early as possible
142	Outcomes must include continuity
143	Quantitative comparisons between alternatives to assess benefits
144	Modelling several different hypotheses
145	Experiments to inform decision making

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
146	Multiple factors to consider
147	Options only need to be possible not precise before testing
148	Long history of poor stakeholder alignment
149	Hypothesis testing approach helps team to move forward
150	Consensus is different to shared understanding
151	Difficult to reach a conclusion
152	Consensus poker was a massive step forward
153	General approach of probing what an outcome would mean to establish the requirement
154	General approach of starting simple and building momentum
155	Significant remote working before pandemic
156	Remote workers wanting more visual contact during pandemic
157	Facial cues aiding understanding in video meetings
158	Anticipation happens on a micro-level
159	Interactions designed for anticipated behaviour change
160	Interactions designed for very short term user response
161	Business financial performance outcomes are anticipated
162	Longer term user outcomes are not anticipated
163	Lean start-up mindset works against anticipation
164	Lean advocates argue that anticipation is impractical
165	Unconstrained empiricism is problematic
166	Unconstrained empiricism disenfranchises design
167	Unconstrained empiricism deprioritises ethical safety
168	Design reduced to a multivariate test
169	User harm reduced to a change request
170	Identification of harm should delay release
171	Anticipation is outwith the empirical mindset
172	Cannot anticipate every consequence
173	Moral obligation to anticipate and mitigate what we can
174	Unconstrained empiricism treats all outcomes as neutral data
175	Empiricist mindset is difficult to change
176	Some signs of empiricist mindset changing
177	Strategy replaced by experimentation
178	Significant human population co-opted into experiments
179	Design lost coherence to empirical drivers
180	Outcomes designed for privileged users
181	Outcomes ignored for non-privileged users
182	Testing alone does not scale to large diverse populations

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
183	Purist user researchers will not like anticipation
184	More experienced user researchers may be more open to extending the time horizon
185	User researchers will run a mile from anticipation
186	Objections to anticipation will be ideological
187	Designers perceive UX people to be process oriented
188	Richer data only helps if it is quantified
189	Designers perceive user researchers to be sceptical of quantitative data
190	Designers perceive user researchers to lack statistical training
191	Quantitative data is perceived as undermining qualitative data
192	Combined insights from qual and quant support deeper understanding
193	Qual and quant analysis are separated in most organisations
194	Quantitative analysis can prime questions for Qualitative research
195	Designers perceive user research to be passive observation
196	Trends research techniques would expand UX research thinking
197	Anticipation requires different patterns and perspectives
198	Anticipation can work step-wise towards a jeopardy or backwards from one
199	Backward chaining from a known risk uses categorisation
200	Static categories cope poorly with emergent problems
201	Forward chaining from actions may find more unanticipated problems
202	Adoption of anticipative methods is currently low
203	A lot of companies communicate research findings poorly
204	Research gets compressed unless it is a parallel work stream
205	Design sessions need to involve researchers to uphold findings
206	Ethical safety requires a multidisciplinary approach
207	Designers need to see the lived experience of users of their product
208	Designers need to see the negative consequences of their decisions
209	Designers can be helped to anticipate problems by training to broaden their mindset
210	Chances of anticipating and avoiding a specific problem are pretty small
211	Designers are increasingly aware of the impact of their choices
212	The Techlash has forced designers to consider the impact of their choices

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
213	Consideration of impact is driven more by fear of retribution than personal ethics
214	More experienced designers are more attuned to their impact
215	Recently graduated designers are more values driven than previous generations
216	Mid career designers are the least impact sensitive
217	Young designers lack the life experience to understand impacts on people unlike themselves
218	Designers do not realise the relative power they have over users
219	Designers do not recognise the responsibility they have to users
220	Social justice discussions are not always welcomed by corporate management
221	Actor triangle from actionable futures toolkit helps identify hidden stakeholders
222	The Futures Wheel is helpful for identifying consequences
223	Consequence scanning works at a micro level
224	Broader methods for anticipation activities are lacking
225	Ethical safety efforts require a champion within the company
226	Mobilised people are more important than tools
227	DesignOps has an accelerationist perspective
228	Doing the same things more efficiently makes the same mistakes more efficiently too
229	A recasting of the role of design is needed
230	Coffin corner analogy for time and complexity pressure recognised
231	Good tools help shift mindset
232	Clients want to see rigour in the process
233	Structured framework helps sell the process
234	Software people don't perceive risk in what they do because so easily changed
235	Service mobilisation driven by user research
236	Product mobilisation driven by most senior stakeholder
237	Needs balanced with cost
238	Backlogs define priority but not necessarily timing
239	Plans can be overtaken by external events
240	User researchers advise on method choice
241	Observations and interviews and workshops are key user research methods
242	Cross-disciplinary involvement in user research

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
243	Developers and managers sometimes included in research
244	Whole team positively engaged in research activity
245	User research recordings shared with team when data protection allows
246	Data digested into a presentation is favoured dissemination approach
247	Research data walls are used where wall space is available
248	Paper prototypes can be used to gather feedback
249	Virtual boards are used where offices lack wall space
250	Shared understanding achieved via presentations and prototypes
251	Some sprints are design and research only
252	Business Analysts are good as a bridge to developers
253	Prototypes also used as a repository for feedback
254	Traceability of decisions achieved by annotating the prototype
255	Trello boards used to collate resources for onboarding new team members
256	Job shadowing used to introduce new team members
257	Diverse platform mix complicates data sharing
258	Data platforms deficient in different ways for different people
259	Understandings shared in walkthroughs, demos and meetings by asking questions
260	Daily stand-ups help test alignment of understanding
261	Sprint retrospectives can identify poor alignment
262	Sprint planning is a useful alignment activity
263	Alignment is harder with remote working than with co-located teams
264	Home working during a pandemic makes alignment harder
265	Challenge is via appeal to research findings
266	Facts are valued over opinions
267	Agile working hampered by fixed up-front funding
268	Timeboxing constrained within a funded project duration
269	Team membership constrained within a funded project duration
270	Inflexible staffing limits time available to stop and think
271	Discovery endpoint linked to clarity of goals
272	Clients enter discovery with a solution in mind but unclear goals
273	Testing starts as soon as understand how to
274	Discovery varies in intensity but never really stops
275	Satisfactory discovery endpoint not always reached in time allowed
276	Expected time frame for discovery is 8 to 12 weeks
277	Duration of discovery is contested

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
278	Four week discoveries feel intense when starting from scratch
279	Discovery is just to understand the problem not solve it
280	Alpha testing is when try to identify solutions
281	Aim of discovery is being confident have a real problem that can focus on
282	Risks of stopping early are identified
283	Design workshops start by challenging riskiest assumption identified in discovery
284	Thinking structured but not dictated by worksheets
285	Initial solution generation happens during Alpha
286	Some aspects of the solution are self evident or given
287	Time spent looking at alternatives probably too little
288	Decisions recorded but method varies between teams
289	Evolution of the prototype can be narrated in detail
290	Version control used for alternate solutions
291	Diversity in usability test participants can be hard to recruit for
292	Start with the most constrained users rather than treat as an edge case
293	Designing for hard to reach users benefits from anticipation
294	Progressive enhancement from the constrained case is easier than trying to augment the nominal case
295	Different attitudes can be anticipated from prior work
296	The fictional nature of personas can be an obstacle
297	Awkward behaviours can be captured in a persona
298	Abstraction of real data make them seem less real
299	Personas voicing inconvenient truths can be useful
300	Explanatory material needs content design
301	Content designers are routinely used for material explaining services
302	Text books rarely reflect work as practised
303	The future is not evenly distributed
304	Progress on user centred design is patchy
305	UX too broad to describe a role
306	Good experiences are less important than delivering needed service
307	Avoiding term UX makes it clearer that all roles impact design
308	Team mobilisation driven by top level goal changes
309	Team mobilisation driven by technology availability changes
310	Senior stakeholders have authority in different chain of command to technical design authority

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
311	Aspiration to mobilise on basis of changing user needs or behaviour
312	Aspiration to have user centred policy design
313	Pilot projects exist supporting user centred policy design aspirations
314	Mixed methods are used to collect data on existing service use
315	Analytics and feedback are collected for live services
316	Aspiration is to do more qualitative research on live services
317	Aspiration to leverage more knowledge from existing services in discovery for new ones
318	Aspiration for service teams to include both user research and design roles
319	Typically service teams are focussed on operational delivery and share a user researcher with other services
320	Feedback often pushed by users rather than pulled by teams
321	Research repositories are a common aspiration but rarely implemented beyond ad hoc data collections
322	Aspiration for libraries to find patterns of changing needs and behaviours
323	Sharing of research insights varies hugely
324	Aspiration for co-located Agile teams sharing insights in person
325	Aspiration for insight sharing via remote collaboration sessions where not co-located
326	Aspiration for whole team to engage with the analysis and interpretation of findings
327	Aspiration for user researchers to share personas and journey maps and highlight clips
328	Phased testing and release used to identify problems early after building
329	Reliance on testing and approved process to avoid problems
330	Focus on uncovering problems not anticipating them
331	Passive anticipation by using patterns validated by past experience is encouraged
332	Shared lessons and social learning support passive anticipation
333	Discovery considered too early for usability testing
334	Discovery is about testing the concept not the solution
335	Problems are embedded early and the wrong solution built from the start
336	Stronger evidence needed to stop than to continue
337	Shared understanding is assumed if there is agreement

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
338	Shared understanding less important than right decisions and progress
339	Working from home changes methods used
340	Many user research methods have a direct equivalent online
341	Communication burden of remote working makes it more tiring
342	Ways were found to achieve the same outcomes online
343	Virtual spaces have some functional advantages over physical space
344	Physical artefacts can be easier to use
345	Some virtual methods will continue others will revert to the physical tool
346	Greater intensity of working is pandemic related not remote working
347	Discovery is sufficient when confident of next decision
348	Aspiration to move mindset to continuous discovery
349	Discovery time limited by stakeholder imposed deadlines
350	Timescales driven by funding mechanisms
351	Aspiration to hypothesis driven empirical design
352	Aspiration to strongly hypothesis based empirical approach to research and design
353	Discovery should also inform the achievable scope
354	Stakeholders like quantitative measures of risk
355	Not all choices made are recognised as such
356	Designers and researchers should interrogate assumptions and choices
357	Aspiration to have traceable options and decisions
358	Traceability encouraged to support onboarding
359	Mobilised as either an agency bidding for a contract or individual partners applying for jobs
360	Skilled practitioners readily employable on public sector contracts
361	Public sector bidding hard for small agencies to win
362	Subcontracting to larger agencies is easier way to be in winning bids
363	Business strategy to be involved higher-up and earlier
364	Business strategy to be more involved in early concept development and discovery activities
365	Need to be involved earlier or key choices already made
366	Business strategy to be higher up the value chain
367	Earlier involvement in project definition increases confidence in process
368	Favour qualitative ethnographic approach to discovery
369	Want to start with users not stakeholders

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
370	Start with evidence of peoples needs
371	Start with a conversation
372	Establish the needs before think about services
373	Stakeholder management is a different skill to user research
374	Data sharing on walls is a pretty good approach
375	We do data sharing within the team using digital versions of stickies on walls
376	We like to involve the whole team in interacting with users
377	Actively involving the team and immersing them in the data
378	Active involvement avoids huge but unread usability reports
379	Developers can be sceptical of inconvenient truths they didn't observe
380	Emotional investment in fully developed solution makes it harder to accept change
381	More agile to test interaction using a prototype or mock back-end
382	Involving whole team in discovery makes it a more integrated and fluid process
383	Show-and-tell presentations in every sprint are easier to do than a huge report
384	Linking findings to actions for next sprint helps
385	Continuous discovery and presentation provides a design golden thread through the project
386	Continuous discovery needs a continuous narrative of findings
387	Highlight clips can provide a documentary of the design
388	Identifying and challenging assumptions is a core part of the method
389	Important to recognise and test assumptions made
390	Culture shock for people used to a waterfall model of development
391	Needs an expectation of trying some things that turn out to fail
392	Assumptions are things to be tested not shortcuts
393	Sometimes legislation assumes an acceptable means of compliance that makes an innovation illegal until the law is changed
394	Good stakeholder engagement can address embedded assumptions
395	Agile approaches can make requirements easier to challenge
396	Prototyping essential for validating the concept as early as possible
397	Momentum of a running project can make it hard to stop even when that is the right choice
398	Role of the Product Owner to ensure shared understanding of the problem

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
399	Communities of Practice within the organisation can also help share understandings
400	Personas can be a prompt to challenge user stories
401	User Stories should be challenged and iterated the same as everything else
402	Discovery spikes can be used to address surprises
403	Issues need to be addressed as they arise
404	There's no release, it's just the thing
405	The Product Owner owns the design rationale and narrative
406	The Product Owner understands why, what, and who
407	Discovery should identify the scope of the minimum viable product
408	Discoveries can be seen as navel gazing
409	Discovery should be tightly focussed
410	One output of discovery should be whether we need a solution at all
411	Discovery questions should be specific not general
412	A well scoped discovery takes between 8 and 12 weeks
413	Having enough to start building does not mean stopping
414	Discovery outputs still embed assumptions that need testing in Alpha
415	Alpha should be a discovery prototype
416	Still on a discovery learning curve during Alpha
417	People used to Agile approaches make more intentional choices and fewer by default
418	The output of Alpha should be a prototype embodiment of the user journey to go into Beta
419	Design choices captured and shared in show-and-tell presentations
420	Product Owners also note design choices to share with stakeholders
421	Budget and timescales remain rigid when unexpected complexity discovered
422	Time needed after discovery to scope the MVP according to findings
423	Retrospectives and reviews are too limited to be effective
424	Operational constraints on user research and sprint planning can be time consuming
425	Agile approach works well with highly interactive products
426	Products for organisations internal use need flexibility to drop ideas that don't work
427	Can cope with complexity if recognise uncertainties and actively negotiate understanding
428	Universal design disappoints everyone equally

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
429	Inclusive design needs to focus on a key group
430	Simple enough for least capable user even if boring to most capable
431	Addressing the most compelling need worked well enough for everyone
432	If centre the people with the most need then satisfy the majority as well
433	Agile can cope with complexity provided you trust each other
434	Mobilisation is client request driven
435	Past attitude was to mould customer expectations to what we wanted to sell
436	E-Commerce attitude is more about making the path to purchase as simple as possible
437	Solutions are considered right from the first step
438	Client request is often an imagined solution not what they actually need
439	Route to current UX role was self-taught
440	Career developed by performing similar E-Commerce role in progressively bigger companies
441	A lot of developers are uncomfortable with customer contact
442	Proactive user centred design is still a work in progress
443	Remote meetings help structure the conversation
444	In-person meetings are more prone to irrelevant tangents
445	Firm time allocation of remote meetings encourages sticking to the agenda
446	Initial requirements come from sales team
447	Initial contact is not with people who understand the technical product
448	Actual need is reverse engineered from client requirement then discussed
449	Initial requirements are generally written but often vague
450	Second step is discussion to refine the requirement
451	Prototypes used to understand the user journey and document it
452	Prototype used to inform the written specification
453	Analysts have a boundary role in the team
454	Conversations with developers used to understand technical impact of design changes
455	Cross-disciplinary conversations with developers inform design
456	Developers like to be engaged in the design discussions

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
457	Discussions around inclusivity centred on perceived best practice
458	Collaborative design between analysts and developers
459	Only the user observable system behaviour needs discussion with the client
460	Clients have expectations from global service platforms that are hard to match
461	The FAANG companies create unrealistic expectations in our users
462	Shared understanding is what it says in the documents
463	That the client requirement and our understanding of it are fully formed is the first measurable
464	Delivery must match what was agreed at the start
465	Cannot mitigate misunderstood requirements once they've been signed off
466	Low fidelity prototypes to support discussion of user journey with clients
467	Helps our understanding and client expectations that deliverable looks like the prototype
468	Contact with prototype avoids surprises when product is delivered
469	I challenge others assumptions more than they challenge mine
470	Internal challenge of the prototype build confidence that needs are genuine
471	Challenges from clients cause scope creep but can be useful
472	Discovery is complete when it is signed off
473	Holistic client engagement is the fat that gets cut when time is short
474	Time available to spend on design discussion is deadline driven
475	Deadlines don't always concentrate the mind early enough to meet them
476	Can get to the point where cheaper to offer a free upgrade than continue maintenance on legacy code
477	Nobody will pay to fix a bug they already know about
478	Very aware of choices influencing the design
479	No visibility of choices made by developers when they embody the design
480	Reluctant to think developer has better solution than one agreed with client
481	Try to have conversations with developers early enough that no need for them to second guess

Table E.16: *Interview codes at completion of extract coding (cont.)*

Tag	Code
482	When wasn't having early conversations second guessing happened more
483	Sometimes hearing the requirement second hand adds to complexity
484	Prefer real-world use cases to personas
485	Some changes come from help desk calls
486	multiple levels of help-desk complicate response
487	Firewalls between analysts and client help-desks
488	Big infrequent releases are harder to manage than small frequent ones
489	Scheduled builds can be overtaken by current designs
490	DevOps and Continuous development expected to deliver quicker turnaround for client requests
491	Long turnarounds cause additional complexity due to workarounds adopted
492	Sales promises can run ahead of system capability
493	Staffing can be a bottleneck to product evolution
494	User centred attitudes are not universal
495	Prototypes are revised and presented to multiple audiences
496	Designs are refined three or four times after version one
497	Sales people do not understand the concept of requirements
498	Getting sales people to present prototypes to the customer is really beneficial
499	Sales engagement with prototypes can bring teams closer together
500	Remote working got us out of our bubbles
501	Better shared situation awareness allows problems to be solved more easily
502	More holistic view of the product when have shared situation awareness
503	Remote working will be a permanent change
504	No interest in office space as working so well from home

E.3 Phase 3 — Initial themes

See [Initial theme generation](#).

Candidate themes and organising concepts

Table E.17: *Candidate theme central organising concepts*

Concept	Codes
C-01 Mobilisation is externally driven	236 308 309 359 434 239 310 313 312 319 318
C-02 Contractual mindset undervalues shared understanding	150 266 441 462 463 465 464 472 337 338
C-03 Shared understanding is actively sought	326 250 376 377 379 382 378 398 259 399 089 454 420 419 374 243 244 245 247 246 501 502
C-04 Design reduced to a multivariate test	168 105 106 109 110 129 147 177 174 179 328 329 330 351 352
C-05 Significance of user impact not appreciated	169 178 213 217 218 219 220 234 208 306 320 336 397 459 181 180
C-06 Anticipation requires a different mindset	197 354 107 108 158 159 160 161 162 163 171 175 176 202 209 287 226 408 229
C-07 Growing awareness of need to anticipate	211 111 112 115 116 118 142 153 173 212 215 214 216 478
C-08 Anticipation is mostly passive pattern reuse	331 332 101 100 457 295
C-09 Discovery should build shared understanding	081 090 088 207 205 079 094 091 093
C-10 Anticipation is impractical	164 172 183 185 186 195 203 210 224 333
C-11 Prefer Agility to Anticipation	102 103 104 124 149 004 425

Table E.17: *Candidate theme central organising concepts (cont.)*

Concept	Codes
C-12 Anticipation can be supported by tools, techniques, and tactics	231 222 221 223 225
C-13 Agile methods aid shared understanding	260 261 262 395 383 384 417 455 456 458 151 152 154 242 433
C-14 Discovery is an activity not a phase	385 130 274 316 317 348 386 402 416 413 325
C-15 Prototyping aids shared understanding	498 499 495 467 468 466 452 451 381 254 253 248 470 414 285 280 289 273 396 415 418
C-16 Should anticipate possible not probable	200 198 282 201 199
C-17 Discovery is a mindset not a fixed process	080 082 123 128 141 240 271 279 281 334 347 127 302
C-18 Remote working is established and understood	095 096 097 155 156 157 249 255 257 258 263 264 339 340 341 342 343 345 346 098 445 503 375 344 504 500 444 443
C-19 Ethical safety requires a multidisciplinary approach	206 182 479 480 481 482 483 492 497 485 486 365 364 363 114 446 427 447 448
C-20 Better time management gives better outcomes	488 489 490 491 473 474 475 476 422 349 350 278 277 275 238 230 227 228 204 170 044 045 047 126 424 276 403 404 407 409 411 423 412 496 126 424 251
C-21 Discovery artefacts are diverse in content and shelf-life	073 074 075 076 077 078 083 084 085 086 087 092 009 052 008 314 315 241 300 301 099

Table E.17: *Candidate theme central organising concepts (cont.)*

Concept	Codes
C-22 Backlog items are prioritised for discovery and build effort	064 065 066 067 068 069 070 048 005
C-23 Equity is not uniformity	132 133 135 136 237 291 429 430 431 432 294 293 292 134 428
C-24 Funding mechanisms constrain agility	046 040 477 421 362 361 269 270 267 268 042 043 493
C-25 Stereotypical perceptions obstruct sharing of insights	187 188 189 190 191 192 193 194 232 233 184
C-26 Business financial objectives trump usability	137 138 139 140 435 436 442 494 304
C-27 Business Analyst is a boundary role	071 121 122 252 453 119
C-28 Abstraction can create friction, but that can be useful	296 297 298 299 400 401 484
C-29 Empirical approach has risks that need managing	165 166 167 353
C-30 Assumptions need to be challenged	072 113 265 283 284 356 388 389 392 394 469 471
C-31 Aspiration to do more experiments	143 144 145 146 391 167 165 166 353
C-32 Aspiration for more sharing of insights and decisions	322 323 324 325 327 357 358 387 321 303 371 235 368
C-33 Solutions locked in too early	437 438 335 286 272 131 426 410 380 372 370 369 311 393 366 148
C-34 Choices not recognised or recorded consistently	355 288 367 290
C-35 Product Owner is key role	405 406 449 450 460 461 373
C-36 Routes into UX roles are diverse	117 120 196 440 439 360 307 305 256 390

E.4 Phase 4 — Developing themes

See [Developing and reviewing themes](#) and Figure [E.1](#).

E.5 Phase 5 — Refining themes

See [Refining and naming themes](#) and Figure [E.2](#).

E.6 Phase 6 — Writing up

See [Writing up](#).

See Theme [T1](#) on Page [108](#) and Table [5.12](#).

See Theme [T2](#) on Page [110](#) and Table [5.13](#).

See Theme [T3](#) on Page [112](#) and Table [5.14](#).

See Theme [T4](#) on Page [113](#) and Table [5.15](#).

See Theme [T5](#) on Page [114](#) and Table [5.16](#).

See Theme [T6](#) on Page [119](#) and Table [5.17](#).

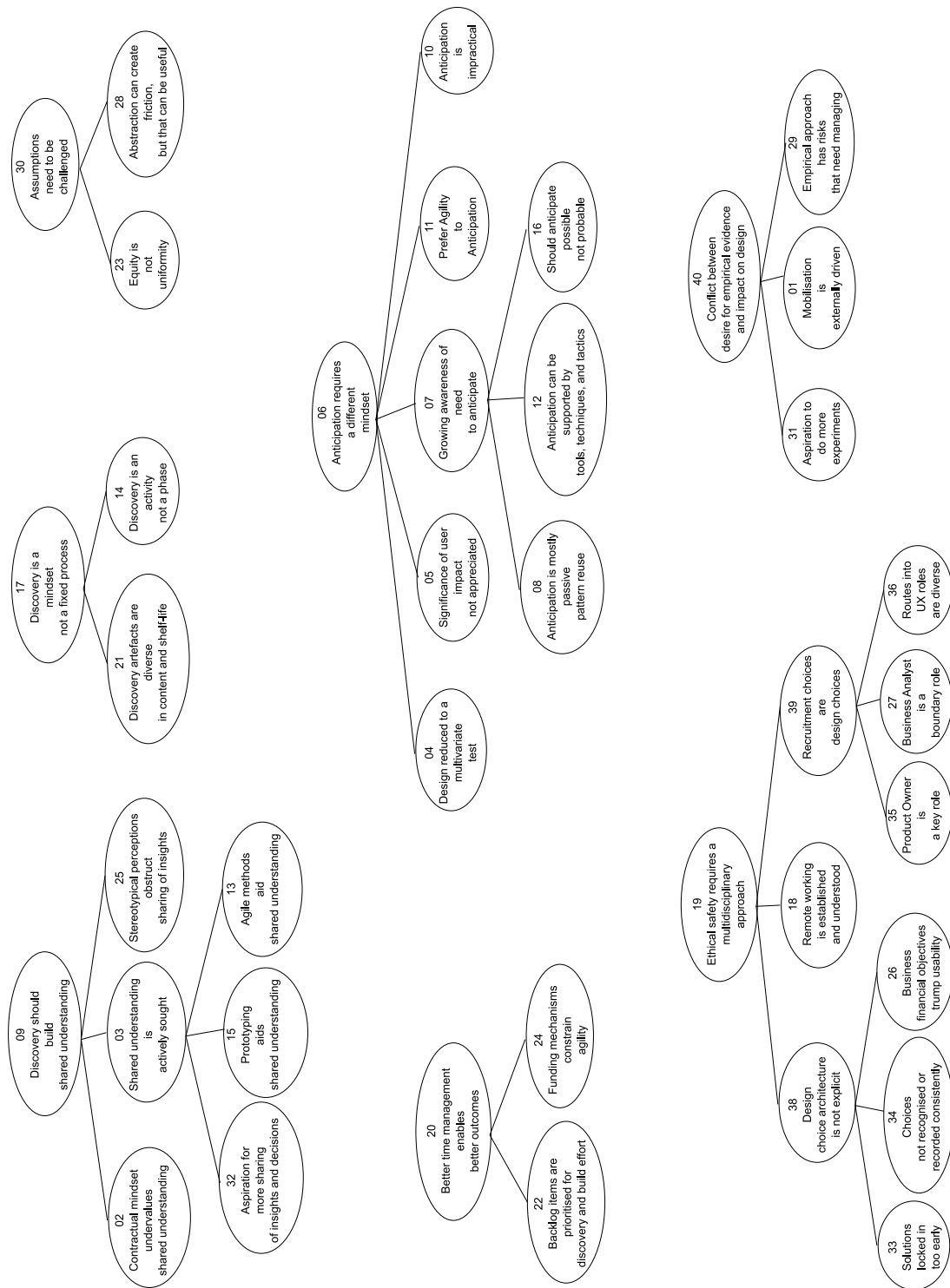


Figure E.1: Interview theme and sub-theme organisation after Phase 4

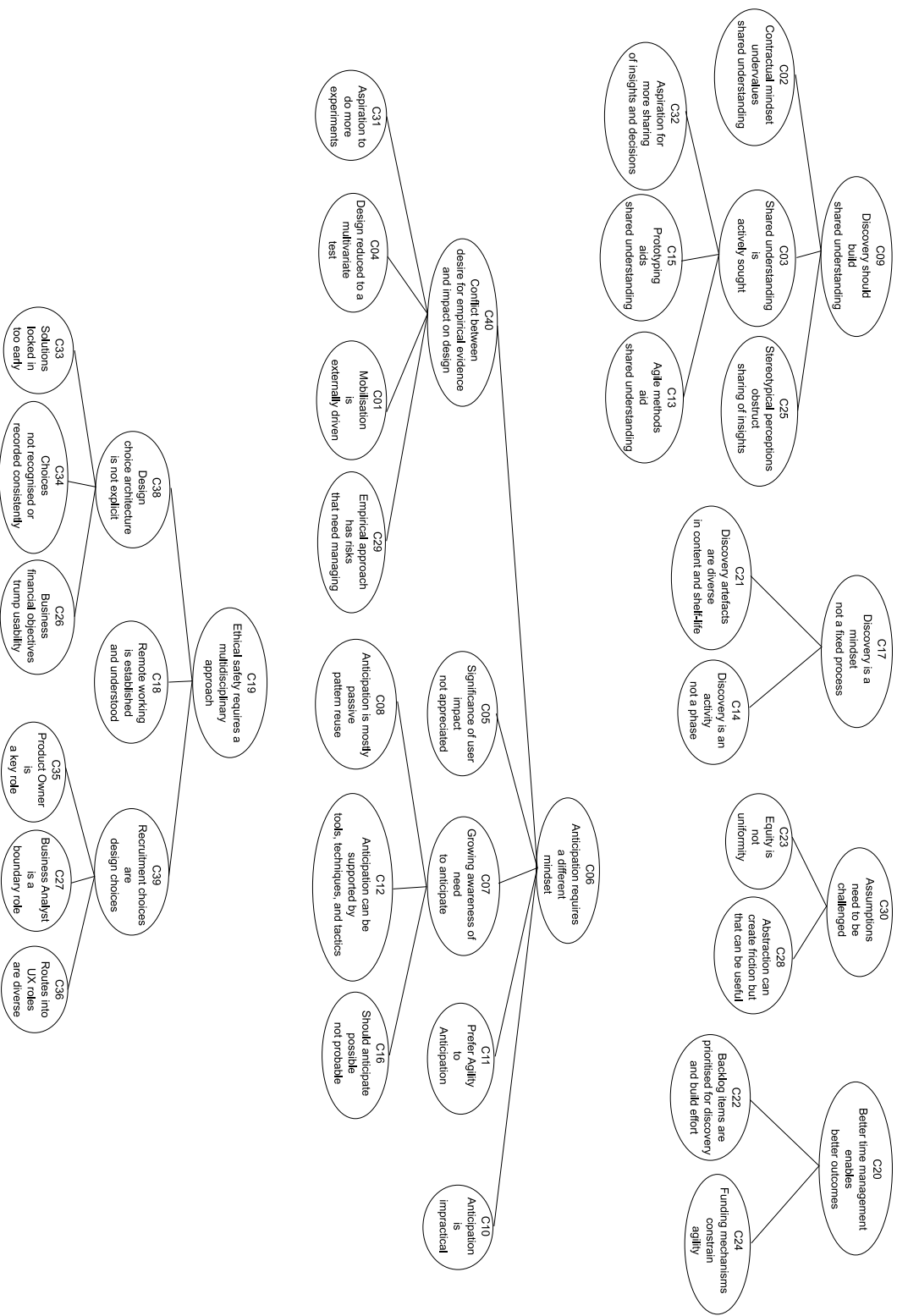


Figure E.2: Interview theme and sub-theme organisation after Phase 5

Glossary

A

accident

An undesired and unplanned but not necessarily unexpected event that results in at least a specified level of loss [206, p175]. 130

accountability

Collaborating in a way that accepts responsibility for actions taken and where coherent reasons for them can be given. 149

agency

The capacity of individuals to reason independently, to make their own free choices, and to enact those choices. In a collaboration, agency may be social agency jointly vested in the participants but mediated by software, or social agency between the user and the software provided that they are mutually trusted and transparent in their motives.

Components of agency are identified, and the implications for empirical research discussed, by Mustafa Emirbayer and Ann Mische [105]. It is described as emerging from social relations by Ian Burkitt [50]. 145

AHEP

Accreditation of Higher Education Programmes 171, 541

alignment

As a key aspect of discovery, a negotiated understanding of what a finding means, or how a practice should be conducted, that aligns the participants of that negotiation in a way that fosters a sense of belonging to the joint enterprise and a shared vision of what it means. Adopted from Wenger's work on Communities of Practice [384, p178] 85

avoidance

A feature of a product that its users recognise as offering a means of interaction with it that will provide a poor experience, and generally a *way of failing*, such that it will be actively avoided by them. For example, a button for an irreversible action that is too close to something used more frequently. *see* [affordance](#)

B

boundary role

A role in which the individual filling it is able to translate understanding between communities and across organisational and extra-organisational boundaries, whether or not they formally hold knowledge integration responsibilities [369] [22](#), [119](#), [185](#)

bowtie

A diagram visualising the path from a threat or challenge, to a consequence, through a loss event and any barrier measures taken to prevent, control or mitigate it. The components are shown in [Figure 6.2](#). Since 2017 these have started to replace platform risk registers as the means of recording and presenting risks and risk management measures within UK military aviation, in addition to previous civilian use in aviation and other domains. [201](#), [213](#)

C

central organising concept

In reflexive thematic analysis, the essence of what a theme is about. The central organising concept is what codes have been clustered around, and distinguishes that theme from others in the analysis. [70](#)

choice

As a key aspect of discovery, the intentional selection of concepts of operation defining a range of capabilities to be used in a future operational context to address a particular problem or capability gap, their refinement to concepts of employment applying a chosen technology, and concepts of use describing how specific implementations or implementation features will be used to meet the identified needs, and the selection of voices to be heard and user groups to participate in the selection of these concepts. [85](#), [183](#)

choice architect

Someone with responsibility for organising the context and structures within which decisions are made. They may themselves be a decision maker, within a structure of their own making, whether they recognise this or not. [34](#), [42](#), [205](#)

community of practice

A community created over time by the sustained pursuit of a shared enterprise [[384](#), p45] [18](#), [42](#), [205](#)

completion in the other

A key aspect of the ethics of care, ‘completion in the other’ is the recognition of, and response to, the attention and care they are receiving from the one caring, by the one cared for. [170](#)

constructivist

A theoretical perspective in which reality is constructed within an individual mind. [57](#)

CSD

Critical Service Design [173](#)

customisation

As a challenge for interaction discovery, how do you handle workarounds and customisations developed by the users of a programmable application? [14](#)

D**deductive**

A method of reasoning in which inferences about a particular instance are made by applying a general law drawn from a set of premises or axioms. [57](#), [68](#)

design ethics

The basis of professional behaviour and intentional choices in the practice of design, guiding how designers work with their colleagues, stakeholders, and users, and how they conduct the design process to determine the requirements and assess the ethical properties of the resulting product. [37](#), [186](#)

Design Operations

The organisation and optimisation of teams, processes, and practices in order to maximise the designed product value at pace and scale. Referred to as DesignOps or DesOps by some authors. [35](#), [46](#)

differentiation

As a challenge for interaction discovery, how can comparative testing be done between design alternatives when some of the alternatives are intolerable? [16](#)

discovery

The process of exploring and researching a problem from the end-user perspective, interpreting the findings, and translating them into project objectives. [3](#), [6](#), [8](#), [9](#), [13](#), [18](#), [22](#), [27](#), [35](#), [40](#), [42](#), [43](#), [53](#), [58](#), [84](#), [103](#), [121](#), [172](#), [182](#), [184](#), [185](#), [205](#), [206](#), [210](#)

DWP

Department of Work and Pensions [46](#)

E

empirical

Based on observation rather than theory or logic. [58](#)

engagement

As a key aspect of discovery, the process of fostering interest and participation in an endeavour on the basis of cooperation and shared outcomes. [85](#), [182](#)

engrossment

A key aspect of the ethics of care, engrossment is the open, non-selective attention of the one caring to the one cared for when thinking about them in order to understand them. [170](#)

equity

Treatment of the user in a way that allows equality of outcome when compared to others, if necessary by providing the service in a different way that better meets their needs. [143](#)

ethical properties

Properties that will distinguish a “good” design that provides a trusted transparent collaboration with the user that focuses on their needs from a “bad” design that exploits, deceives or unfairly discriminates against them. These are non-functional properties that describe how a service is provided, but may also be associated with additional functionality that is not strictly necessary for the job to be done but provides information that supports the ethical delivery of the service. [125](#), [128](#), [129](#), [132](#), [136](#), [143](#), [186](#), [205](#), [207](#), *see* [equity](#), [agency](#), [proportionality](#) & [accountability](#)

ethical safety

Avoidance of harm by considering the ethical properties the system should have and how they might be lost, and thereby supporting a practitioner’s independence to act according to their professional values. [119](#), [186](#), [189](#), *see* [ethical properties](#) & [design ethics](#)

ethics of care

An ethical system that prioritises meeting needs, avoiding harm, and enriching relationships over compliance with rules and standards [170](#), *see* [design ethics](#)

evolution

As a challenge for interaction discovery, how might we maintain models or persona sets so that they remain relevant to the context of use? [17](#)

extrapolation

As a challenge for interaction discovery, how might we analyse user stories to identify future problems with a system that as yet does not exist? [17](#)

F

functional requirement

The services to be provided, described in terms of what function that should be performed. [20](#)

G

GDPR

General Data Protection Regulation [16](#)

GDS

Government Digital Service 3

H

hard exclusion

Involuntary or coercive exclusion from the use of a product or service because participation is disallowed or has manifestly unfair or abusive pre-conditions of use. 192

hazard

A state or set of conditions of a system or an object that together with other conditions in the environment of the system or object will lead inevitably to an accident in a loss event [206, p177]. 130

HAZOP

A Hazard and Operability (HAZOP) study is a method of systematically examining a well-defined process to identify safety, health and environmental hazards and potential operational problems. It was first developed by ICI in the 1960's for use with chemical processes. A key feature of the method [74] is the use of guide words to assist in thinking about possible deviations from the intended design. 39

HCI

Human Computer Interaction 18, 92

HMRC

His Majesty's Revenue and Customs 46

I

imagination

As a challenge for interaction discovery, how can a clear test hypothesis be formed while the problem is still being explored and an unwanted interaction is thought to be possible but the mechanism is not yet understood? Would it rely too much on imagination? 16

imagination

As a key aspect of discovery, extrapolating from personal knowledge and experience to understand another's perspective to share their understanding [384, p175] 85

inductive

A method of reasoning in which a body of observations are synthesised to construct a general principle or theme. [57](#), [66](#), [68](#)

interaction discovery

The process of negotiating a shared understanding of the user interactions implied by a design, and identifying which of them might have undesirable consequences. [2](#), [13](#), [125](#), [205](#), [211](#)

interpretivist

A theoretical perspective in which interpretations of reality are culturally derived and situated in time. [57](#)

issue

An initial identification of something problematic, which might be confirmed as a new threat to an important property that needs to be captured as a jeopardy, might be deemed to be an aspect of an existing jeopardy, or might be discarded as a tolerable nuisance requiring no further action. [134–136](#), [159](#)

ITE

Independent Technical Evaluation [56](#)

iteration

As a key aspect of discovery, repeated cycles of inquiry and negotiation of shared understanding. [85](#), [183](#)

J**jeopardy**

A danger of loss, harm or failure (Google/Oxford Languages) [127](#), [131](#), [134](#), [135](#), [143](#), [154](#)

jeopardy model

A diagram or structured text capturing the vulnerable ethical properties of a design and how they might be placed in jeopardy or lost. [127](#)

K

Ketso

Ketso is a workshop toolkit and approach designed to ensure that everyone is able to contribute equally when gathering ideas from a group. In Lesotho, the word 'ketso' means 'action'. See [Ketso history](#) on their website. [58](#), [73](#), [95](#)

L

loss event

The point in time during a jeopardy situation when an irreversible event occurs that has the potential to cause loss or harm. [143](#)

M

mobilisation

The decision to bring together a team and to prepare practically and psychologically to begin work on addressing a particular problem. [21](#), [85](#), [181](#)

motivational displacement

A key aspect of the ethics of care, motivational displacement is the centring of the one caring on the needs and objectives of the one cared for. [170](#)

MVP

Minimum Viable Product [27](#), [183](#)

MVS

Minimum Viable Service [183](#)

N

navigation

As a challenge for interaction discovery, how might we anticipate user journeys through a landscape that is still being defined? [17](#)

NHS

National Health Service [182](#)

non-functional requirement

How a service is to be provided, described in terms of what properties the function implementation should have, for example its speed or its resource use or its compliance with a standard. [20](#)

P

pain point

A very specific problem that users are experiencing with a product. [14](#)

population

As a challenge for interaction discovery, how might we distil data to define a persona set that covers the user journey landscape when that landscape is still being defined? [17](#)

prediction

As a challenge for interaction discovery, how do you identify a problem in something that does not exist yet, for which you have yet to develop a detailed design? [14](#)

proportionality

Provision of a service in a way that recognises the possible imbalance of power between the designer and user and makes only those demands on the user that are proportionate to the benefit they will obtain from their actions. For example, no data should be requested except what is needed to support the service that the user has asked for. [147](#)

provocation

An idea, or artefact, used as a means to provoke different responses and challenge assumptions and default reasoning, by triggering personal or social dilemmas or threat scenarios. See [\[284\]](#). [143](#), [205](#), [212](#)

R

recognition

As a challenge for interaction discovery, how might knowledge of the reasons for an apparently successful design be obtained? [16](#)

relativist

A bounded relativist accepts multiple mental constructions of reality as equally valid within cultural, moral, and cognitive bounds. A descriptive relativist view accepts that different groups may have different perspectives of reality that can be described without evaluating the validity of that perspective. A normative relativist view evaluates how things ought to be but accepts that the truth of a claim can only be determined relative to the framework in which it is made. [57](#)

representation

As a challenge for interaction discovery, who should participate in a discovery session? [17](#)

Research Operations

Processes and measures that support researchers in planning, conducting, and applying quality research at scale [Nielsen Norman group]. Referred to as ResearchOps or ReOps by some authors. [35](#)

RTS

Release to Service [56](#)

S**sacrificial concept**

An idea or solution created to help understand the issue further, which may then be discarded, so does not need to be feasible or viable or even possible, as the intention is to explore assumptions. Described in the second edition of the IDEO HCD Toolkit [[159](#)]. [95](#)

SAFe®

Scaled Agile Framework [46](#)

SBD

Simulation Based Design [17](#)

shared understanding

A shared conceptual model and shared interpretation of information relevant to the problem. How agile software development methods contribute to this is discussed by Yu and Petter [[394](#)]. [121](#)

sharing

As a key aspect of discovery, the process and mindset associated with sharing an understanding of the research data and achieving alignment of that understanding across the team by active negotiation of meaning and challenging the narrative. [85](#), [182](#)

simulation

As a challenge for interaction discovery, can reliable indicators of problems be developed from modelling known user behaviours? [17](#)

social constructionist

A subjective philosophical position in which knowledge and reality are socially constructed by debate, conversation, and negotiation between people. [57](#)

social presence

The ability of participants in an electronically connected community to project themselves socially and emotionally, as individuals exhibiting their full personality, through the medium of communication. [51](#)

soft exclusion

Voluntary exclusion from the use of a product or service because it appears to offer no reason to participate, or has pre-conditions of use that are disproportionate to the perceived value. [192](#)

spike

A task aimed at answering a question, rather than producing a deliverable product. Depending on the nature of the question, this might be a design spike, addressing a gap in knowledge or understanding, a technical spike selecting the appropriate method of building the product, or a functional spike looking at how people interact with a new feature or how features interact with each other. [45](#)

T**techlash**

A strong and widespread negative reaction to the far-reaching power and influence of large technology companies, especially in relation to their control of personal data, social media, regulation of online access and content, etc. [Oxford English Dictionary] [44](#)

technical debt

The gap between the current state of a software system and some hypothesised state in which it is successful in meeting all the needs of the intended user group in their context of use. [45](#), [206](#)

TFDV

Technology Facilitated Domestic Violence [39](#)

threat

A recognised cause of an identified harm. It may be the only cause or one of many, and may refer to a threat to safety or security or usability. [135](#), [136](#)

U

UML

Unified Modelling Language [17](#)

Unified Process

A software engineering process that grew out of Ivar Jacobson's experience working at Ericsson in the late 1960's and later incorporated work by Grady Booch and James Rumbaugh to give a unified object-oriented process that covered the whole life-cycle. [35](#)

user experience

The perceptions and responses that result from the use or anticipated use of a system, product or service. When used as acronym UX, often an umbrella term for user experience design and related activity [6](#), [18](#), [21](#), [24](#), [43](#), [83](#)

user jeopardy

A system state vulnerable to a usability shortfall leading to users suffering identifiable harm. [131](#), [167](#)

user research

The process of determining the end-user perceptions and responses that result from the use or anticipated use of a system, product or service in a given context. [13](#), [21](#), [26](#), [27](#), [35](#), [42](#), [84](#), [122](#), [182](#), [205](#), *see* [user researcher](#)

user researcher

Someone employed to plan, design or carry out user research activities [6](#), [17](#)

UX

User Experience [4](#), [13](#), [21–24](#), [26](#), [27](#), [30](#), [32](#), [35](#), [40–42](#), [57](#), [62](#), [83](#), [84](#), [92](#), [119](#), [127](#), [178](#), [183–185](#), [190](#), [205](#), [210](#), [211](#)

V**validation**

As a challenge for interaction discovery, how might we validate problems suggested by a possibly unrepresentative subset group of users without doing harm to them or other groups? [17](#)

VR

Virtual Reality [212](#)

VSD

Value Sensitive Design [40](#), [41](#), [132](#), [189](#), [211](#)

W**WCAG**

Web Content Accessibility Guidelines [154](#)

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Required Amendments

Modifications	Candidate response and location within the thesis
Provide a title that is more illustrative and appropriate to the content. You could think about values, anticipation, unknowns unknowns, the domain of use etc.	“A Method for Anticipation of Undesirable Interactions in Software for a Digital Society informed by a Thematic Analysis of Discovery Practice” mentioning practice, emphasising anticipation and the context of a digital society.
Critically reflect on Jeopardy Analysis (500-1000 words/three paragraphs’ words within Chapter 7)	Added Critical reflection on page 169 .
In relation to Jeopardy Analysis (Chapter 7 500-1000 words/three paragraphs), reframe the ending for whom this work is applied – which domain does this work sit best in (we feel the Jeopardy Analysis method would work best as a teaching tool for UX students or for the public sector with complex problems whose values/ethics align to this work)	Added Domains of use on page 171 , identifying contributions to AHEP learning outcomes in Higher Education on page 171 , and discussing its role in public sector service design on page 173 .
Update Chapter 8 to reflect these changes (where necessary)	Reflected critique in Limitations, page 200 , and updated text to reflect inclusion of data, page 203 .
Update Chapter 9 to reflect these changes (where necessary)	Reflect domains of use in Contributions section, page 213 .
Raw Data included in the appendix to provide credibility	Added Thematic coding data in Appendix E , pages 249 to 470
Update the abstract as necessary to reflect all the above changes	Future work section extended to include points above, on page iv .

