# Hand-Drawn Provocations: Unconventional Strategies of Using Illustrated Narratives for Innovation and Speculative Design Practice

By

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A Thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy (PhD)

University of the Arts London

Falmouth University

April 2026

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# ACKNOWLEDGEMENTS

I would like to acknowledge and thank everyone who has supported me throughout my PhD studies and the writing of this thesis. I am very grateful for the Falmouth Doctoral Studentship, which allowed me to produce this thesis and learn new, invaluable skills in research and Higher Education teaching. The additional student fund also helped me to purchase art and design materials for this project, attend conferences, present and publish my research, and attain the Advance HE Fellowship.

I am thankful to my Director of Studies, Dr Danielle Barrios-O'Neill, who has supported me throughout this project from my first proposal and arrival at Falmouth to my final submission and defence of, and corrections to, this thesis. I am very grateful for our supervision meetings and for your intellectual and personal support. I would also like to express my gratitude to my supervisors, Prof. Lee Miller and Dr Cui Su, for their encouragement, advice, help, and support. I also want to give a special thank you to Prof. Chris Morris for his guidance during my Confirmation of Route process. I am grateful for the support of the PGR community and the 2018 PGR cohort, as well as all of the academics at Falmouth University who taught me during my first year of study. I also want to acknowledge the help of the Postgraduate Research team at Falmouth University, particularly Prof. David Prior, Jemma Julian-Vicary, Alice Holland-Bywaters, Katy Shannon, Heidi Ball, and Kerry Taylor.

This thesis would not be the same without the help of Tess Cobb from the English for Academic Purposes Team and Louise Chapman; thank you both so much for all of your support with my writing and editing. I would also like to thank Eva Kaziah Sbaraini and Oliver Hatfield for their help with 3D prototyping and printing. I am equally grateful to George Forster, who developed the narratives for this project. Last but not least, I wish to thank all of the student writers and expert reviewers – particularly Michail Oustamanolakis, Jerry Padfield, Jasmine Robinson, Darius Šerkšnas, Justina Vengraitytė, and James Ward – for their feedback and contribution to my research.

I would love to thank all of my family – particularly my partner Alexander Kerr, my daughter Anika Smiltė Pakalkaitė, and my son Henry James Kerr – and friends for their unconditional support, kindness, and love both before and throughout my PhD journey. I am very proud to have seen Anika and Henry grow up while completing one of the most significant projects of my career so far. Therefore, I dedicate this thesis to my children, Anika and Henry.

# ABSTRACT

This thesis explores how the use of illustrated narratives can spark discussion on less noisy digital interfaces, enhance user experience, provide insights for an ideation phase in the design process, and create opportunities for large information technology companies that use design fiction to innovate. This practice research project adapts the research through design approach and the use of design fiction. The project's first phase applies 'The Poetics of Design Fiction' framework to identify design challenges, generate proposals, and produce 'what if' scenarios, fictional prototypes, user manuals, and illustrated narratives (Markussen and Knutz 2013). The second phase focuses on the use of the expert review method to facilitate discussions with industry professionals (Nielsen and Molich 1990; Nielsen 1994). This is used as a strategy to produce hand-drawn provocations to test methodological advances; these methodological advances are orientated towards practitioners and researchers, as well as large information technology companies that use or may consider using speculative design practices to innovate.

This project contributes new knowledge to the fields of illustration, research through design, user interface design and user experience design, as well as innovation studies. First, the project shows that the use of illustrated narratives can spark discussion, which provides validation and a framework for illustrators and graphic designers (Bleecker 2009; Dunne and Raby 2013). Second, it demonstrates that illustrated narratives can also act as provocations that advance research through the design domain and provide a validation for those employing such narratives in practice research. One of this project's significant findings is that unconventional design approaches, such as design fiction and illustration, can be used to develop user interfaces. The use of illustrated narratives can also facilitate usability and accessibility evaluations of user interface designs in the same way as conventional user interface and user experience approaches. Lastly, this study contributes new knowledge by showing that illustrative narratives can provoke discussions that identify innovation opportunities for big tech companies. The outcomes of this project are the unconventional strategies of using illustrated narratives for innovation and speculative design practice.

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# CHAPTER 1

# INTRODUCTION

This chapter provides an overview of my research project. It presents the research question and sub-questions, research aims and objectives, context, and thesis structure. It also briefly introduces the methods applied during the project.

## 1. Research question and sub-questions

In this practice research project, the main research question is:

How can noise in digital interfaces be reduced using unconventional design approaches, and how can this enhance the user experience (UX)?

This project also has two research sub-questions:

How do design fictions stimulate designers to create healthier information technology (IT) tools and generate insights for the design process?

How do design fictions generate innovation opportunities that would be valuable and beneficial for large IT companies?

## 2. Aims and objectives

This project aims to develop less-noisy digital interfaces to test new methodological advances using illustrated narratives. The insights and improvements gained through the combination of practice research and *expert review* are valuable for designers and large IT companies that use design fiction in their ideation processes for innovation (Michaud 2020; Michaud and Appio 2022). The project's objectives are to test and establish whether illustrated narratives can provoke debate, facilitate usability and accessibility evaluations to enhance UX, provide further insights into the design process, and generate innovation opportunities for large technology ('big tech') companies.

## 3. Context

In this project, *noise* is both a problem and a primary concept that can be understood only by exploring it from the different perspectives in which it functions (Malaspina 2018). Conceptually, noise refers to visual disturbances and UI interferences (Norman 1983, 2013; Sweller 1988). Noise can prevent

an audience from interacting with a user interface (UI), as well as deliberately induce interface overuse (Norman 1983, 2013; Sweller 1988; Fogg 2003; Eyal 2014). From a technological perspective, noise refers to the disruption of signal transmissions as well as information-processing interference (Shannon 1948). In a usability and UI/UX context, noise is conceptualised as interfaces and experiences that increase a user's cognitive and attentive load owing to their design complexities, which can include visual clutter, overcomplicated navigation systems, interruptions, and notification overload (Norman 1983, 2013; Sweller 1988; Cooper et al. 2014). In the context of visual attention, noise refers to the necessity to compete for and attempt to maintain users' attention on digital platforms through the deliberate use of notifications, interruptions, colour, and habit-forming interactions, among other techniques (Fogg 2003; Eyal 2014). From users' perspectives, noise is the cultural norm (i.e. constant connectivity, productivity, information fatigue and overload) with which users interact every day. How noise is considered can be influenced by how users experience and feel about interacting with such visual effects, notifications, etc. (Turkle 2012). As a result, product design has largely treated noise as a type of design error that can be mitigated by reducing visual clutter, cognitive load, interruptions, and disruptions for users (Norman 1983; Sweller 1988; Raskin 2000; Sengers et al. 2005; Cooper et al. 2014; Shneiderman et al. 2016). This view significantly minimises the wider implications of noise as a concept within technical, scientific, cultural, and psycho-social environments (Malaspina 2018).

In this project, *noisy digital interfaces* are defined as interfaces that negatively impact user wellbeing (Fogg 2003; Eyal 2014; Harris 2016; Levy 2017). Moreover, it has been established that the type of noise that seeks to maintain users' attention and negatively impacts wellbeing is designed deliberately rather than accidentally (Fogg 2003; Eyal 2014; Harris 2016; Levy 2017). This positions noise as a critical concern for UI and UX in practice research. Rather than treating noise as a technical error by masking it with cosmetic changes, design disciplines should explore more radical and innovative approaches for dealing with the underlying issue of noise in UIs; for instance, by addressing the absence of mindfulness in technology (Kelly 2010; Case 2016). Therefore, this project explores the theme of noise through three design lenses that have been specifically framed as challenges: (1) habit-forming, distractive, colourful, and cold 'generic' interfaces; (2) screen time overuse; and (3) touch-poor interactions. It also proposes the development of hand-drawn interfaces, mindful screen time trackers, and touch-rich interactions to reduce the visual, attentive, and cognitive load for users, as well as to develop a more mindful and calmer UI/UX. These developments are also orientated towards designing less noisy digital interfaces to test whether the use of illustrated narratives can be employed in UI and UX creation.

*Mindfulness* is another important concept in this project, where it is positioned as the opposing concept to noise. Mindfulness is the ability to intentionally shift focus and attention to the present moment

(Kabat-Zinn 2018). In design processes, mindfulness aims to reduce noise within UIs, as well as to lower distraction and cognitive and attentive loads for users (Sweller 1988; Norman 2013; Case 2016). On the one hand, mindfulness originates from non-secular practices. On the other hand, it is universally accepted to apply its principles in secular contexts; for example, in personal techniques to reduce stress and to improve one's ability to focus and make good decisions, as well as to enhance productivity, wellbeing, life satisfaction, and overall happiness (Brown and Ryan 2003; Kabat-Zinn 2018). However, mindfulness has been critiqued when it is applied in commercial settings to sell products (Wilson 2016). Beyond designing for the application of mindfulness-based stress-reduction techniques, recent research explores the role of mindfulness in human–computer interaction (HCI) and proposes directions for future research in this domain (Terzimehić et al. 2019). This project has a particular focus on designing interactions where mindfulness is conspicuously present, unlike the products of many large IT companies (Kelly 2010).

This project also aims to provide valuable insights, such as *unconventional strategies* for large IT companies and designers. In this project, I define large IT companies as big tech companies that use speculative design practices, such as design fiction processes, for innovation in their research and development departments (Michaud and Appio 2022). Therefore, this research is limited to investigating the role of design fiction in the internal design processes of big tech companies. In this project, design fiction is defined as a speculative design practice that enables companies to produce prototypes and narratives to explore potential new technologies and innovate (Bleecker 2009; Dunne and Raby 2013). According to Michaud (2021), big tech companies pursue new ideas to develop new and improved products, which can be generated only by stimulating the imagination. Unlike conventional problem-solving approaches in traditional UI and UX practices, design fiction focuses on generating ideas for the ideation process (Bleecker 2009; Dunne and Raby 2013; Michaud and Appio 2022). Therefore, a particular focus of this project is creating and testing new unconventional strategies, which I term here *hand-drawn provocations*. These illustrated narratives have a speculative framing (McCloud 2001; Bleecker 2009; Dunne and Raby 2013). In addition to large IT companies, this research is also aimed at a multidisciplinary audience of practitioners (e.g. illustrators, UI and UX designers) and design researchers (both from industry and academia) who would benefit from using design fiction but lack the necessary validation to proceed.

Design fiction researchers have argued that design fiction practice lacks structure and, therefore, that further methodological advances are needed (Lindley et al. 2014). The development of new frameworks helps to validate the methodological credibility of design fiction (Lindley et al. 2014). These new enhancements can then be applied to practice in industry contexts (Dunne and Raby 2013; Lindley et al. 2014). Furthermore, new design fiction methods can enable practitioners from other fields (such as illustrators and graphic designers), who previously lacked the necessary validation, to

contribute to design processes (such as UI and UX development or speculative design practice) that they have not previously considered from a new perspective (Coulton et al. 2017). Improved design processes also help to validate design choices, support more inclusive and meaningful practices, and provide long-term problem-solving, among other aspects, to navigate real-world complexities (Cross 2006; DiSalvo 2012; Norman 2013). As such, this thesis explores how illustrated narratives can stimulate discussions, act as provocations, and be used to design UIs and UXs. The research then considers how this can provide validation for creative practitioners (illustrators and graphic designers as well as UI and UX designers) and design researchers to engage with research through design and illustration (Bleecker 2009; Dunne and Raby 2013). Therefore, the methodological enhancements of this project can expand the design domains for practitioners and researchers beyond conventional problem-solving and traditional UI and UX approaches.

In this thesis, accessibility and usability evaluations are additional crucial features because they can significantly enhance how interfaces are designed to improve UX (Gould and Lewis 1985; Norman 1983; Nielsen 1993; Shneiderman et al. 2016; W3C Website Accessibility Initiative [WAI] 2016). Previous research has established that design fiction engages with the themes of usability and accessibility (Ahmadpour et al. 2019; Sharma et al. 2022; Penney et al. 2024). However, whether design fiction facilitates these types of assessment in the same way as traditional design approaches has not been established. This project explores whether illustrated narratives can also facilitate such evaluations. Advancing accessibility and usability evaluations aims to ensure that accessibility guidelines are followed to remove access blockers for users in the design fiction process (W3C WAI 2016; The Public Sector Bodies (Websites and Mobile Applications) Accessibility Regulations 2018; Government Digital Service and Central Digital and Data Office 2024; UK Government 2024; W3C WAI 2024). This will also help to establish design fiction as a more credible practice and bridge the gap between imagination and provocation and more tangible outputs, supporting its implementation in the design process and its application in industry settings (Lindley et al. 2014).

Alongside key concepts of noise, mindfulness, speculative design practice, accessibility, and usability evaluations, the role of creative practice is also central to this research project because of its capacity to generate new knowledge through creative processes (Frayling 1993; Smith and Dean 2009; Nelson 2013). Unlike traditional research, the outcomes of this project are products of knowledge rather than outputs used for illustrative purposes to communicate knowledge (Nelson 2013). In the context of my creative process, imagination and intuition are used as valid forms of concept development (without technical constraints) and illustrated narrative creation (Bleecker 2009; Gannon and Fauchon 2021). Alongside these aspects, the use of reiteration is also fundamental to my creative process because it enables me to generate insights and demonstrate knowledge from cycles of reiterative processes (Frayling 1993; Zimmerman et al. 2007). Furthermore, reiteration enables the

creation of hand-drawn provocations as well as creative practitioner reflections through engagement with a wide range of tools and materials (from sketching concepts with pencils and pens on paper to printing 3D prototypes and finalising illustrated narratives digitally) that rely less on technical rationality, written analysis, and statistical measurements (Zimmerman et al. 2007; Zimmerman et al. 2010). In this project, hand-drawn provocations are defined as illustrated narratives with a speculative framing that aim to stimulate discussions and provoke debate (Bleecker 2009; Dunne and Raby 2013; Coulton et al. 2016).

While reflection-in-action is a valid way of thinking and a space for understanding and knowledge-generation to emerge (in the process of designing and illustrating), reflection-on-actions allow analysis and articulation of that knowledge and insights after the creative process has ended (Schön 1984). In this project, reflection facilitates the articulation of my growth and development as a creative practitioner and enables me to assess the impact of the work on my role as an illustrator and researcher. Overall, this type of research allows me to produce different types of knowledge, such as hand-drawn provocations and unconventional strategies of illustrated narratives for speculative design practice and innovation, which would not be possible through conventional research methods alone. Therefore, this project employs practice research, which I describe in Section 4 (see pages 17–18).

## 4. Phase 1 – Practice

This research project consists of two phases. The first phase comprised practice research. It involved four methodological stages, which are briefly introduced in this section. The first part of this phase was titled 'Stage 1: Developing Ideas from Design Challenges and Proposals'. The design challenges were identified through a literature and practice review. The design challenges were used as starter points by the designer to develop proposals. They then informed further practice. The second stage of this phase was titled 'Stage 2: Creating "What If" Scenarios'. The three design challenges and proposals were used to generate three 'what if' scenarios. According to Markussen and Knutz (2013), 'what if' scenarios are 'the basic construal principle of design fiction'. This method helped the designer to create speculative scenarios for the *diegetic prototypes*. The third stage in the practice phase was titled 'Stage 3: Designing Diegetic Prototypes'. In this project, a diegetic prototype is defined as a fully functioning technology that exists in an imaginary/fictional narrative (Sterling 2005; Bleecker 2009; Kirby 2010; Dunne and Raby 2013). Following the generation of the 'what if' scenarios, the designer experimented to create three diegetic prototypes in response to these scenarios. This stage focused on software and hardware prototyping to develop diegetic prototypes called Birds app, Yoshi Phone, and Shapie.

The fourth part was titled 'Stage 4: Writing, Designing, and Illustrating Design Fiction Narratives'. At this stage, the three 'what if' scenarios and three diegetic prototypes were used to create design fictions in the form of user manuals and illustrated visual narratives. These design fictions were orientated towards the expert review to stimulate debate (Bleecker 2009; Dunne and Raby 2013). This stage involved writing user manual texts for the Birds app, Yoshi Phone, and Shapie prototypes. It also involved working with screenwriter George Forster to develop different types of promotional narratives for these diegetic prototypes. The user manuals and promotional narratives were created using monochrome hand-drawn illustrations and then designed using Adobe Photoshop software. They were then displayed on the designer's website for review. This phase also involved building and maintaining relationships with industry professionals through social media, who were later invited to contribute to the expert review phase and provide feedback on the designs.

## 5. Phase 2 – Expert review

The second phase of this project comprised the expert review. This section briefly introduces the steps used in this phase and also explains how practice fits into the expert review and the reasoning behind this. Expert review is a usability inspection method used by industry professionals in UI design (Nielsen and Molich 1990; Nielsen 1994; Rosenzweig 2015). It enables debate between expert reviewers to test whether illustrated narratives can provoke and facilitate usability and accessibility assessments, as well as generate insights for the design process and opportunities for big tech companies. The diegetic prototypes and illustrated narratives were then distributed alongside the expert review to industry professionals with specialist knowledge and professional experience of UI or UX design (Nielsen and Molich 1990; Nielsen 1994; Mayhew 1999; Rosenzweig 2015). The feedback from these professionals was then collected and analysed.

This project ended with feedback collection and analysis. This involved designing an expert review using Microsoft Forms software and recruiting industry professionals – aged 18 and over and not in vulnerable groups – to participate in the expert review. The recruited industry professionals were then provided with a participation sheet and asked to sign a consent form. After receiving the signed consent forms, these professionals were then sent the expert review, together with the illustrated narratives. Collected feedback was stored on OneDrive. The feedback was anonymised and then analysed using a coding technique (Saldaña 2009).

## 6. Thesis structure

This thesis comprises six chapters. In addition to these chapters, this research also comprised a practice element. Therefore, the documentation and outcomes of the practice research have been

integrated into this thesis in Chapter 3: Phase 1. A summary description of each chapter is provided next.

Chapter 2 (Literature and Practice Review) explores traditional UI and UX design approaches and how they hinder innovation. This is followed by an analysis of the design fiction approach and how it can advance the innovation processes of large IT companies. Design approaches and requirements that enhance the UX are then reviewed. The chapter also reviews illustration practice and introduces narrative theory that informs it. The chapter concludes with three design challenges and proposals to create less noisy digital interfaces and discusses how these could benefit big tech companies.

Chapter 3 (Phase 1 – Practice) provides the reasoning for the choice of practice research and the research through design approach. It also discusses the use of four design fiction stages to develop hand-drawn interfaces and mindful and touch-rich interactions, which were adapted from 'The Poetics of Design Fiction' framework (Markussen and Knutz 2013). The chapter validates the 'what if' scenarios, diegetic prototypes, and design fiction narratives selected for this research project. This is followed by an exploration of the role of illustration as provocation. It also documents the development of the diegetic prototypes and narratives and presents the results of the Yoshi Phone and hand-drawn interfaces, the Birds app and mindful interactions, and the Shapie and touch-rich interactions. The chapter concludes by describing the unexpected insights gained from working with writers to produce the design fiction narratives and the impact on practice research, as well as presenting the practices used during the COVID-19 lockdown and associated restrictions.

Chapter 4 (Phase 2 – Expert Review) describes the second phase of the project. It provides the reasoning for selecting the expert review method and criteria for the expert reviewer, which is then followed by the expert review design. This chapter then focuses on the development of the eligibility, feedback, and demographics questions. This is followed by an overview of the expert review process. The results of the expert review are then analysed by applying a coding technique, which examines open-ended comments. The chapter then concludes with the results of the expert review analysis.

Chapter 5 (Discussion) discusses how the Yoshi Phone and hand-drawn interfaces, Birds app and mindful interactions, and Shapie and touch-rich interactions can stimulate debate, inspire the design process, and provide innovation opportunities for large IT companies. It also summarises the research findings and demonstrates how the research questions have been addressed. The chapter also identifies the limitations of this research project and provides insights and recommendations for future research.

Chapter 6 (Methodological Advances) describes how this project provides new knowledge. It focuses on four methodological aspects in the fields of design, design fiction, illustration, and UI and UX design. This chapter also suggests how these aspects advance these fields and provide value for big tech companies.

# CHAPTER 2

# LITERATURE AND PRACTICE REVIEW

This chapter provides a review of traditional design approaches and identifies a research gap in these approaches that is limiting UI design: how the role of ideation could be advanced through the use of illustrated narratives. The chapter also discusses design fiction and explores how this method is used by large IT companies, as well as identifies a gap in how such companies could benefit from methodological advances in the use of illustrated narratives. Following this, the chapter examines design approaches and requirements that enhance UX and how design fiction can facilitate this and identifies a gap in its methodological advancement. Furthermore, the chapter reviews illustration practice and narrative illustration theory and identifies a further research gap related to the methodological advancement of illustrative narratives.

## 1. The limits of traditional user interface design approaches

This thesis defines traditional design approaches as *mental models* and UI design principles that are currently used to develop conventional digital interfaces (Norman 2013; Cooper et al. 2014; Johnson 2014; Shneiderman et al. 2016). Traditional UIs are built by using conventional HCI mental models (Norman 2013). According to Norman (1983, 2013), users form mental models based on their 'experience, training, the appearance and behaviour of the system'. Norman (1983, 2013) argued that people form mental models of objects that they interact with and that they rely on their past experiences to navigate interfaces. Regarding experience, users expect interfaces to work as physical actions (Norman 1983, 2013). For example, a shopping trolley icon is based on the physical experience of shopping, which is now associated with the use of a digital shopping trolley (Tidwell 2010). Regarding training, users expect to use interface elements that they have seen before on other websites and learned to use previously. For example, a search bar with a magnifying glass icon is associated with user expectations of the ability to input words to locate online information. Users expect to see a search tab on websites if they need to search for information (Nielsen 1993; Tidwell 2010). This functional element can be found on the Google, Facebook, and Microsoft websites, the Amazon shopping app, and Apple and Android devices. This suggests that mental models provide users with expectations and predictions on how a system operates and influence their decisions on how they interact with the interface (Norman 1983, 2013).

Based on mental models, traditional UI design principles are focused on repetition, consistency, predictability, and familiarity (Tidwell 2010; Norman 2013; Johnson 2014). Through the repetition

of design elements, designers aim to achieve two goals. The first is to provide a consistent and intuitive UX and make users more familiar and comfortable with using a product (Norman 2013; Johnson 2014; Shneiderman et al. 2016). The second goal is to create and maintain design consistency (Norman 2013; Johnson 2014; Shneiderman et al. 2016). Both of these aspects are evident in the Apple 'Human Interface Guidelines' (Apple 2025a) and Google 'Material Design Guidelines' (Google 2025), which provide guidance, components, and tools for UI and UX designers to achieve these goals. Regarding UI design standards, repetition appears to have positive connotations because it enhances usability and UX by reducing user *cognitive load* (Norman 1983; Sweller 1988; Shneiderman et al. 2016). In addition, the main advantage of using existing mental models for UI design is that it reduces user cognitive load (Norman 1983; Sweller 1988). Based on Sweller's (1988) theory, users can process a limited amount of information when they are learning. When users are exposed to a standard and familiar interface, it reduces their learning curve, making it easier for them to learn to use it (Norman 1983; Sweller 1988). Another advantage is that the use of conventional design elements (such as a shopping trolley or search bar) across multiple platforms, apps, and devices creates a familiar, consistent, recognisable, and intuitive UX (Tidwell 2010; Shneiderman et al. 2016). This idea should be considered with caution, as repetition may also have negative connotations, as it is deliberately used to reinforce user impressions of a brand or a certain image (Shneiderman et al. 2016). This analysis means that traditional UI design aims to align interfaces with existing mental models by reducing user learning curves.

There are several disadvantages to prioritising the use of mental models and conventional UI design principles rather than creating non-standard interfaces and unusual interactions. The main disadvantage of unconventional interfaces is exposing users to unfamiliar patterns that they cannot recognise (Norman 2013). This unfamiliarity can be a challenge when designing unconventional UIs because the unfamiliar design increases user cognitive load as they must learn new ways of interacting (Norman 1983; Sweller 1988; Shneiderman et al. 2016). However, this negative impact on user learning can be mitigated by designers educating users on how to use the interface. From the design process perspective, the standards for functional UIs sought to make designing usable interfaces easy and without errors for designers and developers (Norman 1983; Raskin 2010; Cooper et al. 2014; Shneiderman et al. 2016). Furthermore, Gaver (2012) argued that design is orientated against change to the status quo, which suggests that there may also be resistance to considering or designing interfaces with unfamiliar patterns.

When the development of a product is only focused on usability aspects, the outcomes are conventional and lack originality, imagination, and meaningfulness (Kolko 2011). Kolko (2011) also argued that this focus should be on designing meaningful experiences for users rather than usability. Kolko (2014) further argued that conventional design practices obstruct innovation by focusing on

product consistency rather than users' emotional resonance. This idea should be considered with caution, as unfamiliar design outcomes have usability issues (see the more detailed analysis of usability in Section 4 (pages 33–35)). Furthermore, Schwab (2017) explained that while the Third Industrial Revolution focused on the shift from analogue to digital technology, mental models and standard UI processes enabled the design of interfaces for apps, websites, devices such as desktop computers and mobile phones, as well as their operating systems (OS) and software. However, the Fourth Industrial Revolution shifted the focus from digital technology to new technologies, in which the physical, biological, and digital worlds merged, meaning that new ways of interacting are also needed (Schwab 2017). This suggests that traditional UI design approaches are outdated and limit how users interact with devices.

Owing to the excessive focus of traditional usability methods on efficiency, minimising cognitive load, and reducing user errors, disciplinary stagnation has occurred, limiting innovation regarding habit-forming technologies, digital wellbeing issues, and screen time overuse (Dourish 2001; Sengers et al. 2005; Piwek et al. 2016). Norman (2013) acknowledged that traditional UI and UX approaches potentially hinder innovation because they rely on usability rather than creativity and experimentation. Dourish (2004) critiqued the constraints of traditional HCI models because they primarily focus on usability but fail to address the emotional and long-term impacts of technology use. Sengers et al. (2005) argued that traditional UX approaches are an assumption of *designing well* because they only reinforce the design of error-free, efficient, and satisfying interactions while discouraging reflective design thinking on the cultural and social implications of long-term use. Piwek et al. (2016) explained that current usability methods lead to outcomes that encourage compulsive use rather than supporting long-term digital wellbeing goals and healthy digital habits. This indicates that digital wellbeing issues are a consequence and a symptom of an innovation gap that needs to be explored further (the exploration of these issues and how design can address them begins in Section 6 (page 42) and continues to the end of this chapter). This also poses the question of whether the use of unconventional design approaches is a better way to develop UIs and UXs to avoid innovation stagnation.

## 2. Design process and ideation

There are many design processes in traditional UI/UX industry practice; however, they fundamentally share the core principles of user research, problem definition, ideation, prototyping and evaluation (Cross 2006; Rogers et al. 2011; Gaver 2012; Knapp et al. 2016; International Organization for Standardization [ISO] 2019; Gothelf and Seiden 2021; Design Council 2026a). In this thesis, design process is defined as a 'family' of frameworks and practices consisting of a series

of structured iterative activities that allow designers (and non-designers) to explore user needs, frame design issues, generate solutions to those problems, execute, and then evaluate them (Cross 2006; Rogers et al. 2011; Gaver 2012; Knapp et al. 2016; ISO 2019; Gothelf and Seiden 2021; Design Council 2026a). This is evident in traditional UI/UX frameworks used in industry, such as the *Sprint*, *Lean UX* and the *Double Diamond* models among others (Knapp et al. 2016; Gothelf and Seiden 2021; Design Council 2026a). Furthermore, this type of iterative practice is also applied in *Design Thinking*, *Research Through Design*, and *Human-Centred Design* approaches (Cross 2006; Gaver 2012; ISO 2019). To provide context for each principle of the design process (found in the models and approaches described previously), they are briefly described next. First, the user research phase is a study of users and their contexts, as well as operating systems that establish a basis for the design decisions. Second, the define phase involves interpreting user research findings, which inform articulation of design issues as well as user needs and constraints. Third, ideation entails generating and exploring multiple design prospects, which enables the identification of the most promising directions for prototyping. Finally, evaluation involves testing prototypes (for example, through usability and accessibility evaluations or other types of assessments) to identify gaps and needs for further refinement. These activities are non-linear and typically include several iterations of the different phases or of the whole sequence (Design Council 2026a).

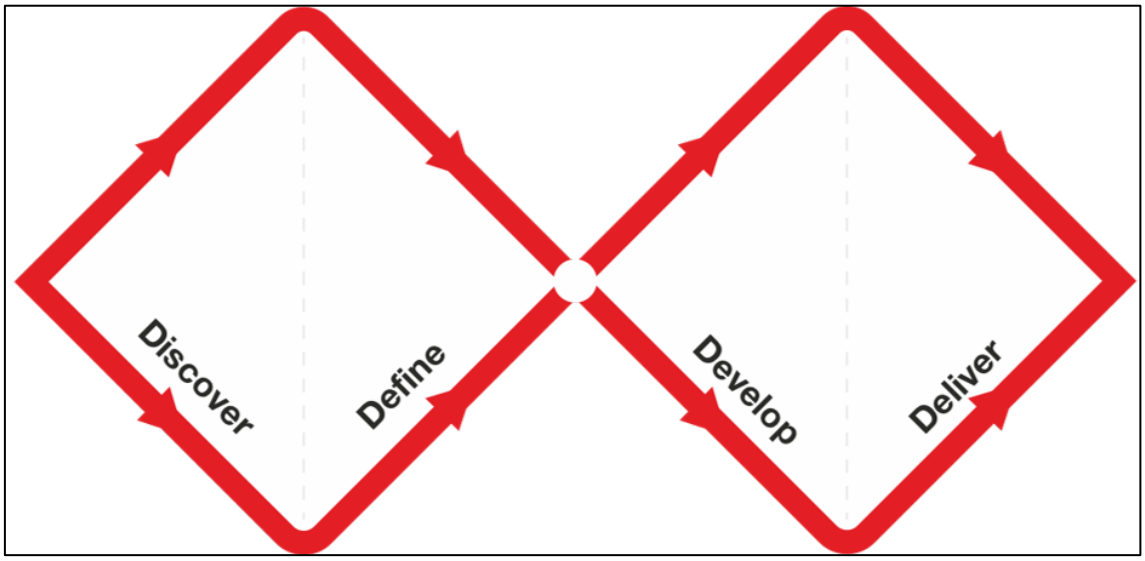



*Figure* 1. *The Double Diamond model.*

In the context of the design and innovation process for developing communication devices in the UK, the Double Diamond model (see Figure 1) is a universally accepted framework consisting of four stages that are independent of specific tools or methods (Design Council 2026a). This source should be approached with caution because the Design Council is an organisation that specialises in all design disciplines and provides advice on national design strategies in the UK (Design Council

2026b). The two diamonds represent two main principles: divergent thinking (exploring the issues in more depth or width) and convergent thinking, which focuses on taking guided action (Design Council 2026a).

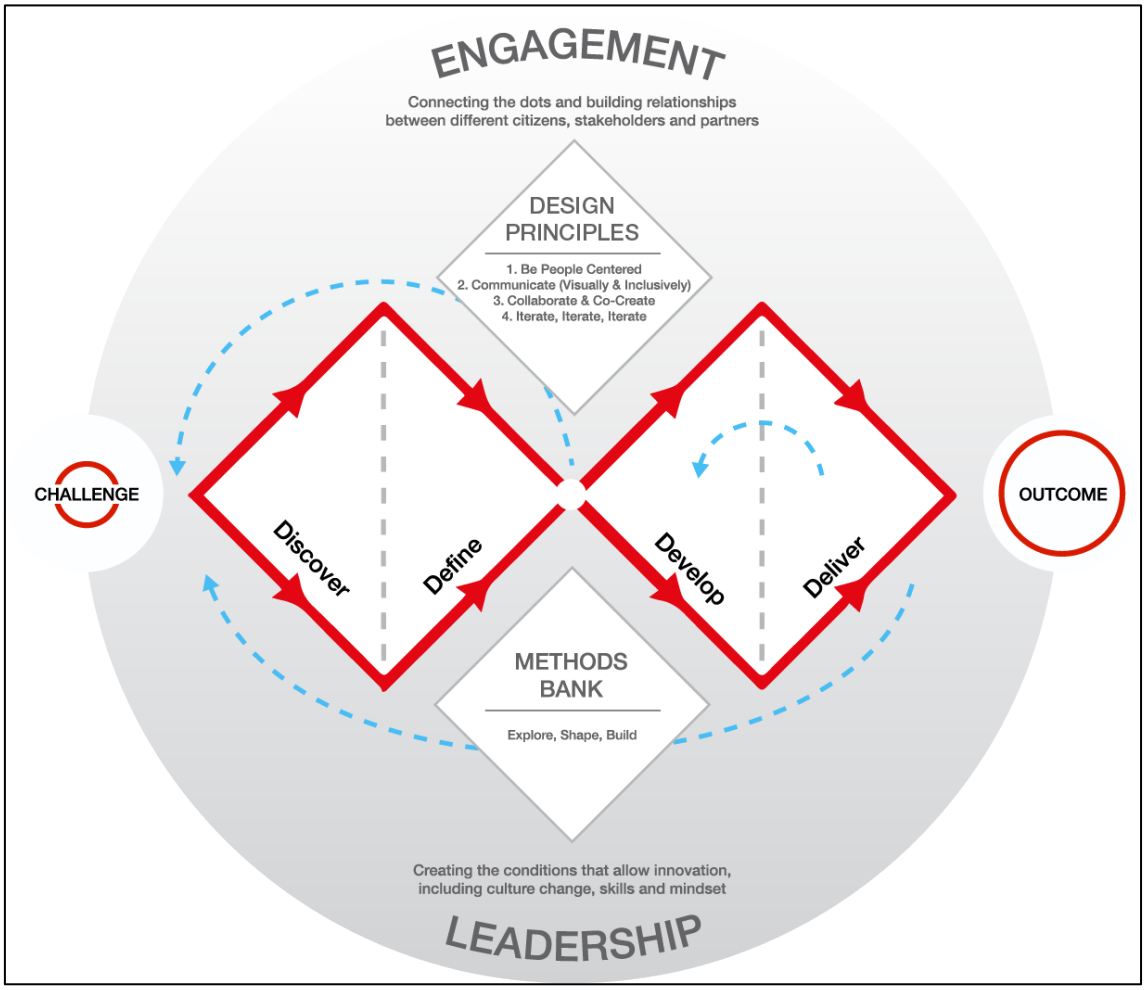



*Figure 2. The Double Diamond model explained.*

The first diamond consists of the *discover* and *define* steps. The discover step enables an understanding of the issue(s) – instead of problem assumption – and involves conducting research with users affected by the problem. The define step focuses on defining the challenge gained from the insights from the discovery phase. The second diamond consists of the *develop* and *deliver* stages. The develop step is aimed at producing alternative solutions to the defined problem, including seeking inspiration and co-designing. The Double Diamond model does not have an ideation phase; however, the ideation phase would ideally sit within the first stages of the develop step in this model. The deliver step focuses on testing solutions, which then informs the selection of solutions to progress. As previously mentioned (see page 24), this type of design process is non-linear, as it promotes iteration as well as the design principles of user-centred design, visual communication, inclusion, collaboration, and co-creation (see Figure 2).

In this thesis, I am particularly interested in exploring how innovation can be best applied in the ideation phase of the design process and what advantages it can provide for those who employ it. I am particularly fascinated with the idea of how speculative design practice and the use of illustration can be employed to advance the ideation stage. Several designers and researchers have explored the use of illustration, sketching, and drawing in the design process. From a HCI perspective, illustrated storyboards are mostly used to provide visual scenarios where technology use is envisioned (Carroll 1995, 2000). Buxton (2007) advocated for the use of sketching and storyboarding to illustrate and explore UXs in the early stages of the design process, including ideation. Rogers et al. (2011) established that storyboards are a universally accepted method because they facilitate user-centred practice, enable design thinking, and act as a communication tool. Compared to traditional ideation techniques such as sketching and storyboarding, Lewis and Sturdee (2024) proposed combining the use of drawing and design fiction in software and hardware design, which could be used as a method by designers in their design processes. Building on this research, I propose the use of illustration during ideation in the design process to enable innovation, which would provide a framework for designers and big tech companies to use in their innovation process.

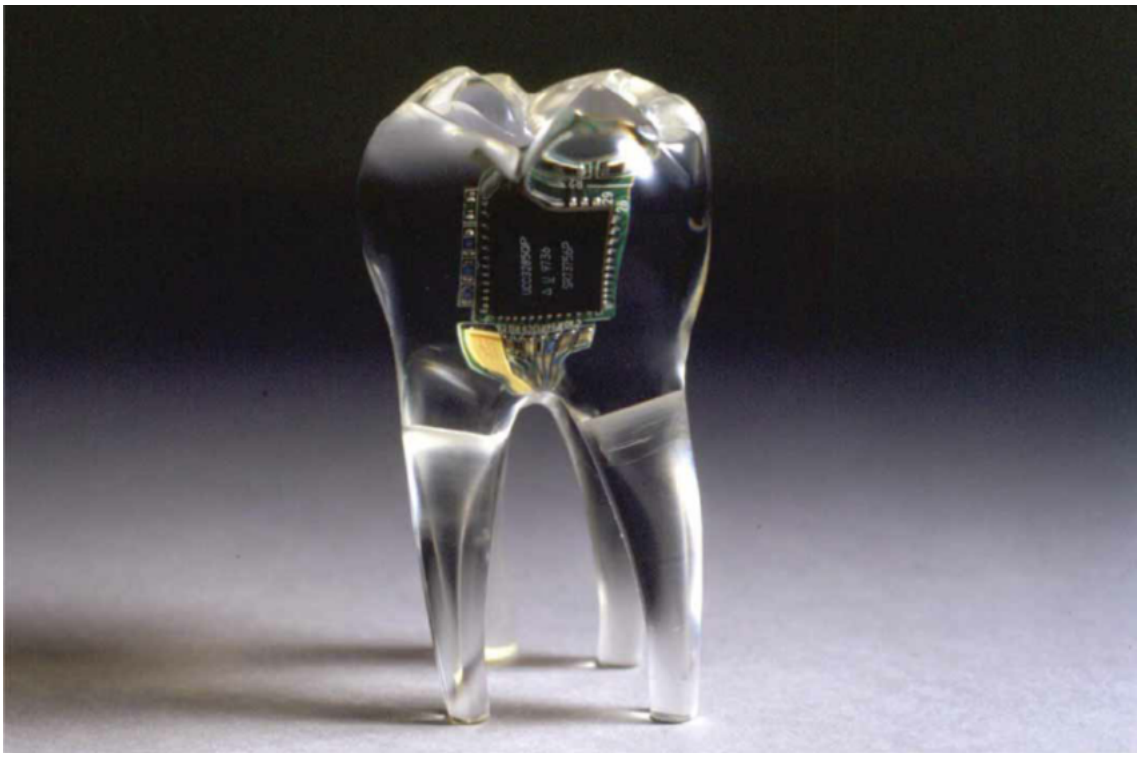


*Figure 3. Audio Tooth Implant.*

*Figure 4. Iso-phone.*

In the context of designing personal communication devices, speculative design is not a new practice; a few notable examples include the 'Audio Tooth Implant' (see Figure 3) by James Auger and Jimmy Loizeau (2000) and the 'Iso-phone' (see Figure 4) by the Human Connectedness research group (Auger et al. 2003). The Audio Tooth Implant prototype works by being embedded in a user's molar and is able to receive phone calls. The Iso-phone is a communication device shaped like a helmet, which users wears underwater (Auger and Loizeau 2000; Auger et al. 2003). Compared to industry illustrators, there is a lack of singular illustrators in academia working at the intersection of UX design, illustration, and speculation. This is because such projects are mainly collaborative and focus heavily on the development of prototypes. For example, this is evident in the Design Fiction as World Building project, where four researchers collaboratively work on the creation of two design fictions. One of the outcomes is the four-page 'Voight-Kampff Machine Design Fiction Comic', which is illustrated by Miriam Sturdee (see Figure 6) (Coulton et al. 2017).

However, in contrast to traditional UX and design fiction narratives, interfaces can also be visualised through narrative illustration, which is especially evident in graphic novels. For example, the *Mooncop* graphic novel by Tom Gauld (2016) is set in a futuristic imaginary world and illustrates the life of the last policeman left living on the moon. The illustrated narrative includes depictions of imaginary interfaces, such as personal police devices (which provide reminders to complete quarterly crime

reports or send messages) (see Figure 5), and self-service outlets, such as a digital doughnut kiosk. Similar to Sturdee's work, this graphic novel employs a palette of blue shades. Expanding on this body of work, further research is needed to test and establish whether illustration as a speculative practice could be used in the ideation phase, which could encourage graphic designers and illustrators to employ this method in their practice.

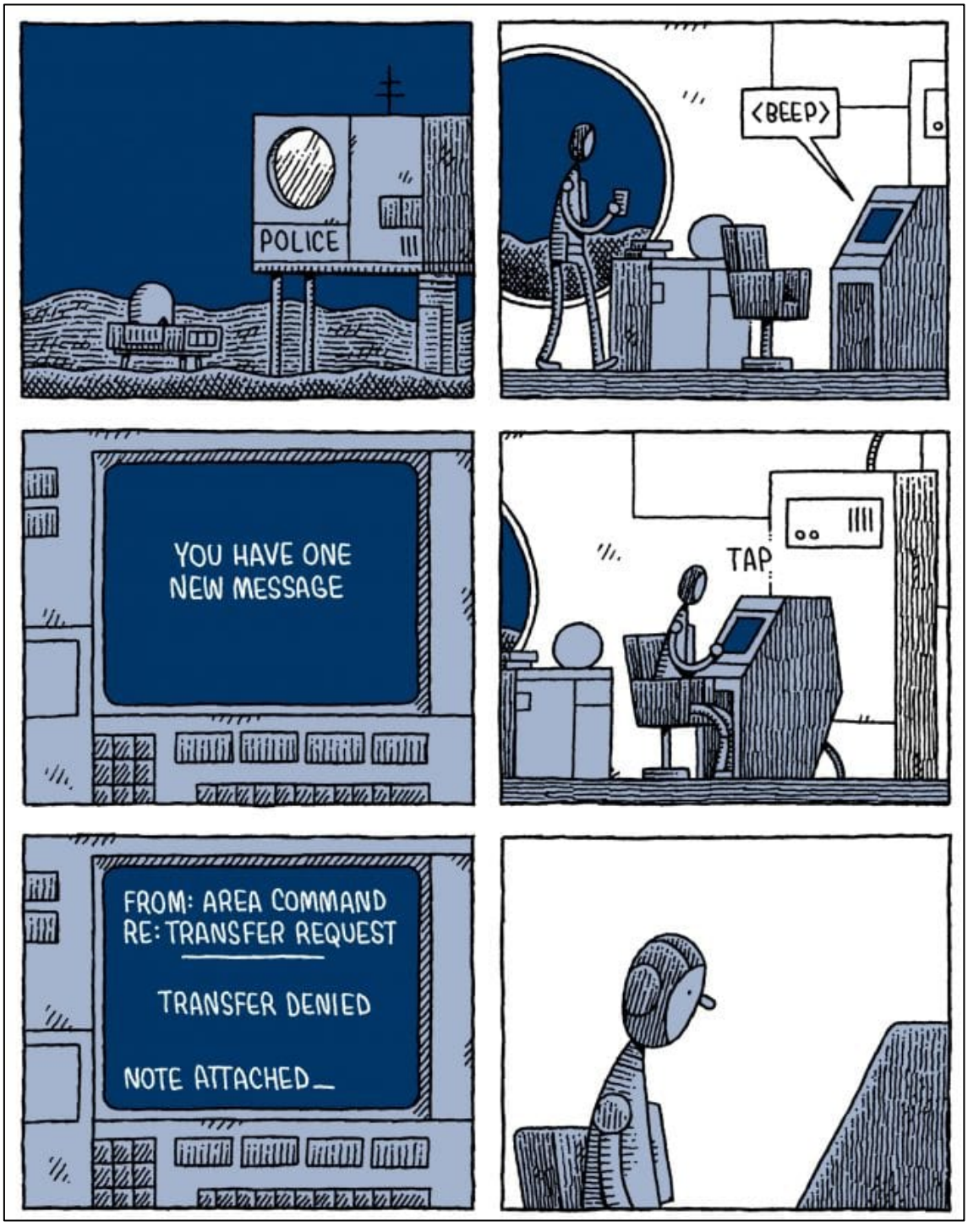



*Figure 5. Excerpt from the Mooncop graphic novel.*

## 3. Design fiction and its value for large information technology companies

Unlike traditional UI design, critical design and design fiction both focus on designing outputs that provoke debate rather than creating functional prototypes (Bleecker 2009; DiSalvo 2012; Auger 2013; Dunne and Raby 2013). Another similarity of these two design practices is that they aim to challenge conventional design norms and use speculation and artefacts to do so (Bleecker 2009; Dunne and Raby 2013). Both of these approaches are intertwined with speculative practice; however, they also have a core difference. Critical design focuses more on the design of artefacts to critique the present, where the narrative may not be central or may even be absent (DiSalvo 2012; Dunne and Raby 2013; Malpass 2017). In contrast, design fiction emphasises imagination and provocation and the expression of speculative narratives through fictional prototypes (Bleecker 2009; Dunne and Raby 2013; Malpass 2017). Furthermore, design fiction is considered an extension of critical design because it can situate critical design objects by incorporating them into speculative scenarios (Bleecker 2009; Dunne and Raby 2013; Malpass 2017). The advantage of this is that design fiction narratives can construct more tangible and comprehensible implications (Bleecker 2009; Dunne and Raby 2013).

Sterling (2005) argued that critical design challenges the role of the designer in solving problems and 'innovating mindlessly' because it requires the designer to think critically and question everything as the basis of design practice. On the one hand, Dunne and Raby (2013) suggested that commercial design focuses on 'problem-solving', 'serving the industry', and 'design for production and innovation', while critical design is orientated towards 'problem finding', 'serving the society', 'design for debate', and 'provocation'. This suggests that critical design and design fiction are theoretically not orientated towards creating opportunities for big tech companies. On the other hand, Bleecker (2009) suggested that speculative design can be used as a tool for creating innovations. Sterling (2005, 2009) also argued that design fiction can be used to innovate and inform business decisions in the economic and technological domains. Speculative research can also facilitate experimentation, invention, attention, and new habits, which are vital when designing for the future (Wilkie 2019). Furthermore, design fiction can be used to imagine future products and explore their implications, generating insights that can be applied to design in the present (Sterling 2005; Bleecker 2009; Dunne and Raby 2013). As such, design fiction can facilitate debate as well as innovation. Therefore, this research aims to test whether the use of illustrated narratives can generate industry-oriented opportunities by stimulating debate, which would be valuable for large IT companies that apply this method in their design fiction processes.

Another significant advantage of design fiction practice is that it does not have technical constraints, unlike traditional UI and UX design (Bleecker 2009; Sterling 2009; Dunne and Raby 2013; Lindley et al. 2018). According to Bleecker (2009), technical limitations are needed when designing for mass

production; however, the removal of technical limits is needed to foster imagination, creative exploration, and innovation, as well as provocation, when using design fiction. Bleecker (2009) also explained that design fiction is orientated towards active and thoughtful imagination and confronting assumptions about products rather than focusing on product design. The objects aim to generate new ways of thinking and provide a critical perspective (Bleecker 2009). Similarly, Sterling (2009) advocated that designers should focus on imaginative thinking rather than technical limitations. Furthermore, speculative design focuses on the design process to provoke a deeper understanding of design rather than creating commercial products (Dunne 2006; Auger 2013; Dunne and Raby 2013). Alternatively, researchers have suggested that design fiction can be product-led by applying the Design Fiction as World Building approach, which focuses on designing products that are free from the technological constraints of traditional design (Coulton et al. 2017; Lindley et al. 2018).

In contrast, the limitation of design fiction practice is that it lacks imminent and timely practical solutions that are orientated towards the real-world applicability of traditional UI or UX design (Dunne and Raby 2013; Blythe 2014; Coulton et al. 2017). Unlike design fiction, traditional UI and UX practices can be an effective day-to-day approach because they are orientated towards user-focused practical solutions and are grounded in real-world application (Norman 2013; Cooper et al. 2014). Alternatively, Bleecker (2009) suggested that design fiction can provide innovative ideas and discussions that are valued by big tech companies because they mitigate corporate sameness and conventions. Furthermore, Michaud (2021) argued that big tech companies search for new creative ideas that can only be facilitated by stimulating the imagination. Michaud (2021) explained that these imaginations must then be directed towards exploring both financial benefits and profitability. Unlike conventional problem-solving, design fiction is a link between imagination and speculation and practical application and implementation, which can enhance tangible design innovation processes in big tech companies (Bleecker 2009; Dunne and Raby 2013). This means that design fiction's value is in the ideas and stimulated imagination that stem from debate and speculative design provocations.

Large IT companies use unconventional design approaches such as design fiction to innovate (Michaud 2020). According to my review, these design fiction approaches can be grouped into two categories. The first is a group of design fiction methods that are used to innovate during in-house design processes, which may not be orientated towards public presentation. For example, Near Future Laboratory (2025b) offers a wide range of services, such as design fiction or innovation workshops, seminars, keynotes, talks and panel discussions, as well as retreats, off-sites, and summits. This information source should be considered with caution as it is orientated towards design fiction commercial services and selling publications and kits. Near Future Laboratory is 'a creative design fiction, innovation, technology, and strategy studio' founded by Julian Bleecker that focuses on design

fiction practice and has worked with clients including Google, Amazon, Apple, Meta, Netflix, and Logitech, among others (2025a, 2025b).

These services are orientated towards showcasing how design fiction pushes boundaries by using speculative prototypes and narratives; discussing the unplanned consequences of new technologies, such as ethics and responsibilities; fostering collaborations between departments; and using design fiction as an ideation technique to imagine possible future services, UX scenario products, and prototypes (Near Future Laboratory 2025b). The studio also publishes books, including the *TBD Catalog*, and kits such as The Work Kit of Design Fiction, which are aimed at people applying design fiction to introduce more imagination into day-to-day operations (Near Future Laboratory 2025c). For example, the *TBD Catalog* relies on the use of photographs, photographic collages, and digital illustrations (Near Future Laboratory 2023). However, many of its examples appear to be generic photographs and illustrations downloaded from stock imagery rather than authentic illustrated works created by illustrators and/or graphic designers. This then poses the question as to whether the promotion of illustrated narratives could help facilitate similar outcomes, as well as how illustrators and graphic designers could be involved in in-house innovation design processes.

The second group comprises various design fictions created by or for big tech companies that are orientated towards public presentation, such as films and concept videos (Kirby 2010; Pasman 2016). Kirby (2010) suggested that diegetic prototypes are depicted in Hollywood movies to test future technologies with large audiences, representing potential collaborations between big tech companies and the film industry. Pasman (2016) analysed the use of video media in concept videos developed by or for big tech companies. He suggested that high-quality images, video effects, music, camera movements, and interface designs are used to depict high-tech. This is evident in the video concepts *Microsoft: Productivity Future Vision*, *A Day Made of Glass* and *A Day Made of Glass 2* (Corning Incorporated 2011, 2012; Microsoft in Business 2015). Building on Pasman's (2016) observations, it can be argued that the production of such outcomes must be costly. From an illustrator's perspective, this prompts the question of whether the use of illustrated narratives could be more cost-effective for large IT companies than concept videos.

Unlike traditional UI and UX design, another significant advantage of design fiction is that by stimulating debate, it can identify the ethical, legal, political, and social implications of the design (Bleecker 2009; Dunne and Raby 2013). Norman (2013) suggested that design should first focus on profitability and usability rather than ethical implications. Furthermore, designers should not be solely concerned with UI and UX ethical concerns because these should be addressed by experts in ethics, law, and policy and follow protocols associated with these areas of expertise or developed through collaboration with the specialists and designers (Verbeek 2011; Floridi 2015). Alternatively, Kelly

(2016) argued that ethical concerns slow down innovation; therefore, ethical implications should evolve alongside technological advances and be addressed after the design process rather than before. In contrast, researchers have suggested that design fiction should prompt questions such as 'What kind of impact do these prototypes have on people and their environment?' and explore the potential implications of the technology (Lindley et al. 2017). Recent research has also proposed that digital interface design should consider not only aesthetics but also critical and ethical aspects (Stopher et al. 2021). For example, design fiction was used to test the ethical, legal, and social configurations of sensing and tracking technologies and their proposed designs (Wong et al. 2017). It has also been used to explore ethical tensions in UX design practices (such as manipulation and persuasion), dark patterns, and conversational UIs (Gray et al. 2018; Nelissen and Funk 2022; Sánchez Chamorro et al. 2023; Mildner et al. 2024). Furthermore, Bleecker (2009) suggested that design fiction engages with the technical as well as ethical dimensions of a prototype at the same time. This suggests that design fiction is a tool to consider implications in UX and UI design as well as a tool to innovate.

## 4. Design approaches and requirements that enhance the user experience

There are many methods and definitions of how to enhance the UX when designing new products, services, and experiences. User feedback can be obtained through *user research*, *user discovery*, and *user-centred design* (UCD). User research enhances the UX because the insights into user needs and problems gained can validate design decisions, help to create better products, and enable stakeholders and designers involved in product development to understand how users experience products (Nielsen 1993; Kuniavsky et al. 2012; Norman 2013; Sharon 2016; Hall 2019). Similar to user research, user discovery focuses on identifying the market of users who will be potential customers for a possible product (Cagan 2008). It also focuses on developing and testing a product with customers and with the workplace teams responsible for its development (Cagan 2008). This method derives from the product development process and is particularly used by large IT companies and agencies that produce work for clients (Cagan 2008; Levy 2015). From a business perspective, it validates the needs of the companies and clients who invest in the development of such products using user research (Levy 2015). It is important to acknowledge that this study is industry-oriented and relevant methods should be considered; however, the main disadvantage of applying the user discovery approach is that this study does not involve working with or reporting to any direct clients and does not receive monetary investment towards prototype development. From a design perspective, this method is particularly useful when developing fully functional prototypes that are orientated towards mass production or use (Levy 2015). However, this study aims to produce diegetic prototypes; therefore, user discovery is not an appropriate method to use in this study (see also Section 3.2 in Chapter 3 (pages 65–67)).

User-centred design aims to enhance the UX by creating highly accessible and usable products (Gould and Lewis 1985; Norman and Draper 1986; Norman 2013; Shneiderman et al. 2016; ISO 2019). User-centred design is also defined as an iterative approach that relies on user needs and research into each step of its process (Gould and Lewis 1985; Norman 2013; ISO 2019). The main advantages of the UCD approach are its iterative design process, usability testing, and accessibility evaluation because these elements potentially improve the UX (Gould and Lewis 1985; Norman 1983; Nielsen 1993; Shneiderman et al. 2016; W3C WAI 2016). According to Nielsen (1993), the development of UIs should involve an iterative design process because this refines the design by using user testing and evaluation methods. As the aim of UCD is to develop highly usable and accessible products, it uses usability testing and an accessibility evaluation method to ensure these conditions and requirements (Norman 1983 Shneiderman et al. 2016; ISO 2019). Usability is defined as a requirement that focuses on ensuring that products, services, and systems are effective, satisfying, and efficient (ISO 2018). During such design processes, usability testing is used to identify inefficiency and dissatisfaction issues with a product and implement changes to enhance the UX (Gould and Lewis 1985; Nielsen 1993; ISO 2019). The word 'product' implies that this method is widely used in commercial settings – similar to user research, whose implications are analysed in the previous section (see page 32).

In contrast, Eason (2007) argued that UCD can have various definitions and interpretations, such as 'design by users', 'design for users', and 'design for users with users'. This suggests that the UCD approach involves different types of user involvement. According to van Velsen et al. (2022), designers should be cautious of how and when they involve users and stakeholders in their design process. These researchers note that designers should carefully consider how user insights are combined with their design skills and existing knowledge to produce outcomes (van Velsen et al. 2022). It can be argued that the UCD approach relies on user needs and user research, and users may not have the awareness and/or expertise to contribute effectively to a design process. This suggests that UCD can have various levels of user involvement in the design process, which can potentially impact the final design.

As well as usability testing, accessibility evaluation is beneficial for recognising and ensuring that products comply with legal requirements for users with disabilities and do not discriminate against such users (The Public Sector Bodies (Websites and Mobile Applications) Accessibility Regulations 2018; Government Digital Service and Central Digital and Data Office 2024; UK Government 2024; W3C WAI 2024). Recent policies also suggest that developing and integrating accessibility in digital tools and devices enhances the UX by designing for the inclusion of users with disabilities (W3C WAI 2016, 2022, 2024). Furthermore, adhering to ergonomic requirements and recommendations in

product design can also increase accessibility (ISO 2023). It is important to acknowledge that there is some overlap and connection between accessibility and the topics researched in this project. For example, noisy digital interfaces are a potential cause of anxiety and cognitive and attention overload for users with cognitive and learning difficulties (W3C WAI 2016). The issue for such users is that too much content causes a mental strain on their cognitive load because they have to differentiate important content from irrelevant content (W3C WAI 2016). However, accessibility guidelines focus on users with cognitive and learning difficulties but do not necessarily acknowledge that too much content can affect all users.

In contrast, it is a widely held view that accessibility requirements can enhance usability for all users, particularly for those who are in limiting situations (W3C WAI 2016). According to W3C WAI (2016), accessibility features can provide access for users with disabilities as well as enhance the UX for users who find themselves in situations that prevent them from using the internet to its fullest. For example, an appropriate contrast can improve access for users with visual impairments, such as colour vision deficiencies, and also provide a better experience for users in bright or dark environments (Morton 2016; W3C WAI 2016). The blog post by Richard Morton (2016) should be considered with caution as it is from the UK Government (the Central Digital and Data Office); however, it is appropriate as it focuses on raising awareness of using colour contrast in web design. Another theory considers that some users have age-related conditions concerning vision, hearing, and physical and cognitive abilities, which are limiting but are not considered a disability; therefore, designing for the elderly may be a similar process to designing for users with disabilities (W3C WAI 2016, 2024). Furthermore, according to the World Health Organization (WHO), a fifth of the world's population will be aged over 60 by 2050 (WHO 2024a). The WHO data should also be considered with caution because it is collected by WHO member states using national laws rather than international law, which may potentially differ in each member state (WHO 2024b). This means that healthy users may develop age-related impairments that also need to be considered when designing interfaces. This analysis indicates that accessibility is a crucial element in design and that designers should design products with accessibility in mind.

There is another overlap between accessibility and this project that is related to touch-rich interactions. There is considerable existing research into developing accessible tactile interfaces for blind and visually impaired users. This research aims to provide and/or improve access for affected users by designing touch-sensitive interfaces, better multimodal interactions, touchscreen gestures, and haptic feedback (Krajnc et al. 2011; Kane et al. 2013; Luthra and Ghosh 2015). This also focuses on solutions for blind and visually impaired users rather than all users who may benefit from touch-rich interactions. Despite the connections between these approaches, this project aims to develop solutions to distractive and 'cold' interfaces, mindless interactions, and touch-poor interactions for

all users of digital tools and devices, rather than focusing on disabled or elderly users. My project also focuses on developing diegetic prototypes rather than fully functional products; therefore, the guidelines for real-world products may not be appropriate. As such, I did not consider design approaches related to accessibility, such as UCD, in this project. However, it is important to acknowledge that accessibility issues can be challenging when designing unconventional interfaces, and I hope that design fiction can address accessibility issues in the same way as UCD (see Section 2 in Chapter 3 for a discussion on the reasons for rejecting UCD as a method for this project (page 61)).

Designers should evaluate the usability and UX of systems, products, and services regarding not only whether they are pleasant to use and provide satisfaction but also whether they comply with usability requirements regarding ergonomics and human factors (Nielsen 1993; Shneiderman et al. 2016; ISO 2018, 2019). As this project does not adapt established, traditional methods, such as user research, user discovery, and UCD, which enhance the UX, it poses the question of whether noise-reduced digital interfaces can be designed to be user-centric and potentially address accessibility issues without employing these UI and UX-related approaches. I argue that an unconventional approach, such as design fiction, is a valid method to create interfaces that aim to enhance the UX.

Usability issues can be challenging when designing unconventional interfaces (Norman 2013; Cooper et al. 2014). Recent research has argued that design fiction can provide a framework for designers to assess the UX of products (Blythe and Wright 2006). On the one hand, viewer responses to a narrative are subjective; therefore, diegetic prototypes can only be evaluated inconclusively (Blythe 2014) (see Section 5, which considers the viewer's subjective perceptions of visual narratives and how this can be mitigated by using methods that direct the viewer's gaze (page 38)). On the other hand, Penney et al. (2024) demonstrated that design fiction can anticipate user needs and ensure usefulness and usability. Design fiction engages with accessibility, as shown by research projects that have focused on designing wellbeing technology for older adults and accessible, inclusive, and diverse education solutions for schoolchildren (Ahmadpour et al. 2019; Sharma et al. 2022). A limitation of these studies is that their methods are based on co-creating design fiction, which involves user input similar to UCD approaches (Ahmadpour et al. 2019; Sharma et al. 2022; Penney et al. 2024). However, the advantage of this approach is that it enables designers and stakeholders to gain an understanding of how users may interact with interfaces that are positioned and visualised in a design fiction narrative (Tanenbaum 2014). This means that design fiction without user input can still potentially facilitate such assessments and conversations. However, no literature specifically suggests that design fiction can evaluate and address accessibility requirements when designing UIs. Notwithstanding this, this analysis suggests that design fiction is aware of accessibility requirements

and that these requirements can be addressed through a design fiction approach in the same way as traditional design approaches.

## 5. Illustration practice review and narrative illustration theory

Illustration practice is an established research method, and there are many ways it can be used to generate new knowledge (Gannon and Fauchon 2021). One way to generate originality is 'testing the transferability of an illustrative methodology within a new research subject' (Gannon and Fauchon 2021). There are many types of illustration practice; however, this project explores the use of narrative illustration, specifically in the field of design fiction. Narrative in illustration is also an established method to visually communicate with and engage an audience (Gannon and Fauchon 2021). Tanenbaum (2014) proposed that design fiction can be 'a tool for communicating innovations' to expert and non-expert audiences. She also proposed that design fiction can 'provide inspiration and motivation for design by exploring the design requirements with a fictional scenario' (Tanenbaum 2014). Lewis and Sturdee (2024) expanded this, stating that the use of drawing and design fiction can be used to inform software and hardware design. They also proposed that this method could potentially be adapted for use in design processes and teams (Lewis and Sturdee 2024). Building on these ideas, I am particularly interested in exploring how illustrative narratives can be used to identify innovation opportunities that could be beneficial for both designers and large IT companies, as well as the use of design fiction to stimulate debate (Bleecker 2009; Dunne and Raby 2013; Tanenbaum 2014). This indicates that illustrative practice is a valid way to contribute to new knowledge.

Regarding practice, the outcomes of design fiction are versatile, ranging from objects and prototypes to narratives and films (Blythe 2014). Based on my review, most speculative or design fiction narratives are created using film-based or photographic media in which design fiction diegetic prototypes are simulated as functional (Pasman 2016). For example, three out of 54 design fiction projects featured on the Postscapes website are illustrative work, with only one example using narrative illustration. The design fictions featured on the Postscapes website should be considered with caution because they are on the website of a company that specialises in following news and technology trends and receives profit from their services (Tracxn 2024). However, the use of this source was considered appropriate because it focuses on the technology trends. The lack of illustrative narratives could have been due to two reasons. On the one hand, it is easier and quicker to prototype design fiction using film, video-making, photography, and graphic design rather than illustration. On the other hand, creating design fiction through narrative illustration may be underrated and less explored by illustrators than filmmakers, video makers, photographers, and

graphic designers. This raises a question about whether illustration can be a better solution than film and video media.

There is a growth of examples of illustrative practice in both the academic and commercial environments. One example is the four-page 'Voight-Kampff Machine Design Fiction Comic' illustrated by Miriam Sturdee (see Figure 6), which is one of the outcomes from a group research project at Lancaster University (Coulton et al. 2017). Another example is Joe Hollier's monochromatic hand-drawn illustrations (2020a, 2020b) (see figures 7 and 8) as well as Daniel Zvereff's inverted monochrome hand-drawn animation (see figures 9 and 10) that is featured on the Light Phone website and blog, the purpose of which is to engage potential and/or existing users of the Light Phone (Hollier 2020a, 2020b; The Light Phone 2024). These examples show that illustrated narratives are a valid and appropriate method for use in both research and industry. This also shows that there may be a gap where illustration practice could advance and/or even promote the use of design fiction.

This thesis also builds on narrative theory, which can be applied in illustration. Many narrative theories could be used to develop illustrative work. However, in this project, theories on imagination and intuition, *negative capability*, *temporal order*, and *focalisation* were analysed to mitigate the issues regarding illustrated narratives (Kant 1781, 1790; Keats 1817; Genette 1980; Bal 1985; McCloud 2001; Kahneman 2012; Gannon and Fauchon 2021; Horstkotte and Pedri 2022). There are two types of limitations with narrative illustration: how it is created by the illustrator and how it is perceived by the viewer (Barthes 1977; Genette 1980; Bal 1985). These two limitations are addressed in the subsequent paragraphs.

First, there is no scientific formula to visualise and create narratives; rather, illustration practitioners use their intuition and imagination (Gannon and Fauchon 2021). This builds on negative capability theory introduced by the English Romantic poet John Keats (1817). Negative capability theory argues that an artist can generate outcomes 'without the pressure or framework of logic or science' (Poetry Foundation 2025). This theory also suggests that fact and reason should not be present when producing artworks 'to be negatively capable', and conditions such as uncertainty and doubt are part of the creative process to achieve it (Keats 1817). This theory could be applied to illustration, where the illustrative outcomes are produced by a practitioner's ability. This capability differs from scientific methods and reason because it cannot provide an author with a guarantee of the final results. Similar to Keats, Kant (1790) also suggested that natural abilities, such as the imagination of the 'genius', guide creative expression rather than scientific methods. Kant (1790) also proposed that humans can recognise 'beauty in art', which is based on a sense of aesthetics and emotion rather than reasoning. This can also be applied to illustration practice in which an illustrator is confident in their ability to

use their intuition to create visually appealing work. Furthermore, Kant (1781) argued that intuition enables humans to perceive space and form; therefore, it can be used to obtain knowledge. This idea can be applied to illustration, where the illustrator is instinctively able to recognise and capture composition and proportion in their work.

Two hundred years after Keats wrote letters about negative capability and Kant's ideas were published, these ideas have become foundational for illustration practice; however, it could also be argued that they are outdated. In this century, the concept of intuition has been expanded. For example, Kahneman (2012) proposed that there are two types of decision-making: fast and slow. He suggested that choices can be made quickly by intuitive thinking or slowly by logical thinking (Kahneman 2012). This suggests that illustrators may use instinctive thinking to make choices when creating work. This also correlates with Kant's ideas. In addition to these theories, there is evidence in the grey literature, such as in interviews with illustrators and designers on online platforms that showcase creative projects. In these interviews, the illustrators are explicit about their use of intuition when creating hand-drawn illustrations. For example, designer Aries Moross, who is known for illustrating campaigns for brands in hand-drawn type, describes using instinct to create work, and George Wylesol, whose work includes a series of published graphic novels as well as commissioned works, uses the term 'intuition-led' to describe his work (Ernst 2015; Milner 2018; Moross 2025; Wylesol n.d., 2025). These theories and ideas demonstrate that the use of intuition and imagination in illustration is a valid way to inform creative decisions.

Second, visual narratives are subjective; therefore, viewers can interpret them in many different ways (Barthes 1977). In addition to imagination and intuition, other tools to develop illustrated narratives include the use of panels, camera angles, composition, and framing devices to direct the viewer's gaze (Genette 1980; Bal 1985; McCloud 2001). According to Genette (1980), the temporal order concept focuses on how a sequence of events structures a narrative using past and future events and different time speeds and event frequencies. Regarding illustration and comics, a temporal sequence can be used to arrange scenes to tell a story, with each panel depicting a still moment, and the viewer grasps the story by bridging the gaps between the panels (McCloud 2001). For example, chronological sequences are widely used in scientific illustration because they guide the viewer, and this can be applied to the development of user manuals (Hodges 2003). This demonstrates that a sequence of panels acts as a narrative device to communicate a story visually by actively directing the viewer's gaze (McCloud 2001). McCloud (2001) expands this further, arguing that the panels in comics can successfully guide the viewer in the same way as the frames of a film. However, compared to film and video, illustration can show multiple perspectives simultaneously rather than being constrained by time-based framing. As previously mentioned (see page 36), most design fiction projects use video

or photographic media, and this insight validates the application of illustrated narratives to develop design fictions through the use of panels.

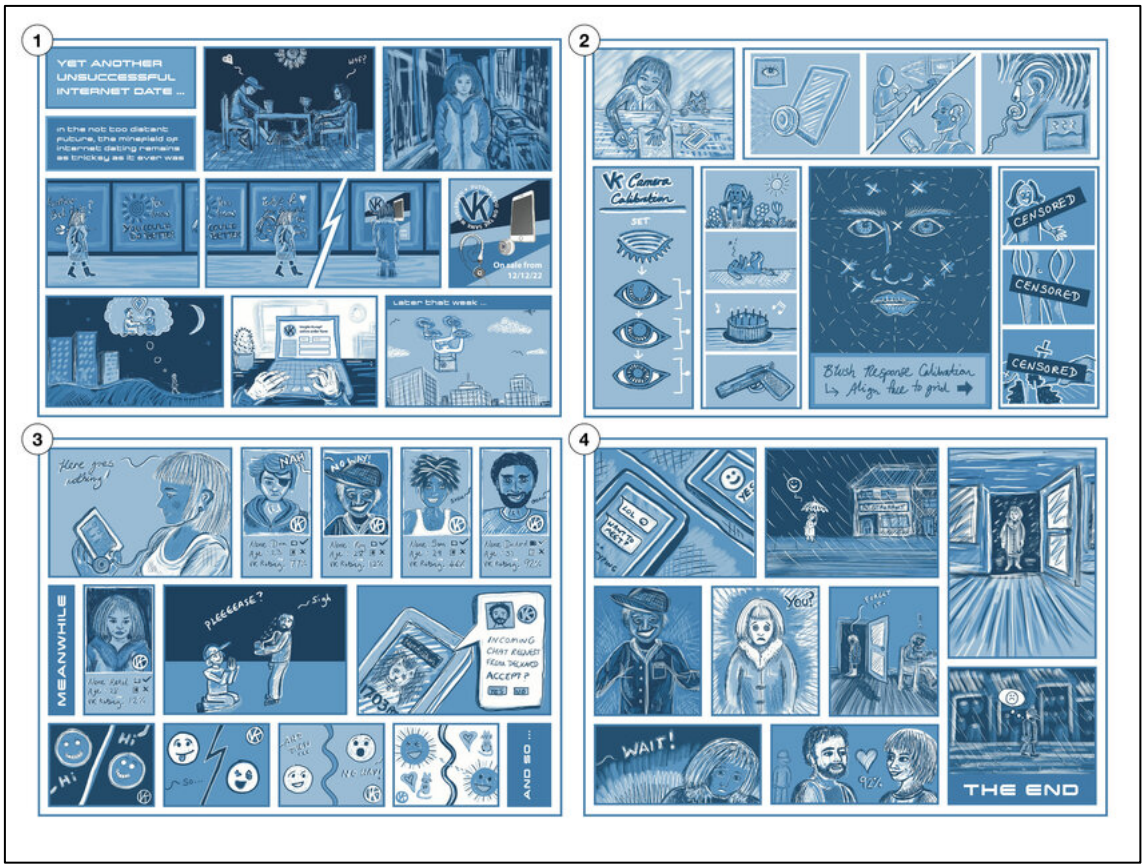



*Figure 6. Voight-Kampff Machine Design Fiction Comic.*

Camera angles, framing, and panel composition are used to create meaning and direct the viewer's gaze; this is based on Bal's focalisation theory (Genette 1980; Bal 1985). Bal (1985) proposed that there are two types of focalisations: internal and external. Internal focalisation focuses on depicting the story through the eyes of a character, and the viewer experiences it through their perspective (Bal 1985). External focalisation focuses on portraying the narrative outside of the character, with the viewer's gaze directed through a camera-angle perspective and without the direct feelings or thoughts of the character (Bal 1985; Eisner 2008). The use of focalisation in illustration and comics is an established way of visually communicating narratives that actively engage viewers (Horstkotte and Pedri 2022). For example, Miriam Sturdee's four-page comic on the Voight-Kampff Machine (see Figure 6) uses external focalisation as it focuses on the female character's actions, emotions, and use of the machine (Coulton et al. 2017). External focalisation is evident in this example through its use of cinematic angles, such as full shots and close-ups, and illustration of the character's emotions and feelings, which are communicated to the viewer (Bal 1985; Eisner 2008). In contrast, Joe Hollier's works in the Light Phone's blog, including 'Lighten Your Heavy Phone' (see Figure 7), do not use

focalisation, while 'A Zine About Going Light' (see Figure 8) does not involve any visible characters and objects are drawn as though seen through the character's eyes, which suggests internal focalisation (2020a, 2020b). Alternatively, Zvereff's hand-drawn animation titled 'A Radically Different Phone' about the Light Phone (see figures 9 and 10) switches between both types (internal and external perspectives) (The Light Phone 2024). This demonstrates that both focalisation types, or even a combination of types, can be used to create visual narratives as well as validate the use of these tools in illustrated narratives.

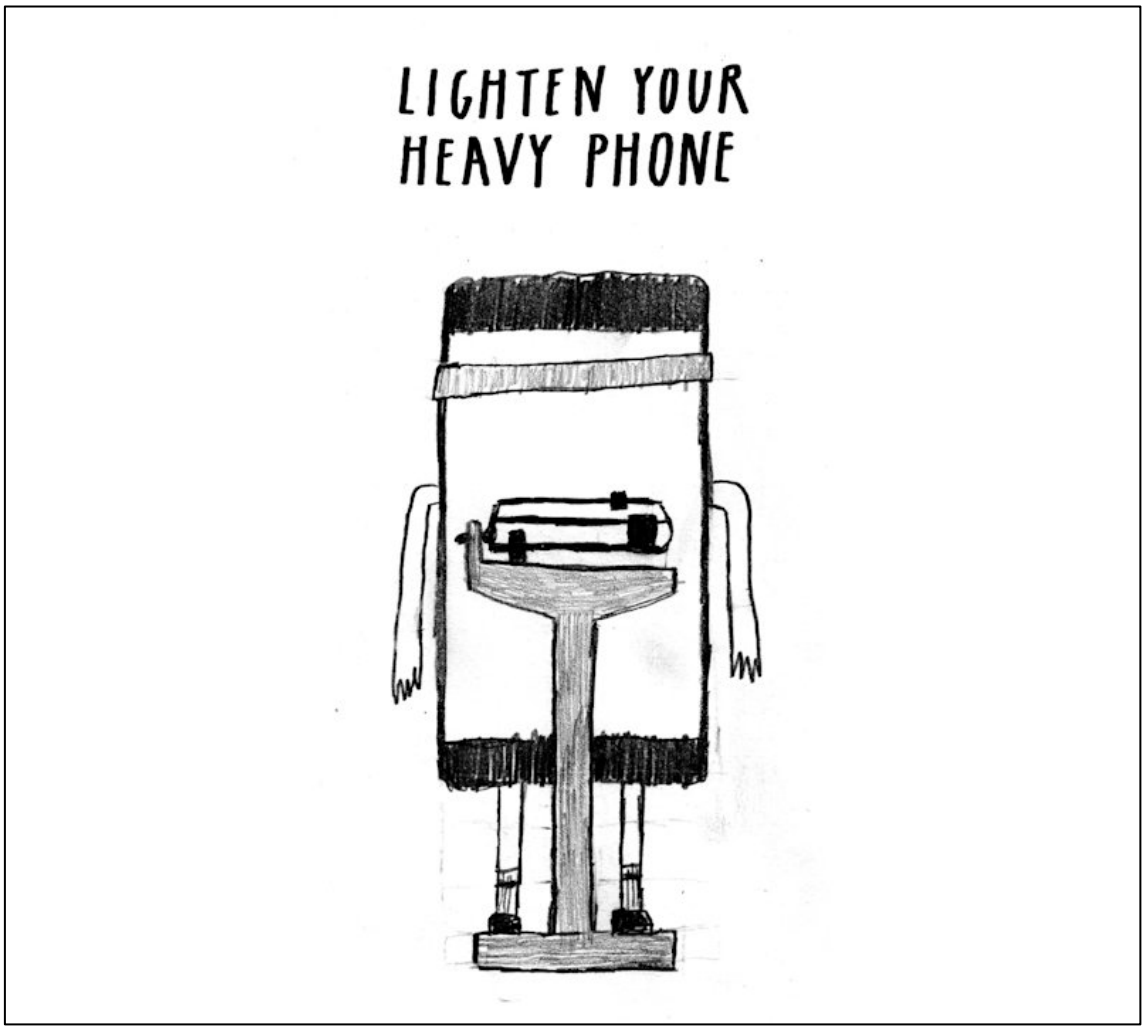



*Figure 7. 'Lighten Your Heavy Phone' illustration.*

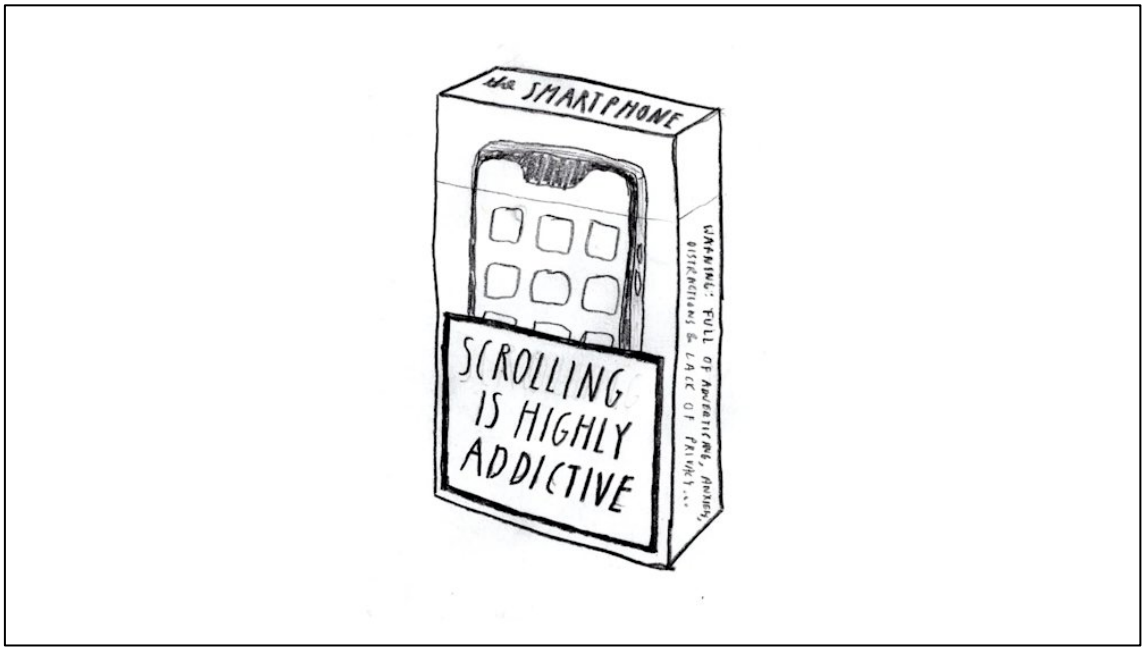



*Figure 8. Illustration from 'A Zine About Going Light'.*

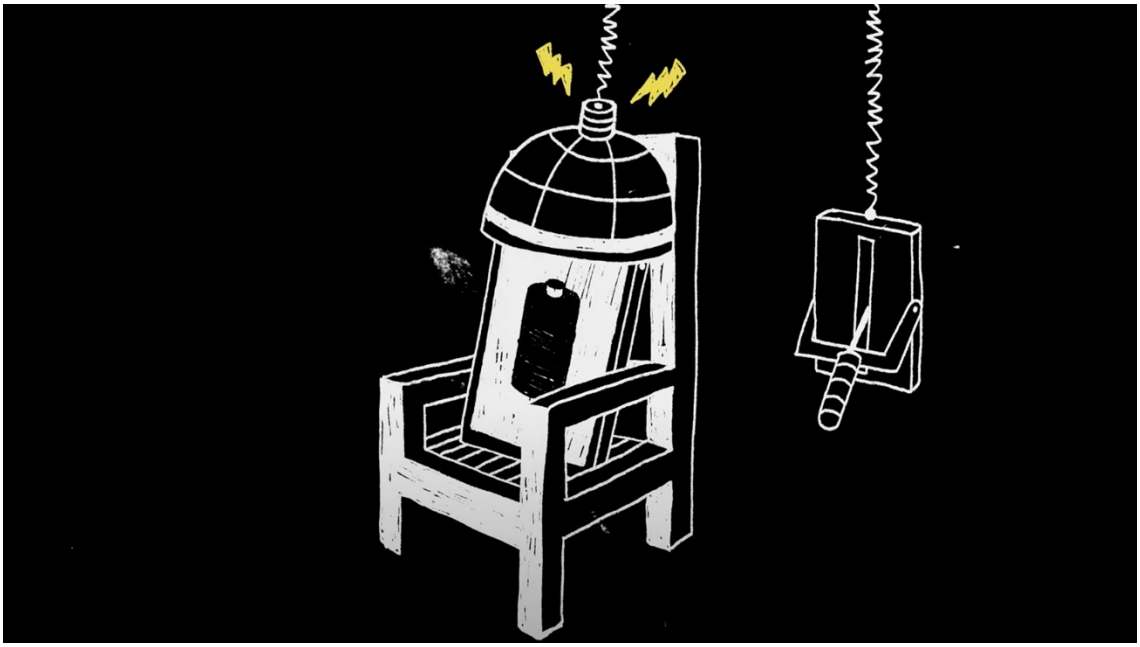


*Figure 9. A scene from 'A Radically Different Phone' animation with internal focalisation.*

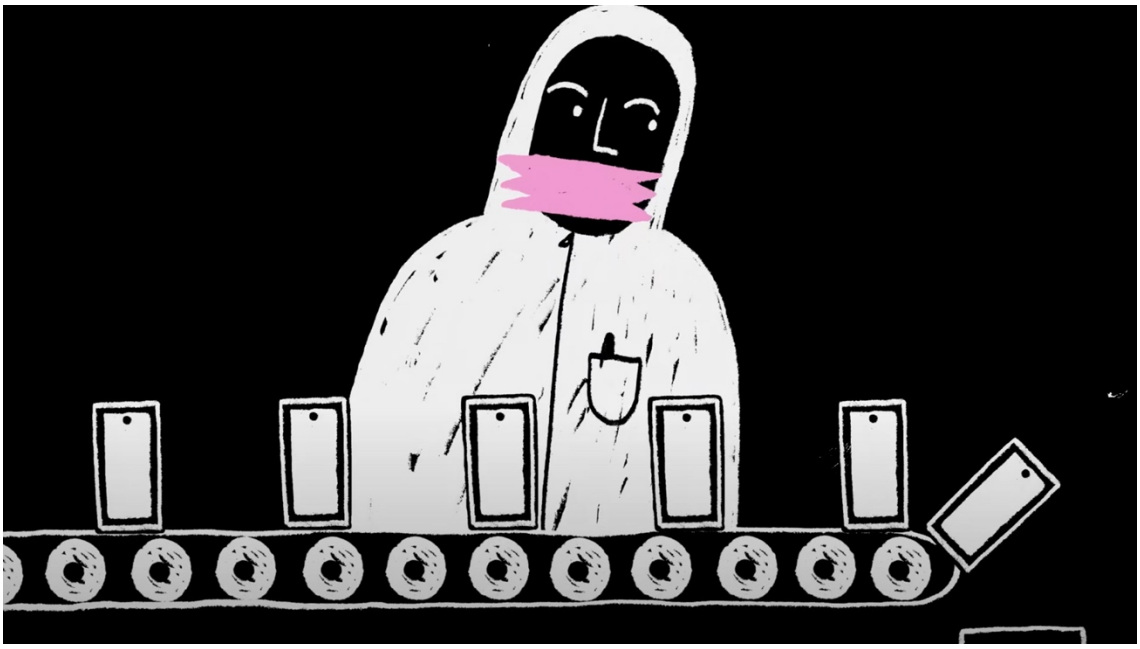


*Figure 10. A scene from 'A Radically Different Phone' animation with external focalisation.*

## 6. Challenges and proposals to reduce noisiness in digital interfaces

This project adapted the four-step method described in Markussen and Knutz's 'The Poetics of Design Fiction' study (2013), which is described in more detail in Chapter 3 (see pages 62–63). I used the writing phase of this project to develop three design challenges and proposals that informed my practice. The evidence from this phase is provided in sections 7–9 in this chapter. The three design challenges – touch-poor interactions, cold generic interfaces, and mindless interactions – are also described in these sections, as well as proposals concerning how to address each challenge. Each section concludes with my thoughts on how these solutions offer innovation opportunities to benefit large IT companies.

## 7. Habit-forming, distractive, colourful, and cold 'generic' interfaces

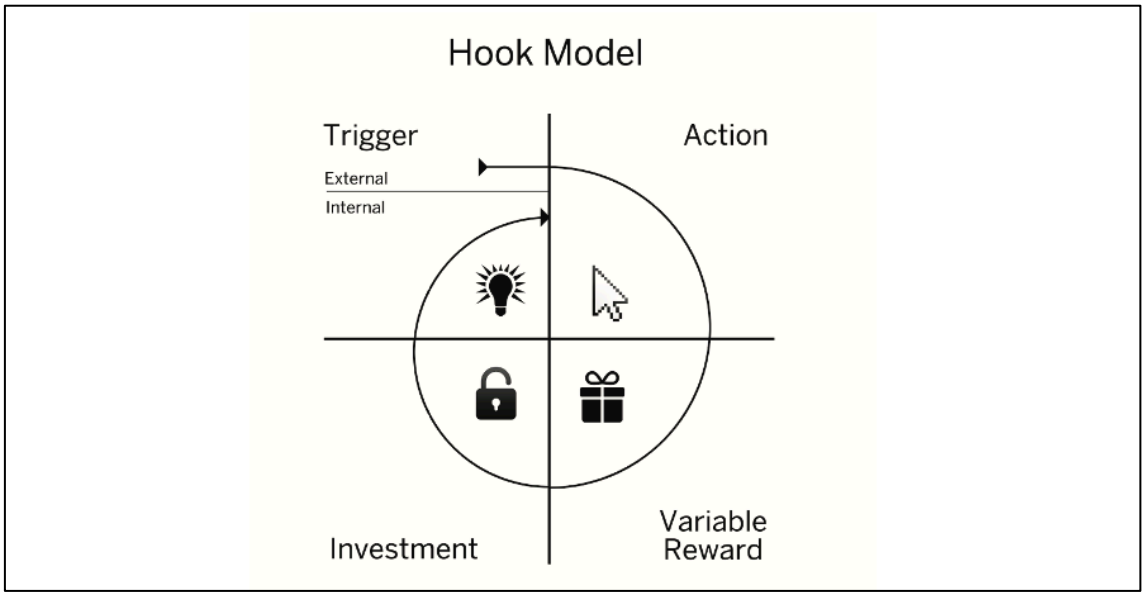



*Figure 11. The hook model.*

The first design challenge focused on issues related to habit-forming and distractive UIs that negatively impact wellbeing (Harris 2016; Levy 2017). I think that the basis for such interfaces is the overuse of push notifications, colour, and digital generic elements (Fogg 2003; Norman 2013; Cooper et al. 2014; Eyal 2014). According to Eyal (2014), push notifications are designed to be addictive and distracting. He explained that habit-forming technologies and addictive apps are created by using the *hook model* (Eyal 2014). The hook model aims to capture and maintain a user's attention by creating an automatic, long-term engagement with a product (Eyal 2014). The hook model consists of four steps – internal and external triggers, action, reward, and investment – that influence a user's behaviour to use an app (see Figure 11). In this scenario, a user may experience internal triggers, such as boredom or fear of missing out, and push notifications are designed to act as an external trigger for the user to act. The notification pops up on the screen, and the user is hooked into entering the platform to check the notification on the app. The action is simple and leaves the user anticipating a reward. According to Eyal (2014), the user is motivated in this way because of the various rewards available through the app. The user can gain three types of rewards: rewards of the tribe, rewards of the hunt, and rewards of the self. These may temporarily fulfil the user, but also leave them wanting more. The engagement and 'bit of work' done by the user on the app are associated with the user's investment in returning to the app. The user develops a habit of using the app and automatically returns to it. The hook model is used by tech giants including Meta, Apple, and Google, and is evident in their products and features, including Facebook, Instagram, WhatsApp, Gmail, iMessage, and the App Store, among others. The hook model is useful for app creators and designers because it creates automatic user engagement with a product (Eyal 2014). The App Store has over 1.8 million apps, and

the Google Play store has over 2.26 million apps, which combined equals over 4 million apps available to download (Apple 2024b; Statista 2024b). This information source should be considered with caution because Statista is an online platform that collects and supplies commercial data (Statista 2025). The number of apps available to download explains the need to employ engagement approaches, such as the hook model, to stand out in such a competitive market.

There are 367 online tools for digital wellbeing, such as apps and browser extensions, that help consumers to protect their attention from online distractions (Lyngs et al. 2019). I believe that apps are designed to be too engaging and distracting; therefore, additional design interventions are needed to control their use (Eyal 2014; Lyngs et al. 2019). This suggests that there are underlying foundational issues in how apps are designed, rather than distraction being an issue for users. In contrast to Eyal's hook model, Case (2016) argued that communication design should follow the 'Principles of Calm Technology' to avoid unnecessary and frequent user notifications. These principles state that designs should create calm and should quietly exist in a user's periphery most of the time rather than capture their attention unnecessarily and/or remain the centre of their attention (Case 2016). Case (2016) argued that this can be achieved by designing ambient awareness by engaging different human senses as well as communicating information to a user without distracting them from their original task or removing them from their original environment. Case (2016) explained that pop-up notifications are the most popular everyday alerts, but they are overused and overwhelm users. She suggested that alerts should only be used to communicate an emergency or create or delete important content (Case 2016). This practice produces calmer and less obtrusive interfaces and a less overwhelming and distracting UX.

In addition to addictive and distractive pop-up notifications, another issue with the hook model is its deliberate use of colour (Eyal 2014). According to Eyal (2014), when users receive positive reinforcements for their behaviour, they form habits. Furthermore, designers can deliberately use colour to form these experiences for their users (Eyal 2014). By adapting the hook model approach, visual cues can increase a user's external triggers, speeding up the next step in the loop (Eyal 2014). This can be employed by integrating red colour, high-contrast and bright buttons, and colours that align with a user's emotional cues (Eyal 2014). Similar to Eyal's ideas, the Fogg behaviour model and the concept of *persuasive technology* also build on the deliberate use of colour to increase user engagement (Fogg 2003). According to Fogg (2003), motivation, ability, and triggers must be present for user behaviours to occur, such as checking their smartphone or refreshing their email inbox. Similar to the hook model, Fogg proposed that the deliberate use of colour (when designing *hot triggers*) can increase a user's ability and enhance motivation (2003). He also argued that hot triggers must be salient from other UI elements; therefore, the use of red and contrasting colours can achieve this goal (Fogg 2003). The difference between the hook model and persuasive technology is that

Eyal's ideas originate from industry experience and are product-oriented, while Fogg's work is based on academic research at the Behavior Design Lab at Stanford University.

Smartphone digital interfaces maintain users in a constantly engaged state through the deliberate use of colour and contrast (Fogg 2003; Eyal 2014). On the one hand, the use of colour (as mentioned in the previous section (see page 44)) is evident in Apple products such as the iPhone and iPad, as well as Android products. The home screen on Apple devices has bright colours and high contrast. Red colour is also evident in notifications from its settings, messages, and the App Store. Furthermore, app icon designs are also bright and high contrast. Similarly, the home screen on Android devices mimics Apple devices, with red and bright colours used. This suggests that the home screen on these devices acts as a dashboard for attention triggers for their users. This also indicates that the intentional use of colour and contrast found in interfaces promotes user habit-forming behaviours (Fogg 2003; Eyal 2014). Prolonged exposure to habit-forming stimuli contributes to cognitive overload, which negatively impacts wellbeing and attention and increases user fatigue (Harris 2016; Levy 2017). Tristan Harris's (2016) article should be considered with caution as it is published on the Medium platform, which is a social online platform for written content such as articles and blogs (Medium n.d.).

On the other hand, both the iPhone and Android OS provide the option to change the colour filters on their devices. Apple products have a greyscale setting that enables users to opt for a black and white view (Apple 2025c). Android users also have an option to turn their screen greyscale using the digital wellbeing and parental controls settings by tapping on bedtime mode and then turning on greyscale mode (Google 2026). According to Google (2026), the greyscale feature makes the apps less engaging, increasing user focus. This claim is made by Google, which is a commercial company and is orientated towards financial profit from its products. However, the claim is supported by research studies, which show that the greyscale setting can be used as an intervention and is associated with reduced anxiety, problematic smartphone use, and excessive consumption (Holte et al. 2023; Wickord and Quaiser-Pohl 2023). This analysis suggests that greyscale features may be sufficient to reduce colour-induced impacts on users; however, it does not resolve the underlying cause: the home screen design itself. I think that UIs with a monochromatic design can be a better solution than the greyscale setting.

The products of large IT companies lack minimalistic and monochromatic UIs, which are better optimised for user wellbeing (Fogg 2003; Turkle 2012; Eyal 2013; Newport 2019). In contrast to Android and Apple devices, Amazon produces a series of Kindle e-readers that have e-ink technology and employ monochromatic UIs; however, they do not have the functionality of a smartphone (Amazon 2024). Furthermore, monochromatic and minimalistic design is evident in the design of

feature phones, which are a popular alternative to smartphones. One example is the Light Phone II (see Figure 12). The Light Phone is developed and sold by artist and product designer duo Joe Hollier and Kaiwei Tang (The Light Phone n.d.a.). The Light Phone is orientated towards consumers who want a break from their smartphone or are ready to switch from a smartphone to a cell phone (The Light Phone n.d.b.). It was designed as an alternative to the tech monopolies and to be used less than a smartphone; therefore, its emphasis is on monochromatic UIs and basic functions, such as making phone calls and sending messages (The Light Phone n.d.a.). The phone comes with a customisable toolbox menu where the user can add or remove tools (The Light Phone n.d.c.). However, the tools are limited and only include an alarm clock, calculator, music, podcasts, notes, calendar, hotspot, timer, directory, and directions. The UI design is monochromatic and minimal. The colour options on the Light Phone II are only black and light grey because these two colours match the darkest and lightest shades of e-ink screen technology (The Light Phone n.d.b.). Unlike the smartphone, it does not emit blue light, and it can be used in sunlight, which makes it more accessible. The advantage of this device is that it has a low distraction level and cognitive load because of its monochromatic UIs and basic, limited functionality. While smartphones have high distraction levels and cognitive loads, they have greater everyday functionality, such as access to essential services, apps, browsers, app stores, cameras, and other devices. However, the Light Phone can be used as an additional device alongside a smartphone rather than on its own if functionality is crucial (The Light Phone n.d.b.). The Light Phone II is currently sold out internationally and is available to pre-order in the United States; however, a newer model – the Light Phone III – is available to pre-order (The Light Phone n.d.d., n.d.e.).

Another example is the Punkt MP01 and MP02 feature phones (see figures 13 and 14). Punkt phones are designed by product designer Jasper Morrison and sold by consumer electronics company Punkt (Punkt n.d.a.). These phones are advertised as designed with the digital age and the user's attention in mind (Punkt n.d.a.). It is aimed at digital minimalists. Punkt phones have their own OS, which consists of a simple navigation system and a clean monochromatic interface without apps. Unlike smartphones and the Light Phone, it has a haptic keyboard with buttons. The MP01 model does not have internet access, but the MP02 model has a very limited internet connection; both models have a Bluetooth connection. The disadvantage of Punkt phones is that they have very limited functionality compared to a smartphone, as they do not have email, apps, a camera, navigation services, or even touchscreen technology. The MP01 model is currently withdrawn, and there are no more available products, while the MP02 model is currently available to purchase (Punkt n.d.b.). Punkt is currently advertising a smarter minimalist phone called Punkt MC02, which uses touchscreen technology (Punkt n.d.c.).

Similar to Punkt phones, the award-winning Mudita Pure feature phone, designed by the Mudita company, also has a monochromatic UI, simple navigation, minimalistic design, and tactile keyboard (see Figure 15). It was developed to support the mindful use of technology and is aimed at consumers who prioritise their wellbeing and want to decrease digital distraction (Mudita n.d.a). Similar to other feature phones, it also has limited functionality and its own OS. Compared to the Light Phone and Punkt phones, the Mudita phone's 'meditation timer' is an interesting integrated feature. This is one of the first inclusions of mindfulness features in technology besides mindfulness apps, which are available for download rather than incorporated into an OS. Similar to the Light Phone, this feature uses e-ink technology (Mudita n.d.a). Previously, Mudita Pure was financed by consumers through a Kickstarter campaign, which raised double the capital needed (Kickstarter 2019). Kickstarter is an online fundraising platform (2025). Mudita Pure phones are currently available to purchase from the Mudita retail outlet, but Mudita is now focused on selling a new product called Mudita Kompact, a minimalist touchscreen e-ink phone (Mudita n.d.b, n.d.c). It could be interpreted that feature phones were temporarily popular as an alternative to smartphones and now appear to be outdated; however, these phones can be used as starting points and references to create better products.

In addition to the issue of distracting and colourful interfaces that compete for the user's attention, there is also the issue of the overuse of generic digital UI elements (Norman 2013). 'Cold' interfaces are designed with generic digital UI elements; therefore, they lack an emotional connection and create a 'cold' UX (Norman 2013; Cooper et al. 2014) (see the analysis on the importance of repetition in UI and UX design in Section 1 of this chapter (page 21-22)). As previously mentioned (see page 22), free UI guidelines, provided for designers and app developers by large IT companies such as Apple and Google, are very useful for effective and fast app prototyping (Apple 2025a; Google 2025). However, they share the same issue of genericness, digital coldness, and a lack of visual texture, and they can induce the negative impact of repetition, such as visual monotony. Norman (2013) warned that the overreliance on generic UI elements can reduce users' emotional sensitivity; therefore, hand-drawn UI elements as an alternative to genericness can evoke positive emotions. Cooper et al. (2014) argued that cold, technical, and generic interfaces fail to facilitate more human-centred interactions. Dourish (2004) further proposed that interactions are grounded in users' own embodied experiences, which cannot be simply defined by traditional design approaches, such as applying mental models and limiting them to the conventional use of keyboards, screens, and mice (see the mental models analysis in Section 1 of this chapter (pages 21–22)). According to Eberts (1994), the *anthropomorphic design approach* in HCI enables the design of more intuitive UXs and UIs because they possess human-like qualities. Therefore, there is a need to mimic human physical experiences, gestures, and tools, such as hand-drawing, to make UIs and UXs more human and organic for users.

This prompts the question of whether incorporating hand-drawn elements in interfaces and interactions makes them more human, organic, and natural for users. Based on this idea, I argue that 'cold' interfaces can be 'warmed' by introducing and integrating hand-drawn UI elements. I question whether hand-drawn typefaces, icons, and interactive buttons can provide a better and more emotionally engaging experience for users than generic elements. The use of hand-drawn elements is evident in the diegetic prototype in the *Black Mirror* television series (see Figure 16) (see Section 3.2 in Chapter 3 for a description of this design (pages 65–66)). It is also evident in Amazon's Kindle Scribe product (see Figure 17). Kindle Scribe is a notetaking device that has a premium pen tool (Amazon 2024). It aims to provide a book-writing and notetaking experience that mimics the look and feel of handwriting. Both of these examples mimic the physical gestures and tools of hand-drawing, and this is the reason why their interfaces and interactions feel more human and 'warmer'. Even though these examples do not have hand-drawn interfaces for the user to interact with, they stand out owing to their visual texture and human feel.


*Figure 12. The Light Phone II (light grey and black models).*


*Figure 13. Punkt MP01 mobile phone.*


*Figure 14. Punkt MP02 mobile phone.*


*Figure 15. Mudita Pure feature phone (pebble grey and charcoal black models).*

*Figure 16. A diegetic prototype from the 'Be Right Back' episode of the Black Mirror television series, which combines an easel and a computer.*


*Figure 17. Amazon's Kindle Colorsoft, Kindle Scribe, Kindle Paperwhite, and Kindle devices.*

### 7.1 Development of hand-drawn interfaces

In response to the design challenges described previously (see pages 43–51), I imagined a feature phone with a minimalistic, hand-drawn, and monochromatic UI that provides a warmer UX (Bleecker 2009). I considered whether the challenges of a colourful home screen, cold generic interfaces, and push-notifications could be addressed by such a design, and also be less noisy and have a low cognitive load and distraction level compared to current smartphone interface designs. Therefore, such a feature phone also aimed to spark debate about hand-drawn interfaces and minimalistic and monochromatic interfaces as an alternative to smartphones (Bleecker 2009; Dunne and Raby 2013).

As this was to be a diegetic prototype, it had no technological limitations (Bleecker 2009). However, it was uncertain how hand-drawn elements could be technically incorporated into real-world scenarios. It was also uncertain what usability and accessibility challenges this design would produce and whether this prototype would generate any insights for the design process or innovation opportunities for big tech companies. Despite this, I felt that a monochromatic, minimalistic, and hand-drawn design would provide an alternative solution to smartphone interfaces because of its low distraction level and cognitive load, in the same way as a feature phone (see pages 45–47). This would provide validation for this practice research.

## 8. Screen time overuse

The second design challenge focused on screen time overuse. Excessive screen time is associated with the *displacement hypothesis* (Vandewater et al. 2007; Domoff et al. 2019*)*. This hypothesis suggests that digital screen use replaces real-life activities that positively contribute to wellbeing (Vandewater et al. 2007; Domoff et al. 2019). Vandewater et al. (2007) found that the use of electronic media and technology displaces time spent on social and physical activities among infants, toddlers, and preschool-aged children. Domoff et al. (2019) concluded that screen time displaces developmental activities in children with a screen time 'addiction' and who experience problematic media use. Therefore, these findings should be considered when designing media for children, and problematic media use should not be dismissed; however, these issues can be related to how families and children are educated to engage with digital media rather than the media itself. Recent research studies have suggested that digital media literacy and parental mediation have a significant effect on how children and families are shaped and supported to use media (Livingstone and Helsper 2008; Nikken and Jansz 2014). It could be interpreted that screen time overuse is not harmful in itself but is harmful when digital media displaces meaningful activities for children and their families owing to a lack of guidance on healthy usage (Przybylski and Weinstein 2018; Domoff et al. 2019). In contrast to the displacement hypothesis, the *digital Goldilocks hypothesis* proposes the opposite: moderate screen time may positively contribute to wellbeing because it enables and empowers users 'to pursue their goals, be more active, feel connected to others and enjoy life' (Przybylski and Weinstein 2018). The researchers found that high levels of daily screen time, particularly on weekdays, and extremely low (or no) daily screen time were linked to lower levels of wellbeing (Przybylski and Weinstein 2018). In addition, one hour of smartphone use a day was associated with optimum wellbeing. This analysis suggests that the relationship between digital screen time and wellbeing is curvilinear, but better tools are needed to support its management.

Another important research and design inquiry is whether *digital wellbeing* is more than simply reducing screen time (Lukoff 2019). The term 'digital wellbeing' suggests that there are issues in navigating and balancing a relationship with technology in a digital world. According to Kirby et al. (2018), digital wellbeing is 'an extension of the concept of well-being centred around the use of the online and digital world'. Jisc (2019) expanded the term 'digital wellbeing' further as 'the capacity to look after personal health, safety, relationships, and work-life balance in digital settings'. Jisc (2019) also proposed that promoting digital wellbeing could include designing IT tools that promote participation in social and community activities, negotiation, and conflict resolution; manage digital overload and distraction; assist users to maintain a healthy lifestyle (e.g. personal health, fitness, diet, and mental health), and 'act safely and responsibly in digital environments and with concern for the

human and natural environment when using digital tools'. Therefore, it can be argued that reducing screen time may not be sufficient to foster digital wellbeing. However, this source should be considered with caution as Jisc is a non-profit company that provides services to the public sector as well as research and education institutions (Jisc n.d.). Notwithstanding this, issues related to screen time overuse of products designed by big tech companies need further exploration.

Big tech companies should produce better digital tools to track screen time (Sheenan 2018). Apple shareholders wrote an open letter to the company asking it to address the overuse of Apple products by children and requesting better parental controls (Sheenan 2018). However, Apple responded to this open letter by developing a feature called 'Screen Time' (Apple 2018). Screen Time enables users to access real-time reports on how much time they spend on Apple products and set and manage time limits (Apple 2018). It also allows users to manage their children's devices. However, Screen Time may not be effective given consumer complaints that it can be disabled by redownloading apps or by guessing the associated password (Apple 2020). There have also been allegations that real-time reports and limits on Screen Time are not accurate (Apple 2023). Apple Discussions is a forum where Apple users can seek advice and support and discuss their experiences with Apple products (Apple 2025d). This suggests that Screen Time may be an ineffective solution to tackle screen overuse. While it should be noted that these complaints come from consumers, a recent research study has supported this claim by establishing that parental control applications have vulnerabilities that can be bypassed and exploited (Maier et al. 2025).

Other large IT companies have also addressed screen time overuse by introducing digital wellbeing features (equivalent to Apple's Screen Time). For example, Android's digital wellbeing tools, including parental controls and unplugging, productivity, and balance features, were launched by Google and can be used on any device running on the Android platform (Google 2026). Android's digital wellbeing tools aim to increase understanding of how consumers use their devices and enable them to create boundaries (Google 2026). The features allow Android users to learn about their time spent on apps and manage their time (Google 2026). However, this works similarly to Apple's Screen Time feature; therefore, Android's digital wellbeing tools are not an effective solution to tackle screen time overuse.

Unconventional digital wellbeing solutions are supported by Google (Experiments with Google 2023). For example, Google has a platform called Experiments with Google that has 17 collections (Experiments with Google 2023). Each of these curated collections has a specific theme and showcases the best technological tools, resources, and experiments. One of these collections is titled 'Digital Wellbeing Experiments', which is a collection of unconventional digital wellbeing tools and ideas that enable users to reflect on their digital habits and set digital wellbeing goals – such as

productivity targets, unplugging, minimising distractions, and creating healthy digital habits – and help them to find a healthier balance with their devices. It also aims to inspire designers and developers to explore digital wellbeing in their work. This site also has a 'Submit Your Experiment' feature that allows designers to submit their designs that use technology creatively and unconventionally, with the possibility of being featured in one of the 'Experiments with Google' galleries. It is unclear how often these galleries are updated and curated, and whether the work featured there is commissioned by Google or other large IT companies. This shows that big tech, such as Google, is exploring unconventional digital wellbeing alternatives to screen time trackers. However, this source should be considered with caution as Google is an IT corporation (and part of the Alphabet parent company) that seeks financial profits from IT products (Alphabet 2025).

Products of large IT companies lack mindfulness (Kelly 2010). Hiniker (2017) suggested that mindfulness is one of the most successful approaches to support digital media use in families (parents and children). Hiniker (2017) conducted a study on how the mindful use of media could be supported in families (parents and their children) and explored which methods would be the best to facilitate it. The findings concluded that mindfulness was one of the most effective approaches for HCI behavioural interventions (Hiniker 2017). This source should also be treated with caution as it is a doctoral thesis. This prompts the question of whether a screen time tracker can have a mindfulness element, which could be a better solution than the current tools provided by big tech companies. Furthermore, Hassenzahl (2010) proposed that designing for positive experiences, such as calm and mindful interactions, can shape more meaningful and human-centred UXs. This also prompts the question of whether mindful interactions can provide a better UX.

Mindfulness apps have a positive impact and also generate a large amount of revenue (Howells et al. 2016; Statista 2022a, 2022b). Statista is a company that stores data and business intelligence on online platforms and provides e-commerce, market, and consumer insights; therefore, this source should be treated with caution (Statista 2025). For example, Calm is a meditation app that is also a globally top-grossing health-related app with revenues over £5 million (Statista 2022b). Furthermore, Headspace is the second-highest-grossing health app, which provides guided meditation (Statista 2022b). These insights do not provide validation for developing a mindful screen time tracker when screen time features can be accessed for free in Apple and Android products. However, this research shows that mindfulness-related apps are financially successful and generate significantly more income than other health-related apps. Therefore, how apps generate income could be explored further; for example, charging upfront payments, in-app payments, etc. (Numminen et al. 2022).

### 8.1 Development of a mindful screen time tracker

In response to the design challenge of screen time overuse, I envisioned a mindful screen tracker. This timer would enable the user to set screen time goals and track these goals themselves. This tracker aimed to support reducing and managing screen time, creating a more mindful UX. I imagined that this could be achieved by visualising low-noise and minimalistic visual cues compared to visually and cognitively demanding smartphone UI designs. As this was to be a fictional app, it had no technical restraints (Bleecker 2009). This app aimed to stimulate debate about screen time overuse and the creation of more mindful and calm interactions compared to screen time features and parental controls (Bleecker 2009; Dunne and Raby 2013). This fictional app also aimed to test whether insights could be generated for the design process, as well as innovation opportunities for large IT companies. This would also provide validation of this practice research.

## 9. Touch-poor interactions

The third design challenge explored touch-poor interactions, which negatively impact user wellbeing and lack touch-richness, such as shapeshifting features (Turkle 2012; Roudaut et al. 2013). The staticness and flatness of touchscreens negatively impact human development as well as the UX (MacLean and Hayward 2007, 2008; Turkle 2012; Roudaut et al. 2013). Relatedly, it has been shown that children learn through sensory play because touch and exposure to a wide range of textures help the development of language and motor skills and enable children to experience and learn about the world (Minogue and Jones 2006). Diversity of type, scale, and material is crucial to sensory learning as it functions to produce diverse knowledge on physical relationships and mechanics in the world, in a variety of circumstances (Lederman and Klatzky 1987). As such, limiting interactions to two-dimensional (2D) surfaces may decrease the ability to recognise three-dimensional (3D) objects and reduce overall haptic perception, as well as affect other linked cognitive development (e.g. language). This issue links directly to the design of standard touchscreen technology found in smartphones, tablets, retail kiosks, displays, and automated teller machines (ATMs), which are flat, static, and lack both physical shape and/or haptic feedback. In addition to the negative impact on human development, the flatness and staticness of touchscreen technology also relate to visual dependency, increased cognitive load, touch input errors, reduced usability, and lower accessibility (MacLean and Hayward 2007, 2008; MacLean 2008; Norman 2013). In terms of the UX, touchscreens rely on visual rather than physical cues and guidance (or a combination of them) to communicate information to the user because the only movement occurs in the interface. This causes increased visual dependency, cognitive load, and touch input errors (MacLean and Hayward 2007, 2008; Norman 2013) (see cognitive load theory in Section 1 of this chapter (page 22)). Furthermore, the lack of physical cues also creates accessibility and usability issues in situations where the user has visual impairments and

cannot rely on visual cues or when they are very mobile and their visual attention is limited, such as when cycling, walking, jogging, or driving (Norman 2013). Therefore, this limits how users interact with touchscreen devices and prompts the question of whether shapeshifting could be utilised to improve the UX, which would also be better for development.

The staticness and flatness of touchscreens also increase physical fatigue and problematic touchscreen use (MacLean and Hayward 2008). Recent studies have also shown that holding and using a touchscreen device for too long causes injuries, such as arm, neck, hand, shoulder, finger, and thumb tension, pain, and even inflammation (Kim et al. 2016). Touchscreen overuse in children is related to weaker muscular development, the inability to grasp and write with tools, and poorer verbal communication and language acquisition (Toh et al. 2017; Intolo et al. 2019). How users control devices has been adapted from the keyboard, mouse, and the hand controls and interfaces of personal computer keyboards, without considering the impact on users. Beyond the repetitive mechanics of mindless interactions leading to the overuse of certain body movements, there may also be underlying issues with ergonomic design, where devices are not optimally designed to align with human anatomy. Current computer controls are designed for a horizontal hand position, which is prone to causing injury, rather than neutral and vertical hand positions, which are better for human anatomy (ISO 2019, 2024). However, this suggests that touchscreens are ergonomically incompatible.

Furthermore, recent research has suggested that humans have a daily 'need for touch' and a lack of fulfilment of tactile needs is associated with lower wellbeing (Peck and Johnson 2003; Patrick et al. 2007). According to these studies, tactile need unfulfillment is related to increased smartphone use, whereby users 'high in the need for touch may demonstrate an overuse of a smartphone's touch screen to satisfy this need' (Lee et al. 2014; Elhai et al. 2016). Humans are 'creatures of touch' because we need tactile experiences for our overall wellbeing. This also suggests that touchscreens have become 'a digital surrogate for human tactile need fulfilment' because touch deprivation and tactile unfulfillment negatively impact user touchscreen overuse (Barrios-O'Neill and Pakalkaitė 2022). Touch and tactility are also used in designing effective interventions to improve wellbeing and solve design challenges, such as touchscreen device overuse and improved ergonomics. An interesting application of tactility is the Mudita Pure and Punkt feature phones with tactile keyboards (see Section 7 in this chapter, where figures and analysis are provided (pages 45–51). Both of these phones encourage the user to interact with the device through a tactile keyboard. Compared to a rectangular and flat smartphone, the Punkt phones have more tactile and grippy hardware, which is designed for one-handed use as well as a comfortable feel in the hand.-Mudita Pure uses clean, curved lines and a stone shape rather than a rectangle. However, while these designs may be better ergonomic solutions for users, I think that they remain rigid and static in a similar way to touchscreens

and smartphones and lack flexibility and/or shapeshifting features. Therefore, another core problem with touchscreen devices is their rigidity, which lacks dimension and movement.

Shapeshifting supports the ergonomic use of devices and human factors by adapting to the user's grip and their task and reducing physical strain (Roudaut et al. 2013). My previous collaboration on touch-richness explored the elasticity dimension in which devices have an ability, such as to convert or transform, be deployed in multiple ways or flexibly, be more organically shaped and asymmetric, integrate with other surfaces or materials, or be adapted for better ergonomic fit (Barrios-O'Neill and Pakalkaitė 2022). We referred to elastic design as a concept that challenges the norms of rectangular, flat, unchanging, hard, and self-contained touchscreen devices (Barrios-O'Neill and Pakalkaitė 2022). We proposed that features such as hardness, softness, flexibility, grippiness, folding, flipping, etc. (which are lacking in touchscreen devices) better align with human factors and provide a touch-rich experience compared to current touchscreen technology because they focus on physical rather than visual cues (Barrios-O'Neill and Pakalkaitė 2022). Experimentation with more diverse features and shapeshifting when imagining and designing mobile devices is evident in HCI research. One of the many examples is the concept of 'Morphees' (see Figure 18). This concept demonstrates self-actuated flexibility, where mobile devices change shape to provide better affordances for their users (Roudaut et al. 2013). For example, a device morphs into a console-like shape when a game is launched. When a device has two curled opposite edges, the user is better able to grasp it with two hands. Compared to a touchscreen smartphone, such a device has high touch-richness, but it lacks aesthetic hardware design and commercial viability.

Products of large IT companies also lack touch-richness, particularly elastic design and shapeshifting features. However, there are emerging products from large IT companies such as Samsung, Motorola, Huawei, and Oppo, among others, with some elastic properties. Examples of such smartphones are the Samsung Galaxy Z Flip and Z Fold series (see Figure 19). They can be folded like a book and flipped like a flip phone. Corning Gorilla Victus glass technology (which is used to produce Samsung's foldable phone screens) is so flexible that it allows users to fold and unfold it without breaking (Corning 1994–2025; Samsung 1995–2025). It can be argued that the actual elasticity is minimal as two touchscreens have been added together. These devices could be more elastic by using more complex shapeshifting properties rather than simply folding; however, there may be technological barriers to such features. Based on my review of folding phone patents, the filing of such patents (both successful and unsuccessful) began with Apple (Rothkopf et al. 2013). This was followed by other large IT companies, such as Oppo and Samsung, among others (Lin 2020; Seo et al. 2021). This demonstrates that big tech companies are heavily invested in the development of touch-rich devices.

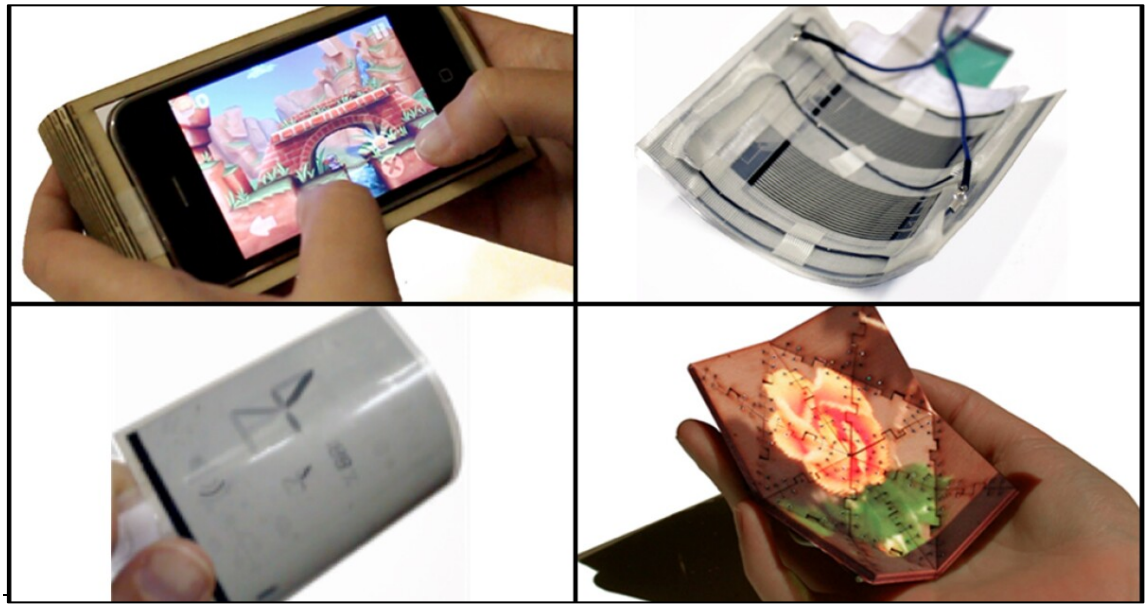


*Figure 18. Morphees shapeshifting devices.*


*Figure 19. Samsung Galaxy Z Flip and Z Fold 5 series smartphones.*

### 9.1 Development of touch-rich interactions

In response to the challenge of touch-poor interactions, I imagined an ergonomic and shapeshifting communication device that provides a better experience than smartphones and foldable smartphones (Bleecker 2009). There were no technological constraints because this proposal was for a diegetic

prototype (Bleecker 2009). This fictional device had elastic features and abilities to change shape according to the user's needs. This device sought to provoke a discussion on touch-poor and touch-rich interactions and how the latter can provide better UXs (Bleecker 2009; Dunne and Raby 2013). Furthermore, this diegetic prototype aimed to generate insights for the design process and innovation opportunities for big tech companies. This also provided validation for this practice research.

# CHAPTER 3

# PHASE 1 – PRACTICE

The completion of the literature and practice review is the first phase of this thesis, which was accomplished by identifying research gaps and providing validation of the research questions and practice research. This project naturally transitioned from desk-based research to a practice stage. This chapter begins with the presentation of the research question and explanation of how practice research aids in answering it. It then discusses practice research and the research through design methodological approach. This is followed by a description of the four design fiction stages used to develop hand-drawn interfaces and mindful and touch-rich interactions. The chapter then provides a theoretical framework for the 'what if' scenario, diegetic prototype, and design fiction narrative. It also describes how my practice developed and presents the results of this practice research. The chapter concludes with a description of the impact on my practice and presentation of this work during the COVID-19 lockdown and associated restrictions and reflections on my practice and development as a creative practitioner.

## 1. Research question

To answer my first research question – How can noise in digital interfaces be reduced using unconventional design approaches, and how can this enhance the UX? – I hypothesised that unconventional design approaches, such as hand-drawn interfaces, mindful interactions, and touch-rich interactions, could reduce noise in digital interfaces and enhance the UX. Currently, there are no case studies on how hand-drawn interfaces and mindful and touch-rich interactions may minimise noise in digital interfaces. There are also no designed prototypes communicating the practical application of such unconventional design approaches that specifically aim to reduce digital interface noise. Therefore, this reveals a gap in current research and the need for a practice research stage to test and develop a prototype for each of these three design approaches. There is also a need for narratives to explain how these prototypes work. I used the research through design approach and the design fiction method to develop hand-drawn interfaces and mindful and touch-rich interactions. The designed artefacts and narratives were presented to an audience, as well as UI and UX designers and software developers, to gain expert review feedback on how these speculative design solutions may benefit designers to develop healthier IT tools and large IT companies. The next stage involved creating an expert review, which was distributed alongside the prototypes and narratives to the UI and UX designers.

## 2. Practice research and research through design

In this thesis, I use the terms 'practice research' and 'research through design'. Practice research refers to approaches where creative or professional practice is central to the enquiry (Frayling 1993). It incorporates methods in which artistic, design-based, or performance practices generate new knowledge, often through iterative, instinctive, and situated modes of inquiry (Smith and Dean 2009). It is different from traditional research paradigms because it focuses on creative processes, objects, and embodied experience as valid forms of knowledge production (Nelson 2013). Research through design is an approach where knowledge is generated through iterative design processes, in which making, prototyping, and material engagement are methods of inquiry to explore and develop new understandings (Frayling 1993; Gaver 2012). While research through design and practice research have distinct disciplinary orientations, they share methodological and epistemological features.

There are many ways to perform practice research. There are also many design methodologies to develop less noisy digital interfaces. Notably, research through design is one of the most widely used design-based research approaches in academia (Stappers and Giaccardi 2016). The benefit of this approach is its various definitions and frameworks that can be adapted to produce design solutions as well as act as provocations (Stappers 2007). The potential advantage of using this approach is that objects, such as illustrative narratives, can be created to be deliberately provocative, which aligns with the aims and objectives of this project (Stappers and Giaccardi 2016). Other approaches that are more prevalent in UI design, such as UCD, were considered. However, the limitation of UCD is that it is orientated towards the development of fully functional products rather than stimulate debate (Dourish 2001; Norman 2005; Bleecker 2009; Dunne and Raby 2013), and this is why the use of the UCD approach was rejected (see Section 4 in Chapter 2 regarding the UCD approach, accessibility, and usability (pages 32–36)).

Ethical approval for using practice research was obtained from the Falmouth Research Degrees Committee (see Appendix A). Furthermore, this phase also included commissioned collaborative work with writer George Forster. The literary texts by the writer were produced under a freelance commission. Therefore, Intellectual Property (IP) rights were established in our collaboration agreement (see Appendix E), with authorship of the literary text remaining with the writer, while authorship and intellectual property of the illustrations remain with the researcher.

## 3. The use of four design fiction stages to develop hand-drawn interfaces and mindful and touch-rich interactions

Design fiction was used to create provocative illustrative narratives that aimed to stimulate debate

(Bleecker 2009; Dunne and Raby 2013). There are several ways of creating design fiction. After carefully reviewing these approaches, I selected 'The Poetics of Design Fiction' framework (Markussen and Knutz 2013). A practical advantage of this approach is that it provides a step-by-step framework for creating design fiction. Using this approach also enabled me to identify overlaps between my practices in these steps. However, a limitation of this approach is its co-design element. The researchers worked in collaboration with a writer and design students to produce the outcomes, with the researchers acting as the instructors and facilitators of the framework (Markussen and Knutz 2013). This raises the question of whether co-design must be a feature in the design process when adapting this framework.

Design fiction can be used as an engagement tool to provoke debate (Bleecker 2009; Dunne and Raby 2013; Tsekleves et al. 2017). The role of co-design in design fiction is widely researched (Knutz et al. 2016; Rozendaal et al. 2016; Gerber 2018; Nägele et al. 2018; Kinch et al. 2022). Kinch et al. (2022) argued that there is a lack of research that explores and defines 'the use and benefits of speculative practices in co-design', meaning that it remains an emerging area of research. Co-created design fictions are often used to create, assess, and imagine healthcare technologies, services, and prototypes by researchers and older authors, elderly users, vulnerable users, patients, their relatives, and staff (Tsekleves et al. 2017; Nägele et al. 2018; Ahmadpour et al. 2019; Ambe et al. 2019; Kinch 2021). However, a co-design approach can be adapted alongside design fiction and can be considered a separate approach (Ambe et al. 2019; Zhao 2022). This suggests that the co-design aspect can be removed from design fiction and is not a mandatory feature of the design process. This also suggests that there is an alternative method used in place of co-design to engage an audience in debate (see Section 4 in this chapter for an explanation of how discussion was facilitated (page 71)).

This study adapted the following four-step method: (1) writing phase, (2) developing the basic rules of design fiction, (3) the experimental process of world-making (drawing, building, constructing, interaction, and visualisation), and (4) prototyping design fiction (Markussen and Knutz 2013). The participants of the original research project comprised the researchers themselves, design students, and a writer. The writing phase included students reading a section from a script (developed by the writer) and then producing a set of mini-scenarios by following specific instructions provided by the researchers. The outcomes of this step were pieces of writing. This step aligned with the design challenges and proposals identified in my literature and practice review. The second step involved developing a set of 'what-if' scenarios from the mini-scenarios. The students were instructed to select a 'what if' scenario and then create a design challenge in response. Following this, they had to discuss the world they were designing for. This step allowed me to refine the solutions proposed in the literature and practice review. In the third step, the students were taught to draw storyboards, build microworlds, and construct objects and interactions. However, the researchers instructed the

students to develop work based 'on their skills, techniques and methods the designers were trained in' (Markussen and Knutz 2013). For example, illustrators drew storyboards and created characters because they were highly skilled at this rather than producing graphic designs or interaction design-based outcomes. The final step included students developing prototypes based on their process of producing ideas and creating worlds, with the set of prototypes representing the final result of the project. The final two steps of this study are an example of how an illustrator can successfully produce design fiction, and these steps enabled me to use my illustrative practices to create outputs.

Based on the four-step method adapted from 'The Poetics of Design Fiction' (Markussen and Knutz 2013), my process for creating design fiction consisted of the following four stages: (1) developing ideas from design challenges and proposals, (2) creating 'what if' scenarios, (3) designing diegetic prototypes, and (4) writing, designing, and illustrating design fiction narratives. In my study, the original step 1 (writing phase) was replaced by developing ideas from design challenges and proposals. I developed three design challenges and proposals in Chapter 2 (literature and practice review), which informed the production of 'what if' scenarios at stage 2. The original step 2 (developing rules of design fiction) was represented by stage 2 (creating 'what if' scenarios). This stage involved producing three 'what if' scenarios to inform the development of the diegetic prototypes. Stage 3 (designing diegetic prototypes) replaced the original step 3 (experimental process of world-making: drawing, building, constructing, interacting, and visualising) and involved producing three diegetic prototypes. The original step 4 (prototyping design fiction) was substituted for stage 4 (writing, designing, and illustrating design fiction narratives) in my study. This phase involved writing text, illustrating, and designing user manuals for the diegetic prototypes. It also included working with students and a writer to produce narratives for the diegetic prototypes. I then illustrated the written narratives, which were the final outputs of this practice element.

### 3.1 'What if' scenario theory

In design fiction, the 'what if' scenario is the 'basic rule of design fiction' because it enables the designer to imagine and describe the possible future in a more detailed way (Markussen and Knutz 2013). First, 'what if' scenarios are evident in the science fiction genre. One of the most well-known examples is *Frankenstein: The 1818 Text* by Mary Shelley about a monster (2018). According to Aldiss (1995), this is the first science fiction story because it imagines what would happen if a scientist imparted life to non-living matter and created a humanoid by using a secret scientific (but fictional) technique. Another, more recent, example is the stories in the Netflix *Black Mirror* television series written by Charlie Brooker, which question what would happen if technology could alter the human body and/or consciousness (2011). For example, the episode titled 'Nosedive' explores the scenario

of what if people were rated by their social interactions by using eye implants and mobile devices, and how these ratings would impact their socioeconomic status (Brooker 2016).

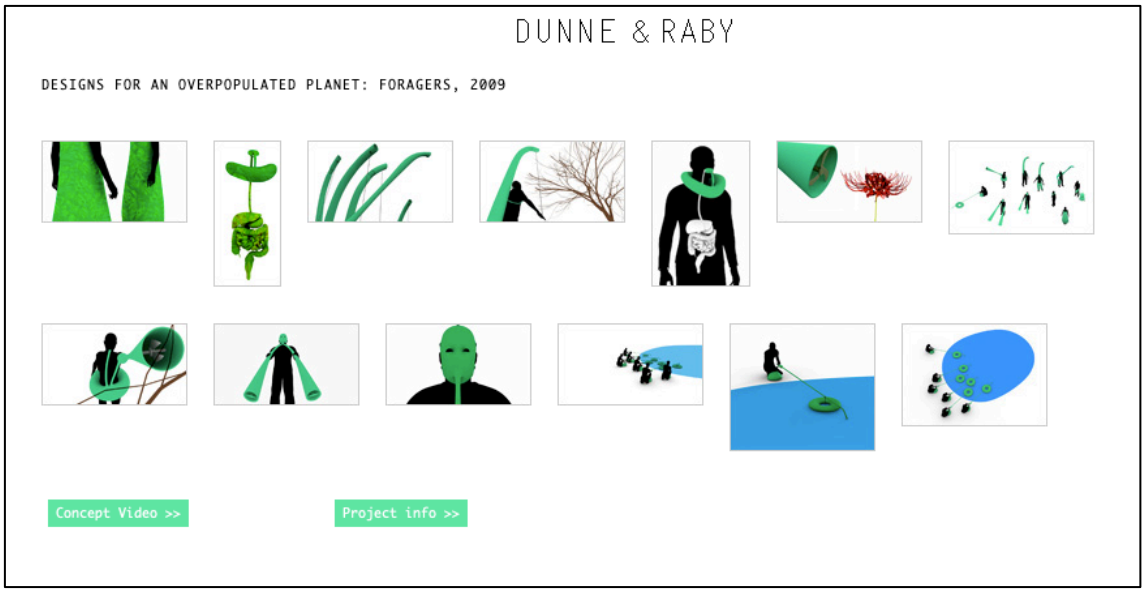



*Figure 20. Concepts from the Designs for an Overpopulated Planet: Foragers project.*

These examples are over 100 years apart, but both explore not only similar themes on altering the human body but also futuristic possibilities by using 'what if' scenarios to communicate their ideas. Furthermore, a compilation of design fiction projects featured on the Postscapes website is accompanied by the following description: 'Grounded as much in imagination as reality, design fiction is about bending the rules. It's about asking, "What if?", and using the remains to probe the edges of our changing world. The results may only be props or prototypes – but the best ones end up helping us navigate our near futures and the stories they share' (Postscapes n.d.). This depiction suggests that 'what if?' scenarios are closely associated with design fiction practice in digital media; however, this assertion should be considered with caution, as Postscapes is a company focused on tracking news and technology trends and earns profit through membership fees for exclusive content (Tracxn 2024). The 'what if' scenario is also evident in Dunne's and Raby's (2009, 2013) Designs for an Overpopulated Planet: Foragers project (see Figure 20). These designers stated, 'What if it were possible to extract nutritional value from nonhuman foods using a combination of synthetic biology and new digestive systems of other mammals, birds, fish, and insects?', and then applied this approach to develop a series of objects and a concept video (Dunne and Raby 2009, 2013). This analysis indicates that the 'what if' scenario is widely used in story creation as well as in design fiction to inform further development of the practice. According to Bleecker (2009), the use of imagination and the expression of imagination are valid ways to create design fiction; therefore, I used my imagination to create 'what if' scenarios. This provides validation for using 'what if' scenarios in this project.

### 3.2 Diegetic prototype theory

The term 'diegetic prototype' stems from the word 'diegesis'. In the context of film theory, particularly in science fiction cinema, 'diegesis' is defined as a fictional world. The term 'diegetic prototype' was introduced to describe future technologies that exist as fully functional objects in fictional worlds (Kirby 2010). One of the most recent examples is the Netflix *Black Mirror* television programme, created in 2011. There are seven series of this programme and 33 episodes in total. Each episode comprises a fictional story related to a future technology, and sometimes several different types of technologies are featured in an episode. I briefly discuss here three diegetic prototypes that I found compelling and were most closely related to my research.


*Figure 21. A diegetic prototype from the 'Hang the DJ' episode of the Black Mirror television series.*

I was fascinated by the interactive drawing and painting wooden worktable/computer (with a screen) from the episode titled 'Be Right Back' in Series 2, the circular-shaped timer from the 'Hang the DJ' episode from Series 4, and the use of mindfulness meditation in the 'Smithereens' episode in Series 5 (Brooker 2013, 2017, 2019). The 'Be Right Back' prototype was a combination of an easel and a computer. The screen and keyboard were integrated into an interactive grey screen in a wooden frame with little drawers for the Wacom and Apple pencil-like tools that were compatible with the screen (see Figure 16). The fictional character used this prototype to produce artistic drawings and paintings for her job. This explored the future possibility of and need for digitised hand-drawings and paintings. The prototype from the 'Hang the DJ' episode (see Figure 21) was a circular-shaped timer with a screen and smooth corners, which was used in a fictional dating game simulation. My first impression

was that this circular device potentially fitted the user's hand more ergonomically. This fictional prototype also fitted the description of a textural, touch-rich device because it did not have the typical rectangular smartphone shape. The third example from the 'Smithereens' episode used recorded mindfulness meditation, portraying how characters applied this in their daily lives to disconnect from stress and technical overload. The Uber driver character listened to a calming voice in his car to ground himself. Another character, who was the owner of a fictional social media company, is shown meditating and 'digitally detoxing'. The mindfulness tech trend is evident in this episode. These diegetic prototypes also suggested the potential exploration and emergence of hand-drawn interfaces and touch-rich and mindful interactions in tech.

According to Kirby (2010), the aim of using diegetic prototypes in entertainment is to create hype around fictional technologies and business opportunities to encourage the development of real-world working prototypes. These diegetic prototypes from *Black Mirror* described previously (see pages 48 and 65–66) potentially represent this type of exploration. It can also be argued that these fictional prototypes aim to provoke a response from the audience rather than being orientated towards mass production or the development of a fully working prototype (Stappers and Giaccardi 2016). These episodes are also examples that show that fictional objects can be simulated as being fully functional in a story and do not have to be fully operative to be thought-provoking. Another practical advantage of using diegetic prototypes is that they are instrumental in creating design fiction narratives. This also relates to the design fiction limitation of over-reliance on the visual narrative rather than the prototype (Bleecker 2009; DiSalvo 2012; Dunne and Raby 2013). According to Coulton et al. (2016), diegetic prototypes are needed to mitigate the overfocus on the design fiction narrative by diverting some of the focus towards a physical object. This provides validation for creating fictional 3D prototypes (whose functionality is simulated) in this project.

Wireframing is a key part of designing and prototyping interfaces, particularly in the early stages of the design process, because it provides a foundation for the digital interface (Staiano 2022). This is typically monochromatic, but it can be hand-drawn on paper or software-rendered (Buxton 2007; Staiano 2022). Emerging technologies are also able to transform hand-drawn wireframes into high-fidelity mock-ups (Wimmer et al. 2021). Recent research has also suggested that monochromatic hand-drawn wireframes are an established way to design products and services (Buxton 2007; Case and Day 2019). The advantage of using hand-drawn wireframes is that they enable designers to create quick, low-fidelity solutions (Buxton 2007). The limitation of this approach is in readily sharing it with teams, designers, developers, and stakeholders for feedback, particularly in commercial settings (Cooper et al. 2014). This was not an issue for this project because it did not involve immediate client responses. According to Wood (2019), basic wireframes without aesthetics should not be confused with final designs. However, even low-fidelity hand-drawn wireframes can vary in fidelity and detail.

For example, a wireframe comprising only text boxes and minimal text would differ visually and aesthetically from a wireframe in which all of the UI elements are illustrated in detail (Wood 2019). However, the use of wireframes in design fiction differs from other practical design applications because it not only explains the usability of the design but also encourages imaginative engagement, provokes debate, and proposes futures (Bleecker 2009; Dunne and Raby 2013). This analysis indicates that low-fidelity wireframes can be used as final outputs. Furthermore, in this context, low-fidelity is defined as the first rough draft sketches produced to create the final drafts and also the final wireframes with detailed hand-drawn illustrations, which are oriented towards the final outputs. Another important advantage of using wireframes is that they are crucial in simulating the fully functional objects (please refer to the examples mentioned in the previous sections (pages 65–66)). This also provides validation for developing prototypes using wireframing to simulate how fictional, less-noisy digital interfaces work.

### 3.3 Design fiction narrative theory

In 'The Poetics of Design Fiction' framework (Markussen and Knutz 2013), the researchers placed strong emphasis on connecting literary practice and design practice when developing design fiction with design students during a workshop. They also worked in collaboration with a Danish writer, using the writer's unpublished novel as a starting point. This manuscript comprises a dystopian narrative in the near future, in which a civil war breaks out owing to a financial and economic crisis in Denmark in 2018. The design students were instructed to respond to this narrative by developing design fictions. Some of the themes were 'about how the civil war would effect a radical change in our family structures, rituals, health care services, energy supply' (Markussen and Knutz 2013). In response to the brief, the students developed speculative prototypes together by following the four framework steps mentioned previously (see page 63). In the context of this framework, literary technique is merged with design practice; however, I did not have a specific speculative narrative for my project. Nevertheless, I adapted the four-step methodology, which also led to my identification of the need to develop more general design fiction narratives. In my project, the narratives had a different purpose as they did not provide a starting point and emphasis, but rather were a complementary element to the design practice. First, I identified the need to communicate how the prototypes worked. Second, I recognised the need to communicate how the prototypes could potentially be marketed and advertised to consumers. These findings stemmed from the following analysis.

Regarding the use of technological products and applications (both software and hardware), user manuals are designed to assist users by providing instructions, information, and tips on using the device, service, or application (Samsung 2022). User manuals typically include explanatory text and

simple illustrations or diagrams. The user manuals of large IT companies such as Apple, Samsung, Sony, Nokia, and others can be found on their websites. This shows that user manuals are a standard way to communicate how devices and applications work and are an accepted method in the IT industry, particularly in large IT companies. Furthermore, technical writing is used to produce user manuals in the IT industry. Technical writing is a writing practice that aims to communicate technical information to experts and consumers on computer software, hardware, and consumer electronics (Society for Technical Communication n.d.). For example, Google provides technical writing courses for its engineers and software developers because 'every engineer is also a writer' (2022). As such, technical writing could be used to develop the user manuals for the diegetic prototypes in this research, as well as being an established way to communicate ideas in the IT industry.

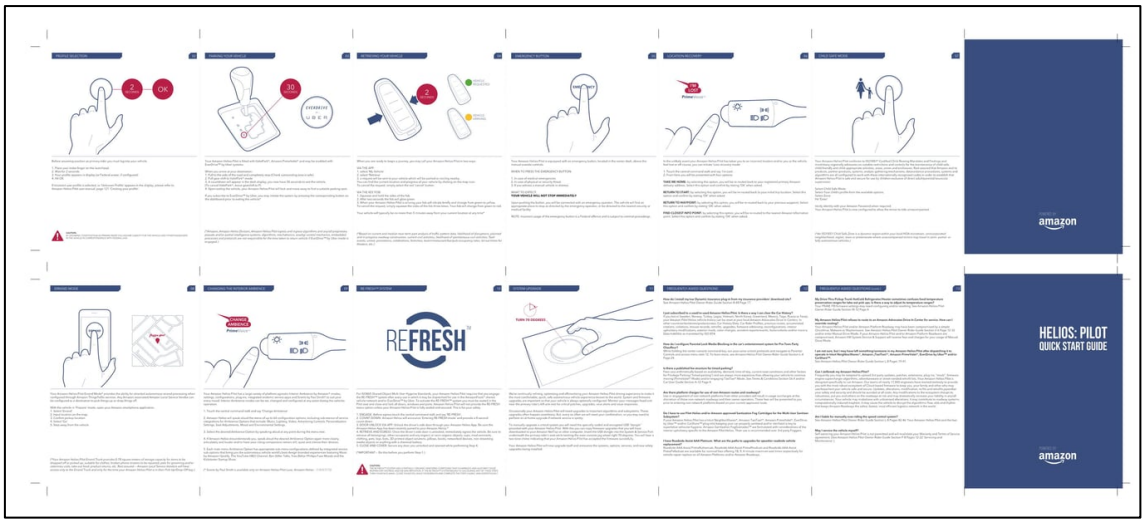



*Figure 22. The layout of the Quick Start Guide fictional user manual.*

Creating fictional user manuals and catalogues for fictional products, devices, and services is a common practice in design fiction. From the designer's perspective, the purpose of design fiction narratives is to explore, test, and communicate possible future scenarios with an audience (Bleecker 2009; Dunne and Raby 2013). From the audience's perspective, design fiction narratives aim to stimulate discussion on whether those futures are possible and desired (Bleecker 2009; Dunne and Raby 2013). For example, the Near Future Laboratory (2015a), an international design agency, is focused on producing 'catalogs, newspapers, or user manuals from the future, which are objects that could be designed to exemplify and to materialize these scenarios about possible futures for clients as well as our own investigations'. One of its projects, titled Quick Start Guide (see Figure 22), was a fictional user manual for Amazon's fictional self-driving car and was accompanied by a set of keys (Near Future Laboratory 2015b, 2015c). Another example is a project called Ambient Furniture Catalog by Paul Franzosa, which involved a series of visualisations of diegetic prototypes including 'Skype Cabinet', 'Facebook Coffee Table', 'Energy Clock', 'Pandora Chair', 'Google Latitude

Doorbell', and 'Amazon Trash', together with technical instructions in a single document (Franzosa 2011). The use of chronological sequences was evident in these examples, and this is what I applied to my own practice when creating user manuals (Hodges 2003).

In addition to developing user manuals, illustrative storytelling is another method used to promote products and services to consumers and IT industry experts. One example of this is the hand-drawn type and illustrative elements evident in several Light Phone campaigns, created by the company co-founder Joe Hollier (2020a, 2020b). Hollier's practice focused on monochromatic pencil and black liner or marker illustrations and typography. The use of visually pleasing hand-drawn illustrations with the texture of pencil and marker felt unconventional and thought-provoking compared to the smooth-looking websites of large IT companies. Therefore, I applied the use of monochromatic illustration to create project outcomes. In addition to illustrative storytelling, design fiction comics are commonly used to visually communicate the potential uses of a diegetic prototype. For example, the four-page 'Voight-Kampff Machine Design Fiction Comic' (see Figure 6) illustrates how a consumer can potentially use a diegetic prototype (Coulton et al. 2017). In this comic, Sturdee used one colour scheme, comprising different shades of blue, and comic panels to tell the story of how the fictional Voight-Kampff Machine works. As previously mentioned (see page 39), Sturdee's work applies external focalisation because the main character (as well as other characters) is portrayed outside of the character (Bal 1985). First, Sturdee used panels to create the narrative. She then used cinematic angles, such as full shots and close-ups, to depict the actions and emotions (Eisner 2008). Then, Sturdee depicted the character's emotions by illustrating their face and demeanour (Eisner 2008). In my own practices, the narratives were focused on external focalisation; therefore, I applied the same methods as Sturdee, including panels, framing devices, and illustration of the character's emotions (Coulton et al. 2017). This analysis provides validation for developing the user manuals for each of the diegetic prototypes, the use of technical writing to produce the text for the user manuals, the illustrative outcomes, and the design fiction comics for the three diegetic prototypes.

In 'The Poetics of Design Fiction' study (Markussen and Knutz 2013), the researchers showed that the use of poetic methods, such as literary practice, can be incorporated into design practice. I thought that this would be an important element for my project because it would enable me to create narratives. The researchers had used a script (developed by a writer working with them) as the starting point for the design fiction (Markussen and Knutz 2013). A limitation with this approach was that I did not possess the writing skills to develop literary texts. This prevented me from incorporating this at the beginning of my practice. Another disadvantage of integrating this at the beginning of the project was using unrefined design proposals rather than fully developed concepts. This validated the need to employ a writer to create the narratives once the diegetic prototypes were produced. As mentioned in Section 3 (see page 63), a key focus in stage 4 was working with students and a writer

to create narratives for the diegetic prototypes. However, I decided to commission a writer to develop narratives for my prototypes (which then would be illustrated by me) in this project.

## 4. Illustrative practice as provocation

A benefit of adapting the four-step method from 'The Poetics of Design Fiction' is that it allowed the creation of design fiction (Markussen and Knutz 2013). Important advantages of this approach are that it provides a framework for design researchers (such as myself) and also shows how using literature in practice can be a valid method to explore the design process (Markussen and Knutz 2013). The researchers used the co-design aspect to engage a writer and students in discussions during the design process (Markussen and Knutz 2013). The constraints of this framework can be categorised into two key aspects: (1) issues relating to how the narrative is created and (2) how it is perceived (Barthes 1977; Genette 1980; Bal 1985) (see the narrative theory discussion in Section 5 of Chapter 2 (pages 37–39)). First, the use of this framework in real-life scenarios or industry may not be feasible or may be limited by time and resources because it relies on a writer creating a story and an illustrator or designer then creating diegetic prototypes and visualising the story. Therefore, designers and big tech companies should consider this when investigating this approach.

Second, viewers construct meaning from the narrative themselves (Barthes 1977). When design fiction narratives rely on poetry and literary practice, such as the overuse of symbolism and metaphors, they become too abstract, conceptual, or too open to interpretation (Barthes 1977; Coulton et al. 2016). This then leads to narrative misinterpretation as the viewer may not understand the primary authorial intent of the speculation (Barthes 1977; Coulton et al. 2016). Malpass (2017) argued that poetic design fictions are inaccessible to non-expert audiences when they are too conceptual, and such audiences may not be familiar with speculative or poetic frameworks. Coulton et al. (2016) proposed that speculative narrative framing enables viewers to understand the story and its speculative intent. This means that poetic design fiction should include speculative framing to avoid disengagement. This should be taken into consideration when using 'The Poetics of Design Fiction' framework and developing speculative narratives with poetic elements (Markussen and Knutz 2013).

Another limitation of this approach is that it does not provide further steps regarding how outcomes can create debate without the co-design element (see the analysis of co-design in design fiction in Section 3 of this chapter (page 62)). DiSalvo (2012) suggested that design practice should 'spark debate'; however, Ward (2019) argued that it is unclear how and where debate is facilitated and who is involved in the conversation. The original aim of my project was to present the outcomes as an

exhibition, at which members of the design community and a public audience would participate in a discussion at a private viewing. However, this was not possible owing to the COVID-19 pandemic (see Section 8 for further information (page 151)). Therefore, this discussion was designed as an expert review in which I shared my practice with the intention of provoking debate with the expert reviewers.

I am particularly interested in testing illustrative narratives to prompt discussion that may lead to new concepts. A recent study has suggested that in the speculative design process, narratives function as a provocation tool during a project's dissemination phase (Casnati et al. 2024). This study reassured me that illustrated narratives could be used to stimulate debate. With this in mind, I found Hollier's monochromatic hand-drawn illustrations and typography for the Light Phone thought-provoking and relevant to my own practice. Call-to-action slogans, such as 'Lighten your heavy phone' (see Figure 7), illustrated in still and animated hand-drawn typography with illustrated elements in black and white, were orientated towards consumers, encouraging them to try and buy the product but also to try a different way of using technology (Hollier 2020). The texture and uneven pencil strokes, uneven but aesthetically pleasing typeface, and monochromatic contrast in the images felt refreshing compared to the smooth-looking websites of tech giants such as Apple, Amazon, and Microsoft. Another example is 'A Zine About Going Light: Remaining Human in our Digital Age' (Hollier 2020), consisting of monochromatic pencil and black liner or marker illustrations accompanied by written explanations or narrative (see Figure 8), which was published as a blog post. It is thought-provoking because it causes users to rethink their current or unhealthy smartphone use habits. This suggested that hand-drawn monochromatic illustration can stimulate debate and provided validation for using it to produce design fiction narratives. Outside these examples of illustrative practice, the main disadvantage of this approach was that there was no other literature that I could apply to support my hypothesis on how illustrated narratives stimulate debate. Another disadvantage of using illustrative narratives as a provocation tool is that it is an experimental method that does not provide any guarantee that relevant data will be collected. This created a significant risk factor; however, I was confident about embracing thus uncertainty and exploring this new concept with the aim of collecting unexpected insights.

## 5. Yoshi Phone and hand-drawn interfaces

In stage 1, I identified a design challenge called 'cold' generic digital interfaces through my literature and practice review. Such interfaces could potentially be enriched by designing a feature phone with a hand-drawn interface. I now needed a method to develop a more specific concept for the feature phone, which comprised stage 2. In this stage, I considered how this proposal could be adapted into

a 'what if' scenario by brainstorming ideas in my sketchbook using my imagination (Bleecker 2009). My intuition was to adapt the proposal using the same words and restructuring the sentence into a question. My first attempt was, 'What if a feature phone could have a hand-drawn interface?', which I wrote in my sketchbook (see Figure 24). I decided that this 'what if' scenario was sufficient because it enabled me to create a prototype with a hand-drawn interface design. This shows how my practice evolved from a proposal to a more detailed vision.

In stage 3, I focused on developing the shape, interface design, logo, and name for the feature phone as well as a 3D prototype. First, I considered what a feature phone with a hand-drawn interface could be called. I developed the name 'Yoshi Phone' by using my nickname 'Yoshi' (to recognise myself as the creator of this device and its hand-drawn interface and to communicate this to consumers and clients) and adding the word 'phone'. The next stage was to determine the phone's shape and how it would look and feel. I thought that its shape should reflect similar current market-leading designs, such as the Light Phone and Mudita Pure phones – that is, rectangular shaped with rounded corners and able to be held in one hand. I drew a rough sketch of its rectangular shape with preliminary UI design in my sketchbook (see Figure 24). I did not focus on its dimensions because I wanted to capture the correct proportions of its shape, as it was a first draft. However, the shape of the device was not as important as the emphasis of this design, which was its hand-drawn interface. This physical prototype aimed to complement and facilitate the hand-drawn UI rather than be the main focus. The shape needed to be larger as the interface looked too small, and I was worried about its functionality in terms of visibility. I drew another draft with a slightly larger shape, and I rounded its dimensions so that it did not look uneven (see Figure 25). I believed that its dimensions would readily fit into a user's hand, and the hand-drawn interface would be visible on the screen. This demonstrates how my practice evolved from a 'what if' scenario to a final feature phone visualisation with a product name, which was ready to be 3D printed (see Figure 25).

The final sketch and dimensions from my sketchbook were used to produce two AutoCAD files. The first file was without fillets, while the second contained them, as I did not know if the fillet would impact how the prototype felt when held (see figures 26 and 27). Based on similar current designs, such as the Light Phone, Mudita Pure, and Punkt phones, I decided to use one colour in the design and a black hand-drawn interface. The prototype could also be printed in other colours, but the technical advice was to use white so that it could be sprayed another colour after it had been printed if required. However, based on my hypothesis that monochrome hand-drawn interfaces reduce noise, I decided to keep this basic white colour. The Yoshi Phone prototypes were 3D printed in a hard white recycled polylactic acid (rPLA) filament material from Fliamentive. The ridges from the 3D printing were visible on the prototypes. As advised by the 3D technician, I smoothed the prototype

surfaces with 320-grit waterproof sandpaper and water until smooth, and the ridges had disappeared. This demonstrates how my practice developed from a phone visualisation to a physical 3D prototype.

Simultaneously, while working on the physical prototype, I developed a logo and the phone's interface design. I used the original Yoshi Phone sketch to improve the structure of the UI design. This was inspired by the idea of 'modes', based on activities or places associated with tasks rather than apps. This solution was inspired by Google's Creative Lab (2019a, 2019b) digital wellbeing experimental app, 'Morph'(see Figure 23), which also uses modes. I thought that this feature phone could have modes instead of apps, which would drive the device's structure. The UI structure was not important, as the focus was on its hand-drawn elements. In my original sketch, I developed the UI menu and icons based on the phone having six main modes – basics, home, work, commute, wellbeing, and offline – which offered the user tasks that were most likely associated with their location. The preliminary sketch included various ideas on how the modes could be visualised, such as by using typeface and symmetrical shapes, icons, icons and typeface, and typeface only.


*Figure 23. Work mode from the 'Morph' app.*

I thought that there were too many ideas, and I needed to refine how the modes would be visualised. For example, the Light Phone UI has typeface only, while the Mudita Pure has both typeface and icons. I considered whether the Yoshi Phone could have two different views, such as 'icon view' and 'non-icon view', which users could select from. By using both modes, the phone would not be too similar to the Light Phone. Both views would also communicate low-noise digital interfaces. For example, the non-icon view would potentially provide a less distracting experience because it would lack hand-drawn icons. I also thought that by including the icon view, I could create hand-drawn

icons, making the phone less similar to the Mudita Pure design. I imagined both views in the minimalistic hand-drawn UI style because they had to align with the concept of the feature phone and its less noisy experience. I proceeded by creating life-size pencil layouts in my sketchbook. Using a black fineliner pen, I then drew the potential wireframes needed to set up the icon and non-icon views. Some of these illustrations were sufficient to use, but others needed refinement. I sketched out several more illustrations of these elements to visually improve them. I realised that the 'Yoshi Phone' hand-written typeface from the wireframes could be used as its logo, and so the illustrations could have several uses. I then used the same process to develop the icon and non-icon views. After inspecting the illustrations in my sketchbook, I determined that they were acceptable for the final UI. All of the icon modes were illustrated, and their line work was consistent. I was satisfied with the results because the icons were aesthetically pleasing. I also had ample additional illustrative elements that were improvements on the originals. I scanned the final illustrations of the interface design for the Yoshi Phone (see figures 30–32). This demonstrates how my practice evolved from sketches to final illustrations of the feature phone UI. This also shows how it evolved from a 'feature phone' to the Yoshi Phone with an associated logo and UI design.

The last step in this stage was to combine the physical prototype and the hand-drawn UI to simulate the Yoshi Phone. After the 3D prototype had been printed and smoothed, it was ready to be photographed. I considered whether taking photos in different locations would help to communicate the idea that the user could switch between modes. For example, an image of a hand holding the Yoshi Phone outdoors while walking would represent 'commute' mode, an image showing a hand holding the phone with 'home' mode activated while on a bed, etc. I had several ideas of how these modes could be documented, but I also wanted to experiment with the imagery during the photoshoot. I needed a strategy to facilitate this. I decided to go on a short user journey in which I would act as a user and show the Yoshi Phone's functionality. This enabled me to identify more situations for the Yoshi Phone modes. These images were produced on one of my daily walks during the COVID-19 lockdown, and I composed and photographed the prototypes in various indoor and outdoor environments by adjusting my hand and camera positions for each photograph (see Section 8 in this chapter for a description of the impact of the COVID-19 lockdown and restrictions on my practice and presentation (page 151)). Once I had produced a range of images, I picked the best image, which could then be edited and used for the user manual if required. The aim was to use these images to simulate the hand-drawn interface (see Figure 28). After I edited the scanned drawings using Adobe Photoshop software, I placed the hand-drawn interface onto the images of the Yoshi Phone prototype to simulate how this fictional prototype would work. The result of the development of these hand-drawn interfaces was a diegetic prototype called the Yoshi Phone (see Figure 29). The hand-drawn interfaces were successfully implemented on the Yoshi Phone. Unlike a smartphone, the Yoshi Phone used a minimalistic, hand-drawn, and monochromatic UI, which was free from colour

and 'generic' UI elements. Compared to a typical smartphone interface design, it also provided less cognitive load and distraction for users. This demonstrates how the development of the physical prototype informed the hand-drawn interface design.

In stage 4, I focused on the development of text, storyboards, illustrations, and designs for the Yoshi Phone user manual. The written narratives for the phone were produced by writer George Forster, which I then illustrated. To produce the user manual, I first needed to document how it would work. As in other user manuals, I began with the cover page and 'about' section. These two elements introduced the user to the user manual and provided information about the Yoshi Phone concept. Based on its UI design, I wrote about how to set up the Yoshi Phone and its icon and non-icon views. I then described how to select and change modes. Offline – which was one of the modes – worked differently from the other modes; therefore, I provided a separate instruction for it. I wrote eight pages of content, which represented a storyboard in a chronological order (see Appendix B) (Hodges 2003). At this stage, I believed that the text would be sufficient to proceed further. Before determining the sequence, layout, and size of the user manual, I reviewed user manuals for Nokia phones and identified that a vertical layout composition and A5 size were typically used. To begin, I sketched a vertical layout for the user manual and potential illustrations to accompany the text (see Figure 33). Owing to the horizontal orientation of these sketches, images, and illustrations, I realised that it created an illogical composition by including excessive white space next to the imagery sides. This prompted me to change from a vertical to a horizontal layout, which resolved this issue and enabled me to finalise the user manual storyboard (see Figure 36).

Based on the storyboard and user manual text, I began production of the Yoshi Phone user manual. I created a first draft of the eight-page user manual, which included headings and instructional text together with the hand-drawn interface design and edited photographs. I noticed that it was difficult to understand the setup sequence without guiding the user to specific icons. I considered how I could mitigate this issue visually. I initially thought of using a mouse cursor because it enables the user to select an action and proceed to the next task. Using a digital cursor on the Yoshi Phone interface design would provide the user with an understanding of the setup sequence. I also considered creating a hand-drawn cursor; however, I was concerned that it would be lost and disappear in the interface and may confuse the user. Instead, I downloaded an open-source pointer cursor, which I then implemented in my designs. After reviewing the user manual, I realised that the instructions for the icon and non-icon views could be clearer. I also thought that selecting and changing the mode could be merged to avoid duplication. I reflected on how I had only focused on the UI settings and had not provided any information on the phone's design or how it worked, such as when it is locked or how to access the modes in the non-icon view. I realised that the user manual needed further work to address these issues. Rather than edit the text, I decided to work on the design. This enabled me

to add the missing pages and steps, merge sections, and identify missing images for the new pages and sections. After I had created the missing images using Adobe Photoshop, I inserted them into the final user manual layout. I then inspected this and amended any visual defects until the designs were complete and refined. This demonstrates how my practice developed from storyboarding, planning, and sketching images to producing final illustrations for the written narrative, as well as writing the user manual text and producing a final user manual for the Yoshi Phone.

'Yoshi Phone. Break the Mould' is a design fiction written by George Forster in response to my brief (see appendices F and H). Alongside the narrative, he provided me with its concept. I reviewed the concept and then read the narrative, and I thought that it was an interesting solution. The narrative provided a clear story in which the Yoshi Phone was portrayed accurately, and it also provided me with rich visual cues (such as a black void, illumination, flicker, shatter, light dies, etc.) throughout the story that I could use for the associated illustrations. In addition, the writer produced an advert copy of a hand-drawn aesthetic and offline/screen time functions, and a slogan. However, I decided not to use these because they included repetition of the 'Yoshi Phone. Break the Mould' phrase, and the narrative was sufficient to depict the phone. This demonstrates how my practice developed from receiving written narratives to finalising texts for illustration.

I encountered some challenges when working with the writer. George Forster's first submission included two written Yoshi Phone promotional narratives, short radio adverts, and text for a fictional Yoshi Phone website. While the writer had not been asked to produce these elements, he had created two types of promotional narratives for the Yoshi Phone called 'The Square Man' and 'See the World Again' (see Appendix G). 'The Square Man' highlighted the uses of the prototype but used either an overly positive tone or depicted unrealistic uses for the device that were reminiscent of the future visions of productivity developed by large IT companies, such as Microsoft's 'A Day Made of Glass', 'A Day Made of Glass 2', and 'Productivity Future Vision' (see Chapter 2). 'See the World Again' was the first draft of the 'Yoshi Phone. Break the Mould' narrative. I considered that the narrative provided a realistic representation of how the Yoshi Phone prototype worked and answered my brief. However, I thought that the title, 'See the World Again', did not fit the narrative and that it could be better communicated using the slogan that ended the story: 'Yoshi Phone. Break the Mould'. I communicated this to the writer, and he responded that he had created two types of narrative to provide me with a choice. He also amended the title of the second submission. While I was not entirely satisfied with one of the narratives, I decided to work with the writer because he had answered the brief and responded to my feedback. I thought that he would be able to produce narratives for the other two diegetic prototypes – Birds app and Shapie – and would implement my feedback if required. This demonstrates how I evaluated the written narratives before illustrating them.

To illustrate the 'Yoshi Phone. Break the Mould' phrase, I re-read the narrative and then created an initial storyboard in which I illustrated all of the potential panels (see figures 34 and 35). First, I thought that each panel could be included on a separate page; however, the illustrations may not be sufficiently detailed to be on a page by themselves, while the gaps between the sequence of images could be too wide. I re-read the narrative and realised that the story did not have a narration or text to use before the images, and that it read as though it was a silent animation or video. Therefore, I decided to use 16:9 ratio panels and create smaller sequential gaps between the images by using two same-sized comic panels on a page (see Figure 36). I reviewed the panels and worked on producing the final storyboard. When producing this final storyboard, I purposefully arranged the sequence of scenes. I aimed to only depict the important moments in the story (McCloud 2001). According to McCloud (2001), this enables a viewer to comprehend the visual narrative by connecting the gaps between the panels. Furthermore, the writer had portrayed this story using external focalisation, with the narrative expressed outside the main character rather than through their eyes (Bal 1985). Therefore, I also focused on visualising this character's emotions and feelings by framing the camera-like angles in the storyboard (Eisner 2008). After drawing all of the panels in sequence with a new structure, I realised that some of the panels were repetitive, unnecessary, or did not provide visual flow in the story. I removed and merged some of the panels so that the story was more fluent (see Figure 37). I used my imagination and intuition to visualise and select the scenes. I then prepared the pencil layouts for the final illustrations in my sketchbook. This demonstrates how my practice evolved from a finished text ready to be illustrated to a final storyboard.

I used my previous sketches as a starting point to create the final illustrations. I considered the composition, character design, anatomy of the characters, and backgrounds while drawing the illustrations. When I did not know how to illustrate a specific scene, object, or part of the human body, I gained inspiration from my surroundings and images obtained from Google image searches. I sometimes failed to achieve the desired results the first time; therefore, I would erase the pencil drawing from the panel, reflect on how it could be improved, and draw it again. I also sometimes did not know how to illustrate the same scene on several panels. Therefore, I would trace the original scene on tracing paper and copy it onto another panel before amending it to fit the narrative. I went through this reflective, instinctive, and intuitive thought process to create these illustrations until I felt that each of the illustrations had a good composition, the proportions were correct, and the linework flowed.

After I had sketched the outline of the final scenes onto the panels with a pencil, I used black artist fineliner pens to draw the final illustrations and panel outlines. I rubbed out the pencil markings and then added shadow lines to depict the pitch-black void, the illuminating light from the phone, and daylight after the smartphone was broken in the story (see Figure 38). I then scanned the black and

white illustrations (see Figure 39). To edit the final illustrations, I gained inspiration from *How to Draw Noir Comics: The Art and Technique of Visual Storytelling* by Shawn Martinborough (2007), which provided advice on how to colour hand-drawn narratives. I thought that the noir, monochromatic comic style would be appropriate because it would enable me to illustrate the shadows, darkness, and light elements often mentioned in the narratives. I used black to depict the pitch-black void as well as to create a dramatic contrast between the darkness in the story before the smartphone breaks and the daylight after it breaks. I also used black to separate the foreground and background in the illustrations and focus attention on the prototype and its use. This demonstrates how my practice progressed from a final storyboard to producing final illustrations.

This section also demonstrates how my practice developed during each of the four stages. The final results of these four stages were two illustrated narratives. The Yoshi Phone user manual was an 11-page, A4-sized document describing the phone's concept, how its icon and non-icon views worked, and its setup (see figures 40–50). The 'Yoshi Phone. Break the Mould' narrative was a nine-page, A4-sized series of illustrations envisaging how the phone would be advertised to potential consumers and clients (see figures 51–59). Both of these narratives were published on my personal website (see Figure 60). The Yoshi Phone user manual and the 'Yoshi Phone. Break the Mould' illustrated narrative can be accessed at https://www.joskaude.com/my-phd-project-yoshi-phone.

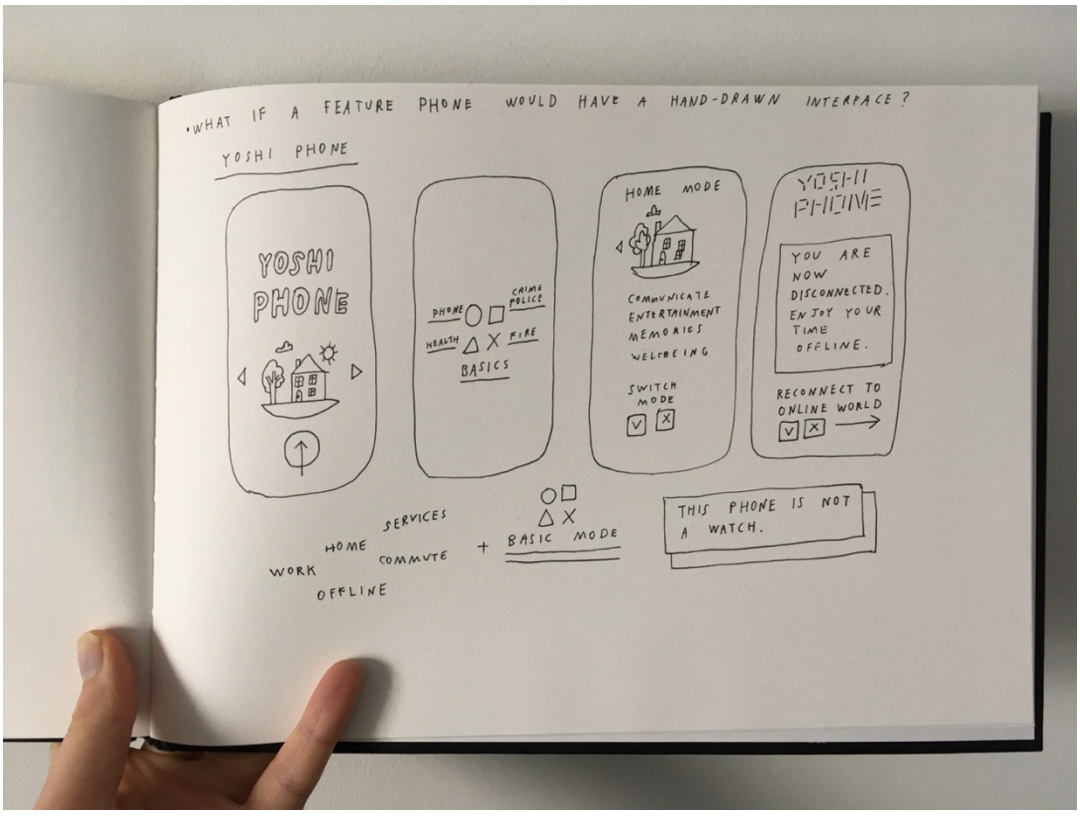



*Figure 24. 'What if' question exploration for the Yoshi Phone.*

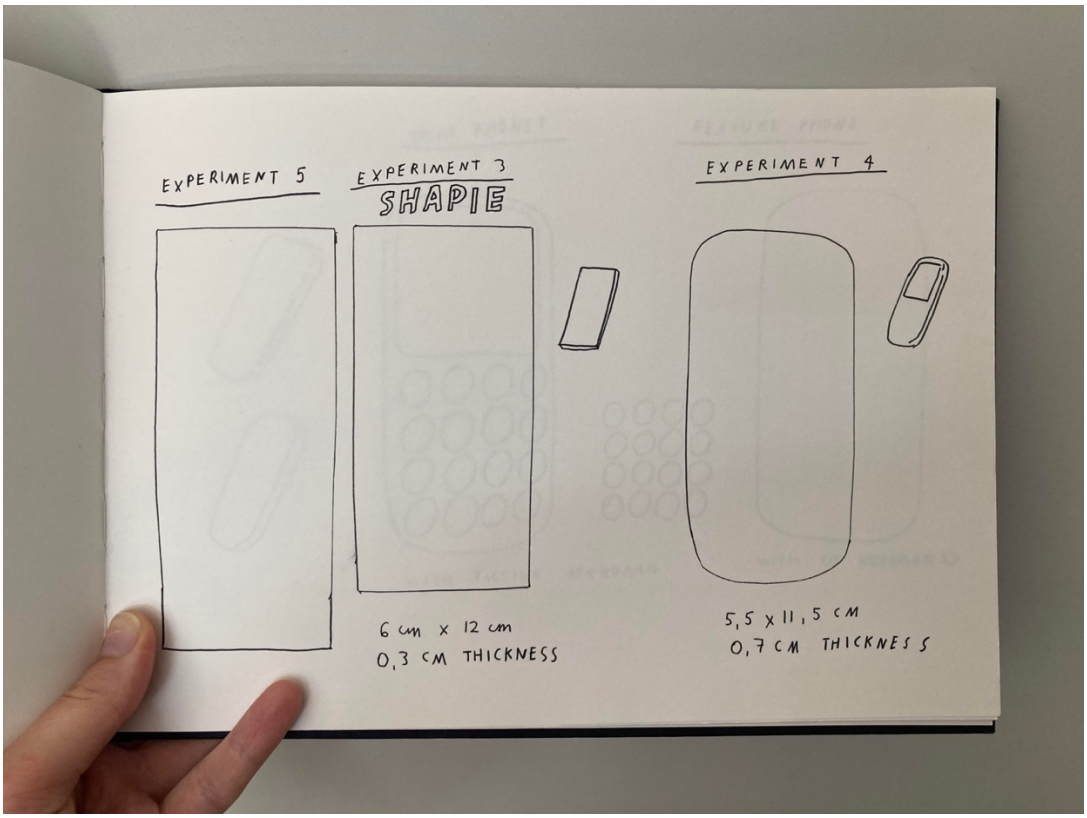



*Figure 25. Yoshi Phone prototype sketch.*

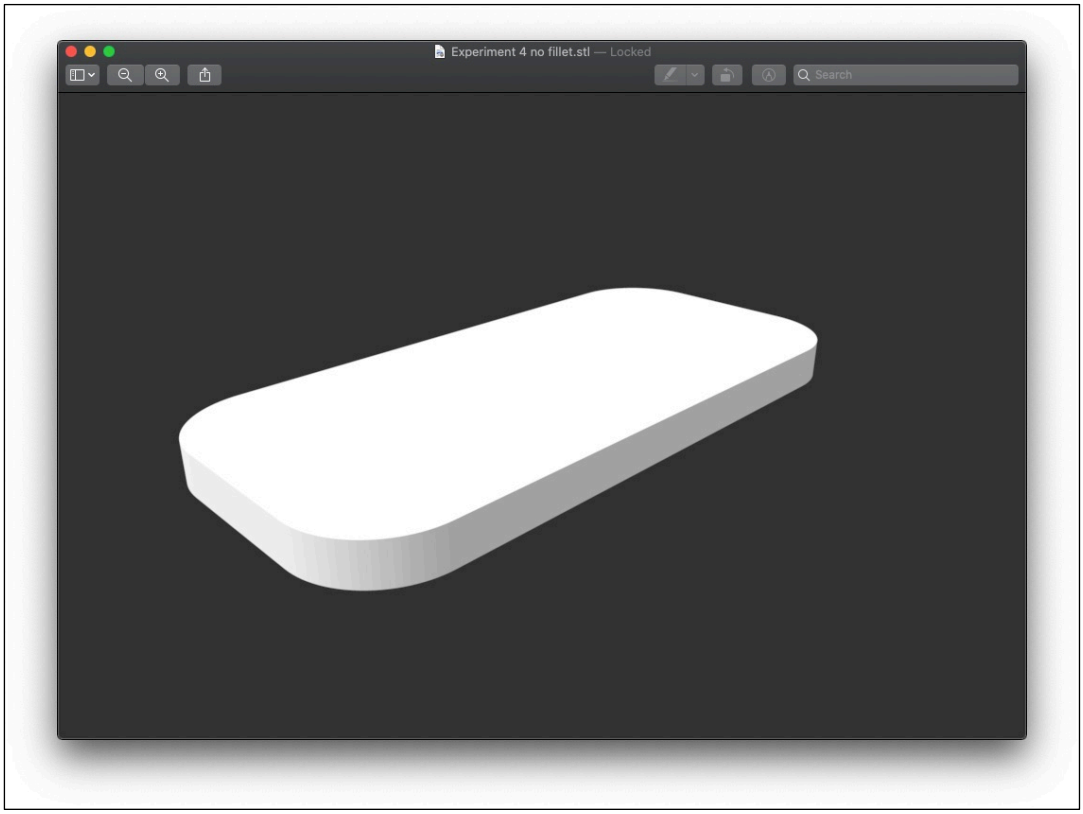



*Figure 26. Yoshi Phone 3D print prototype without fillets.*

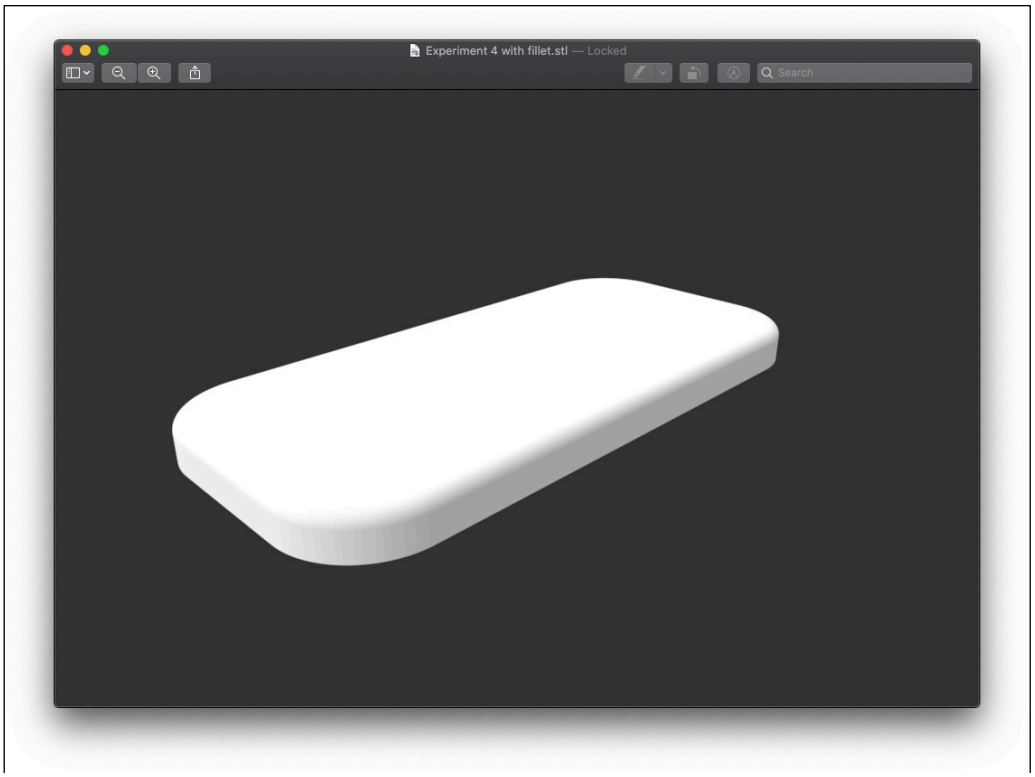



*Figure 27. Yoshi Phone 3D print prototype with fillets.*

*Figure 28. Yoshi Phone 3D prototype photographs.*


*Figure 29. Yoshi Phone 3D prototype with the user interface included.*

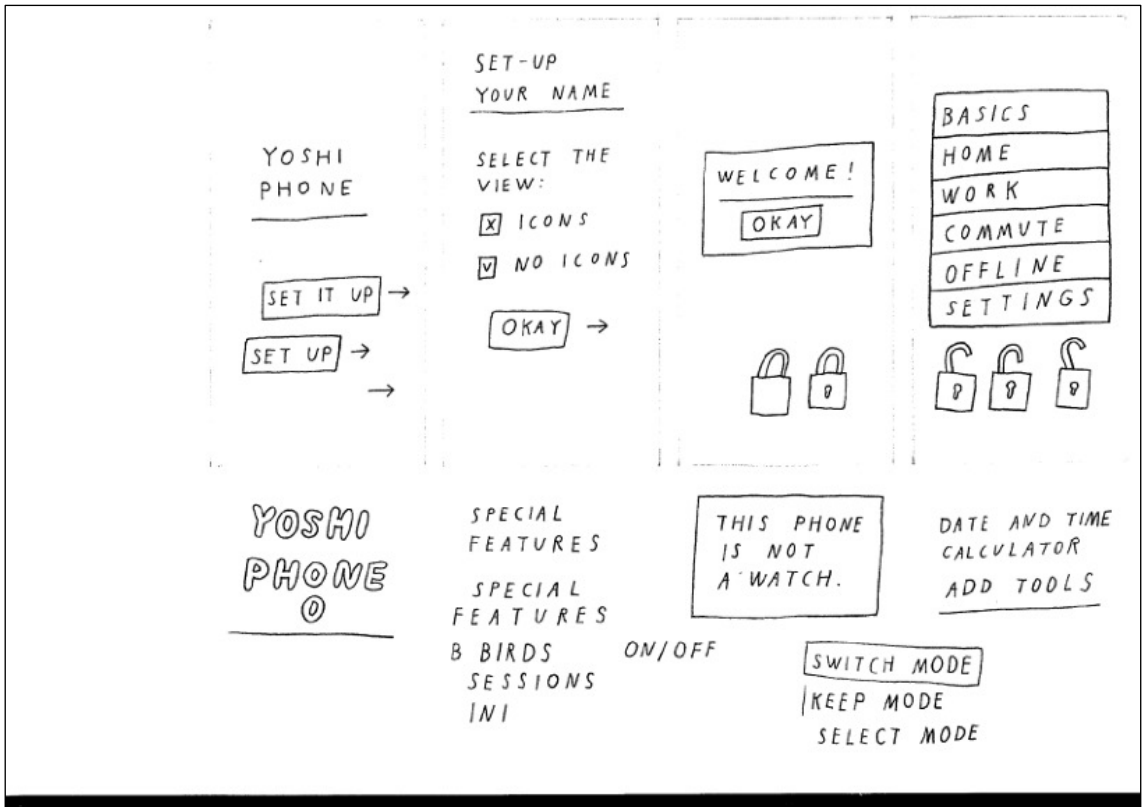



*Figure 30. Yoshi Phone interface sketchbook scan 1.*

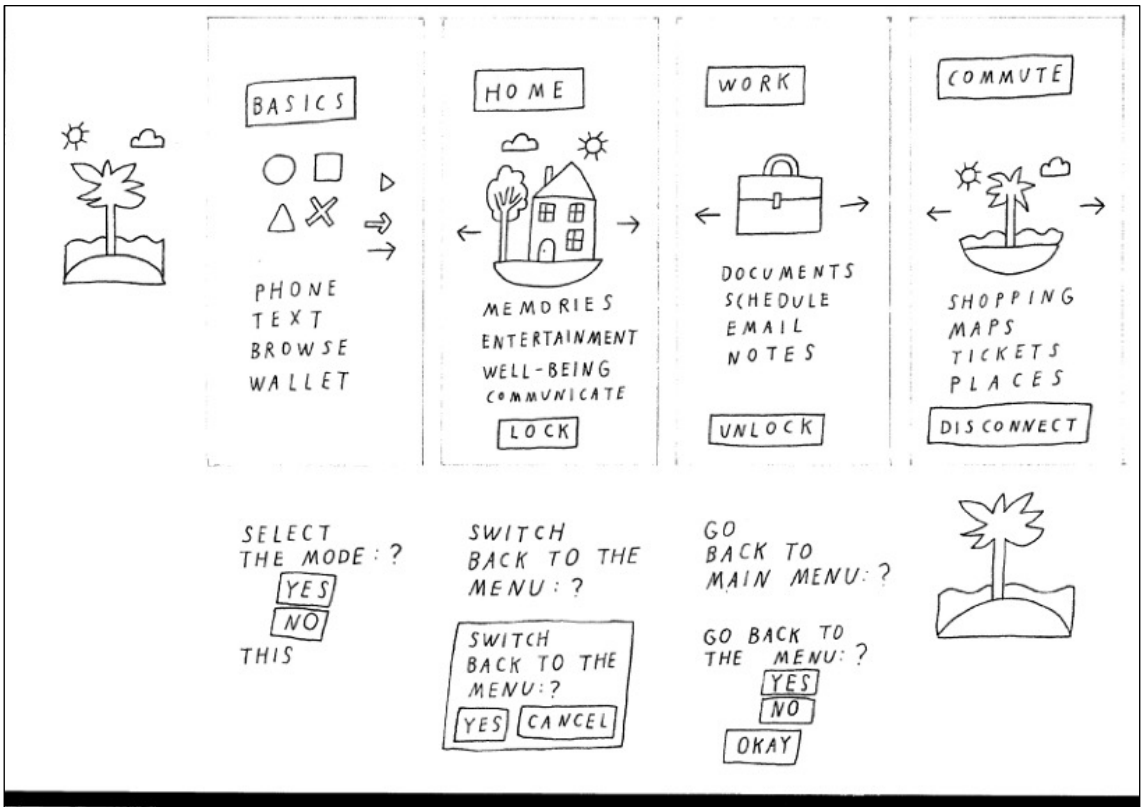



*Figure 31. Yoshi Phone interface sketchbook scan 2.*

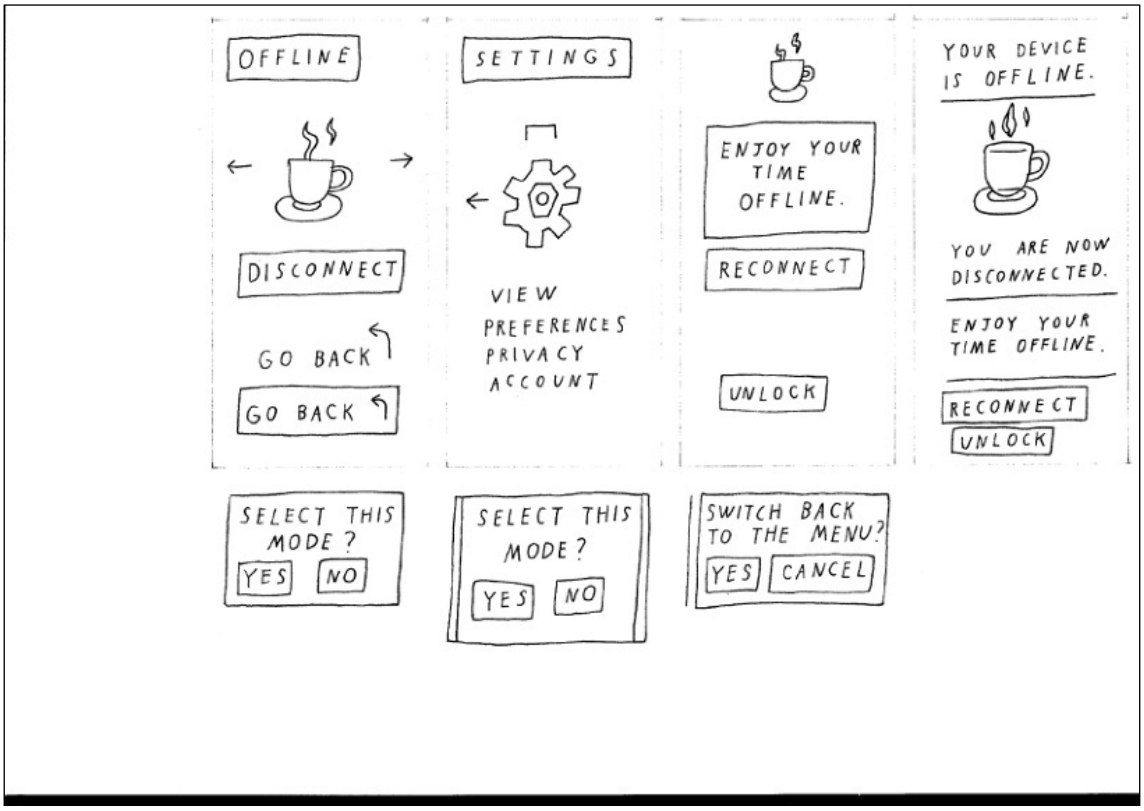



*Figure 32. Yoshi Phone interface sketchbook scan 3.*

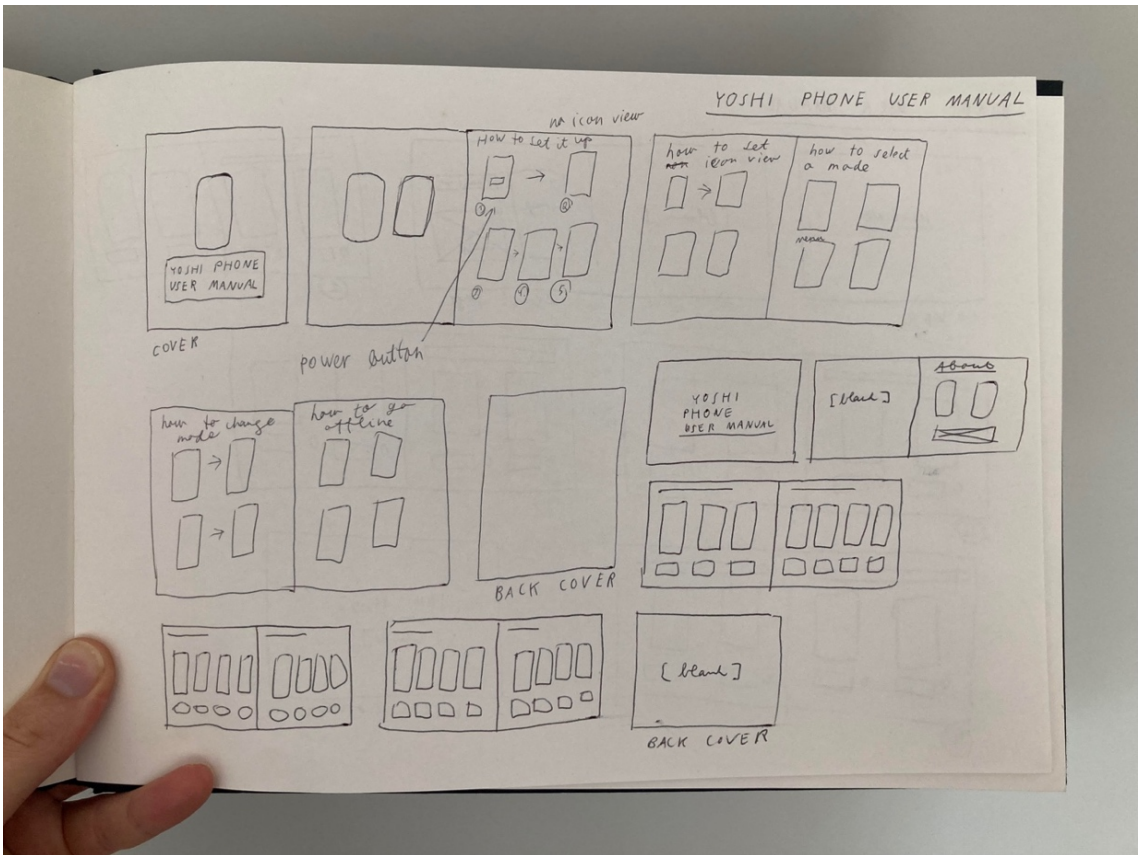



*Figure 33. Yoshi Phone user manual layout sketches.*


*Figure 34. Yoshi Phone narrative panels 1.*

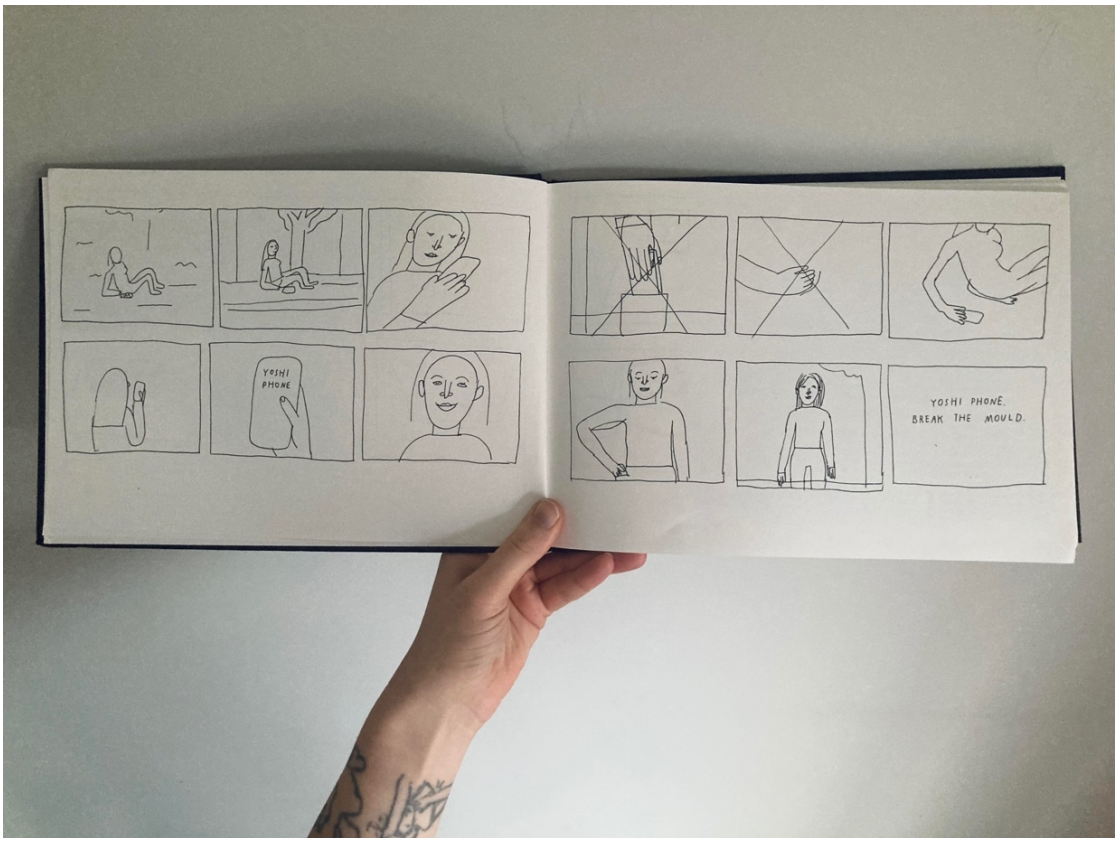



*Figure 35. Yoshi Phone narrative panels 2.*

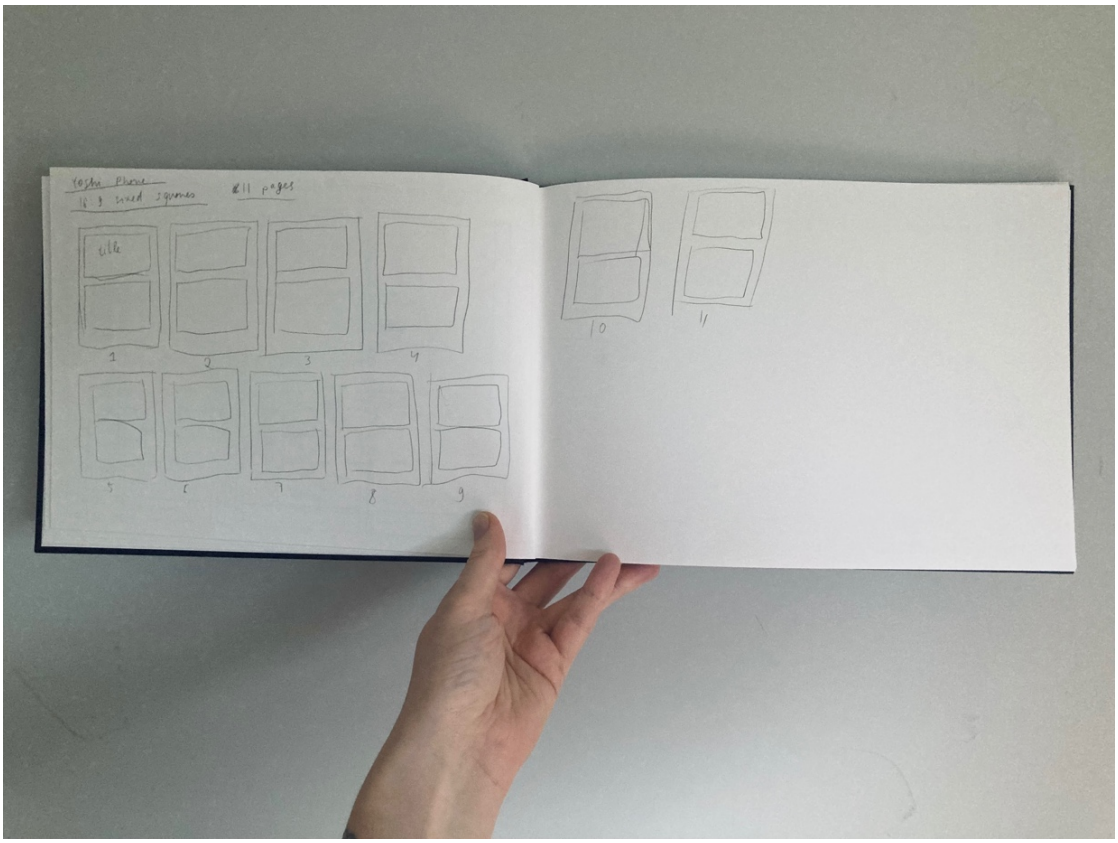



*Figure 36. Yoshi Phone narrative storyboard idea.*

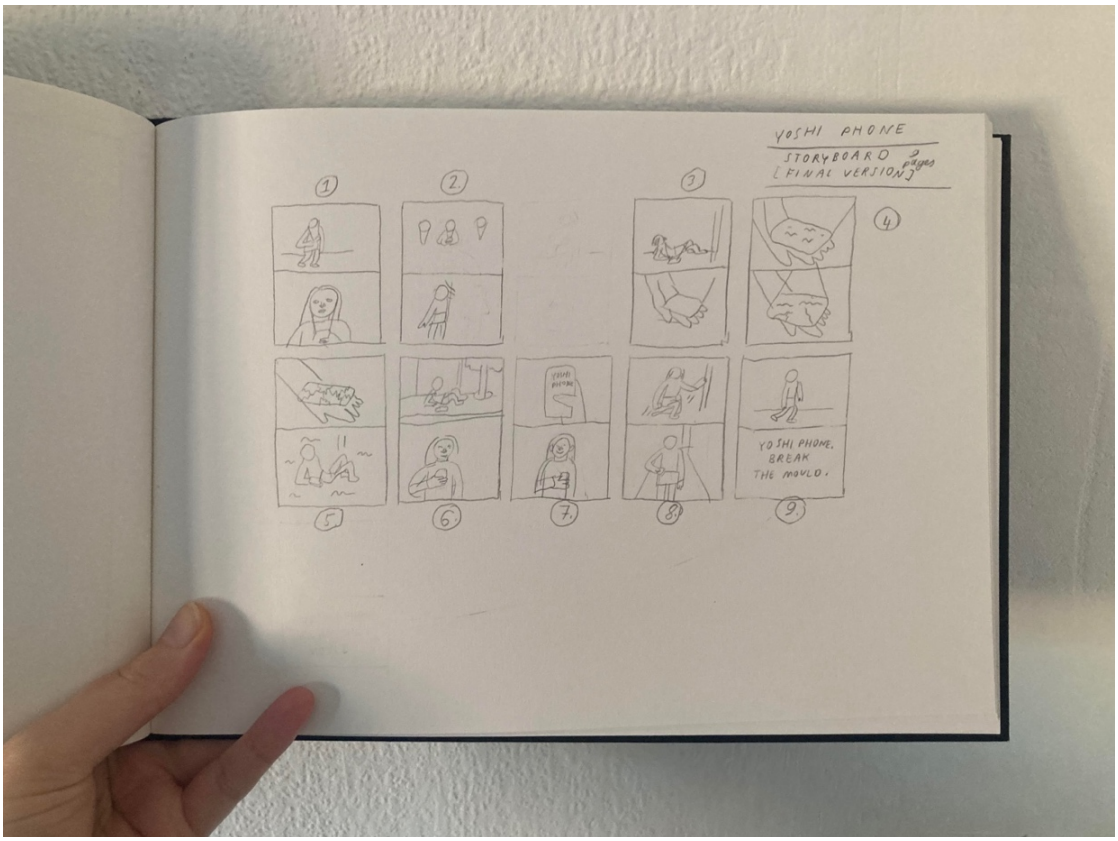



*Figure 37. Final Yoshi Phone narrative storyboard.*


*Figure 38. 'Yoshi Phone. Break the Mould' narrative in fineliner.*

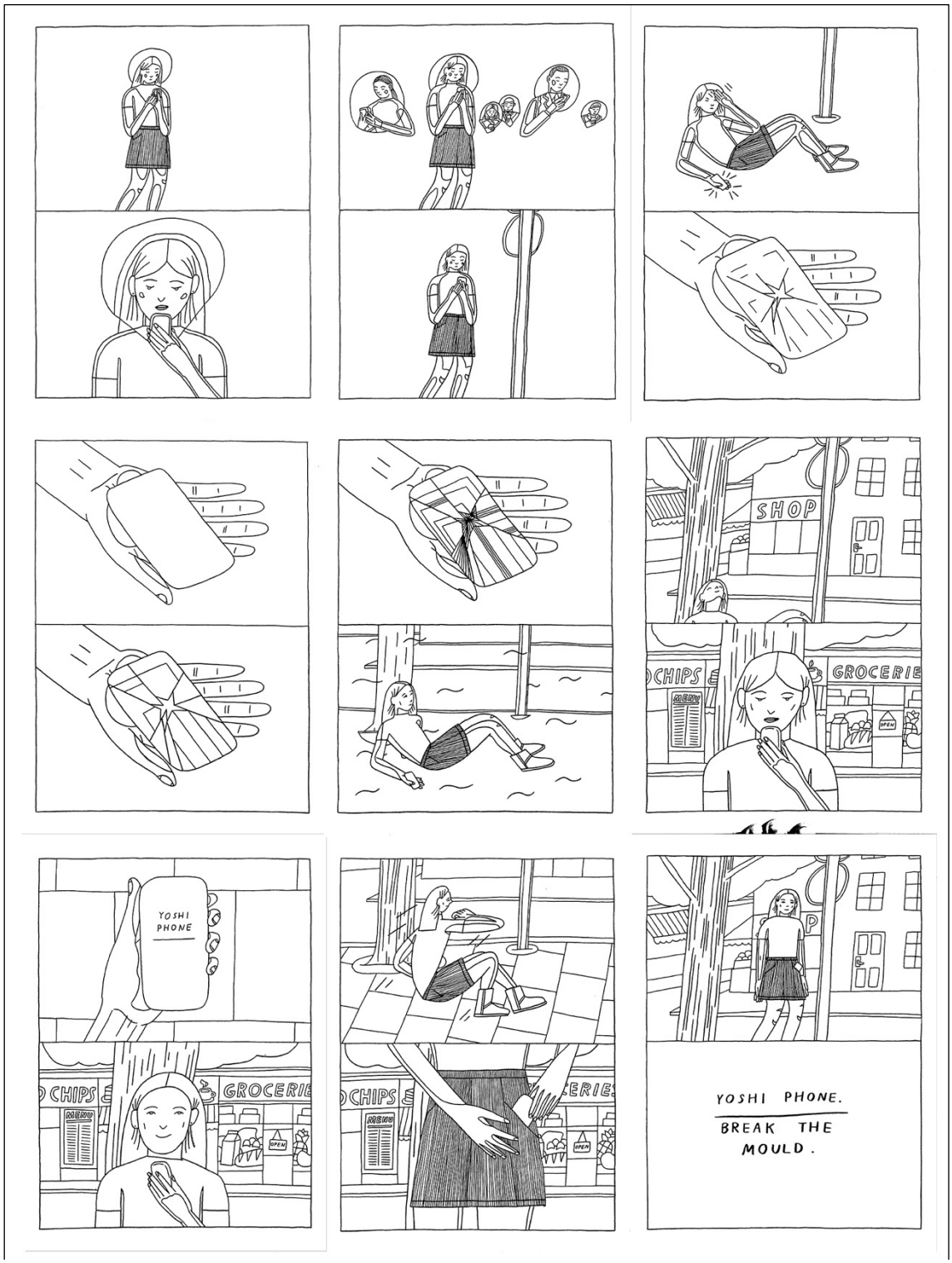



*Figure 39. 'Yoshi Phone. Break the Mould' narrative scans.*

YOSHI
PHONE

User Manual

Yoshi Electronics Ltd.

*Figure 40. Page 1 of the Yoshi Phone user manual.*

About



'Yoshi Phone' is the first feature phone with a minimalistic hand-drawn user interface, which is gentle on users' attention.

*Figure 41. Page 2 of the Yoshi Phone user manual.*

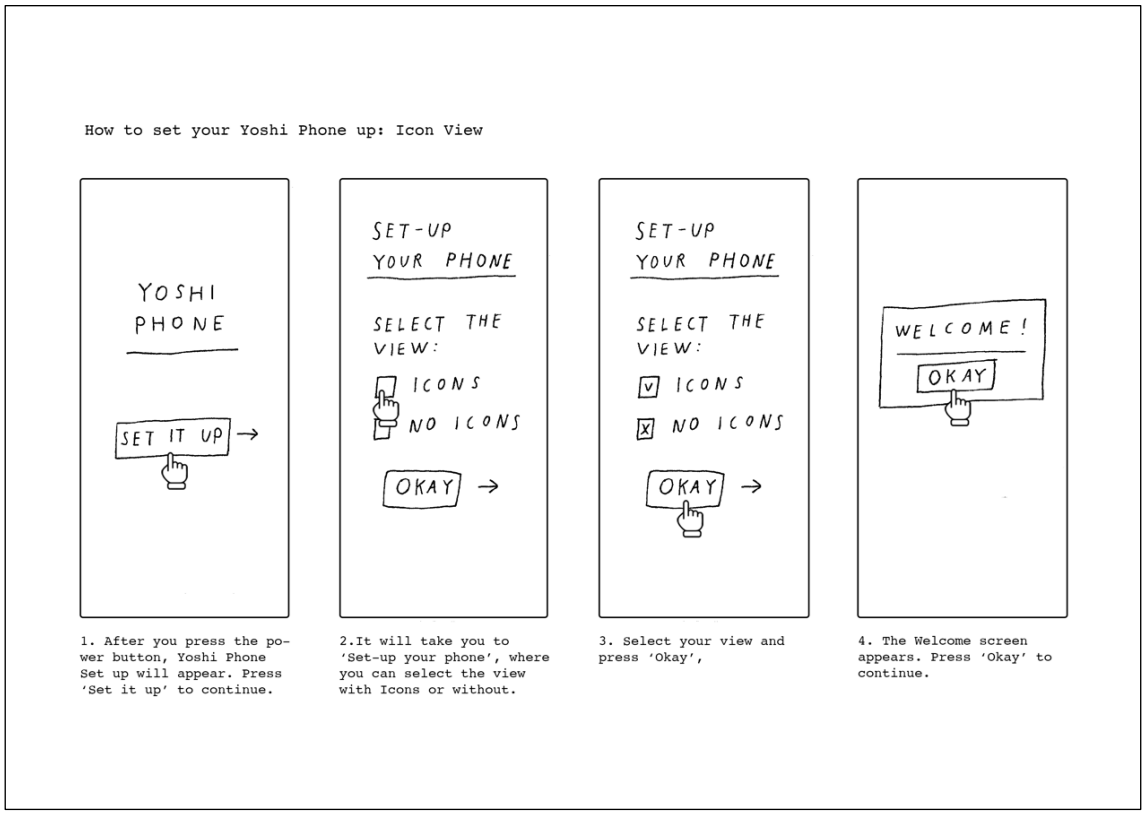



*Figure 42. Page 3 of the Yoshi Phone user manual.*

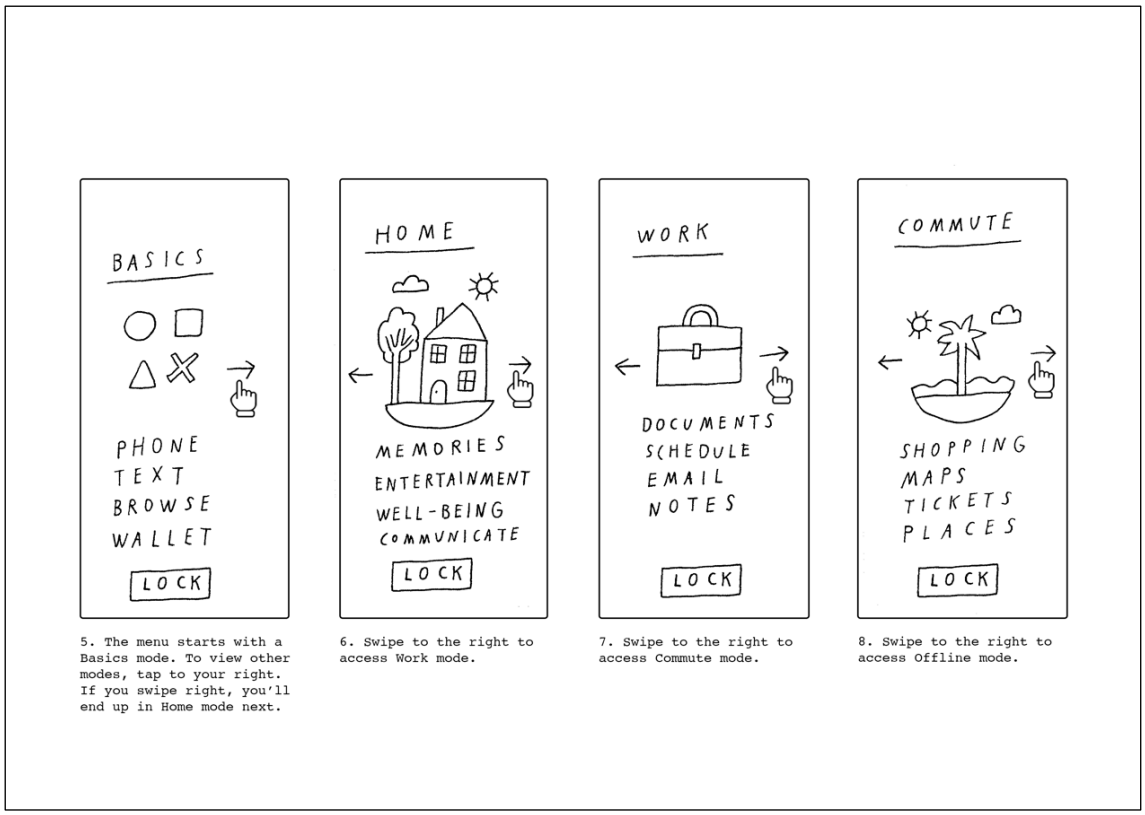



*Figure 43. Page 4 of the Yoshi Phone user manual.*

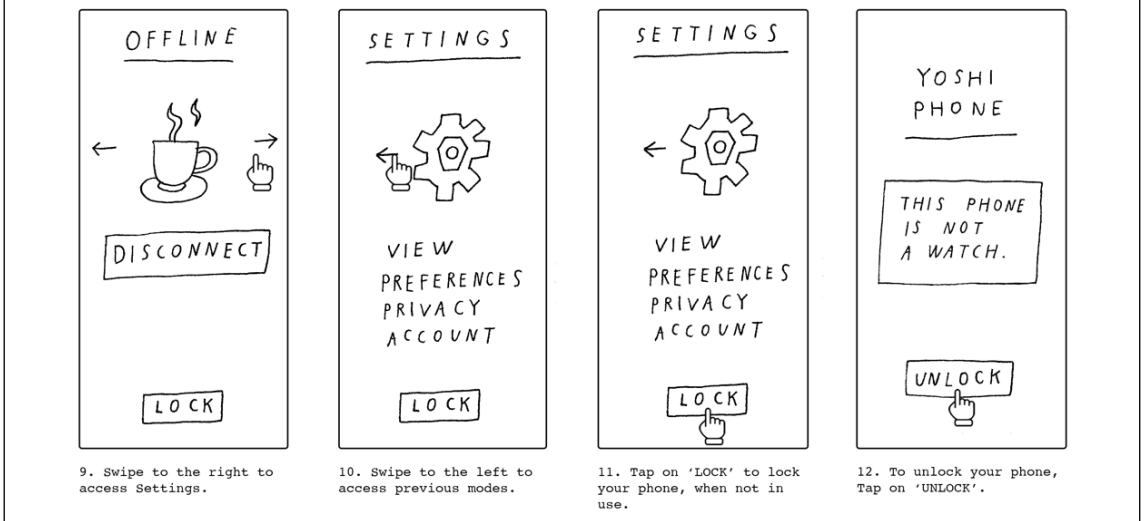



*Figure 44. Page 5 of the Yoshi Phone user manual.*

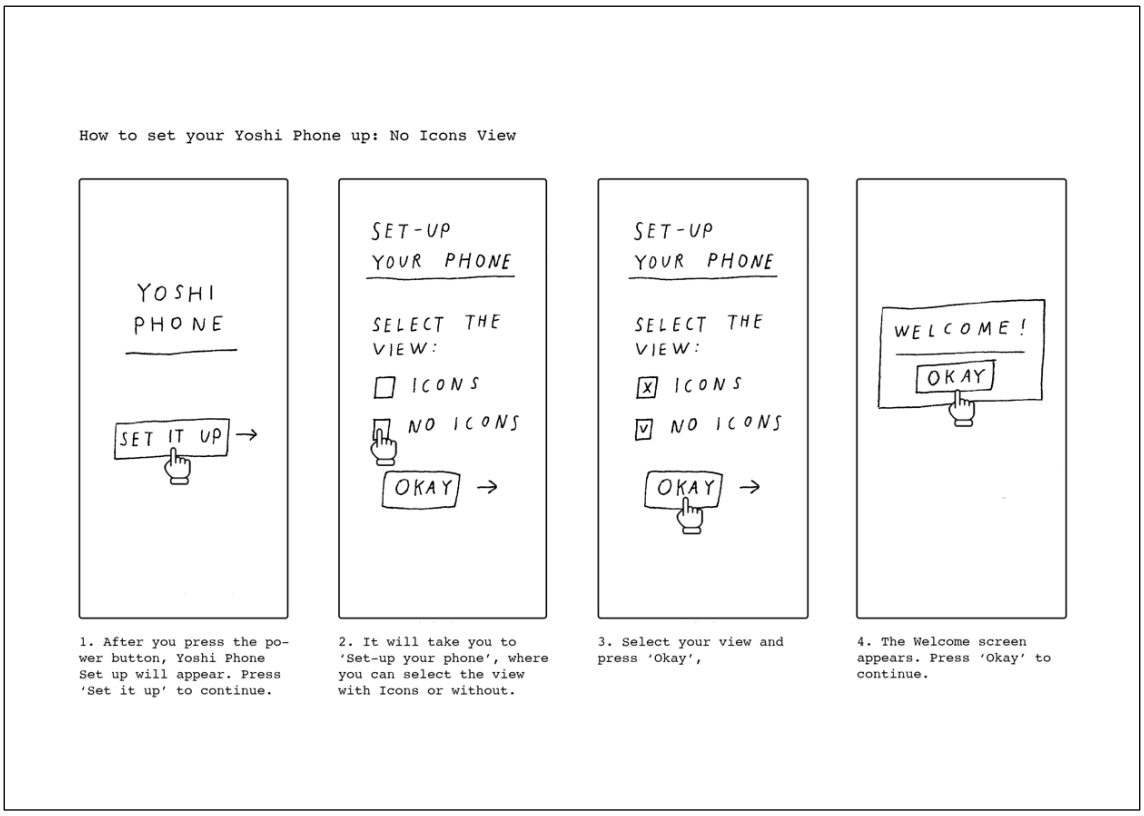



*Figure 45. Page 6 of the Yoshi Phone user manual.*

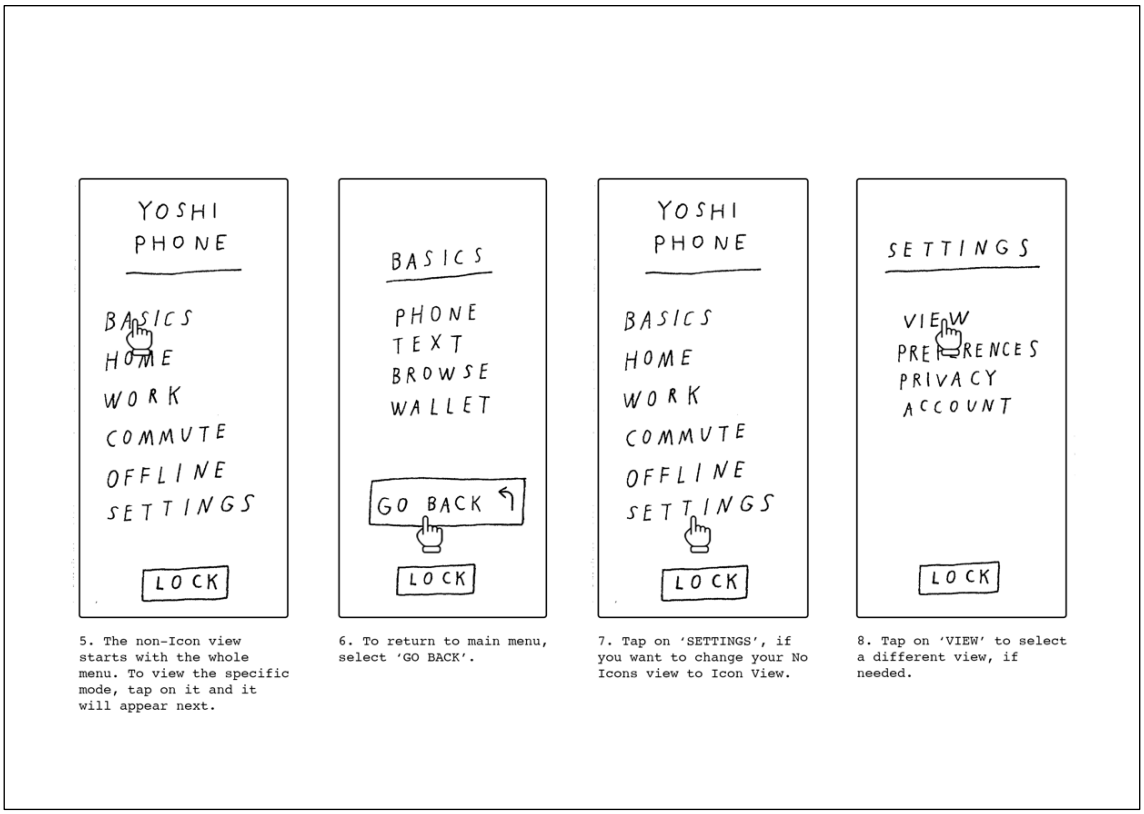



*Figure 46. Page 7 of the Yoshi Phone user manual.*

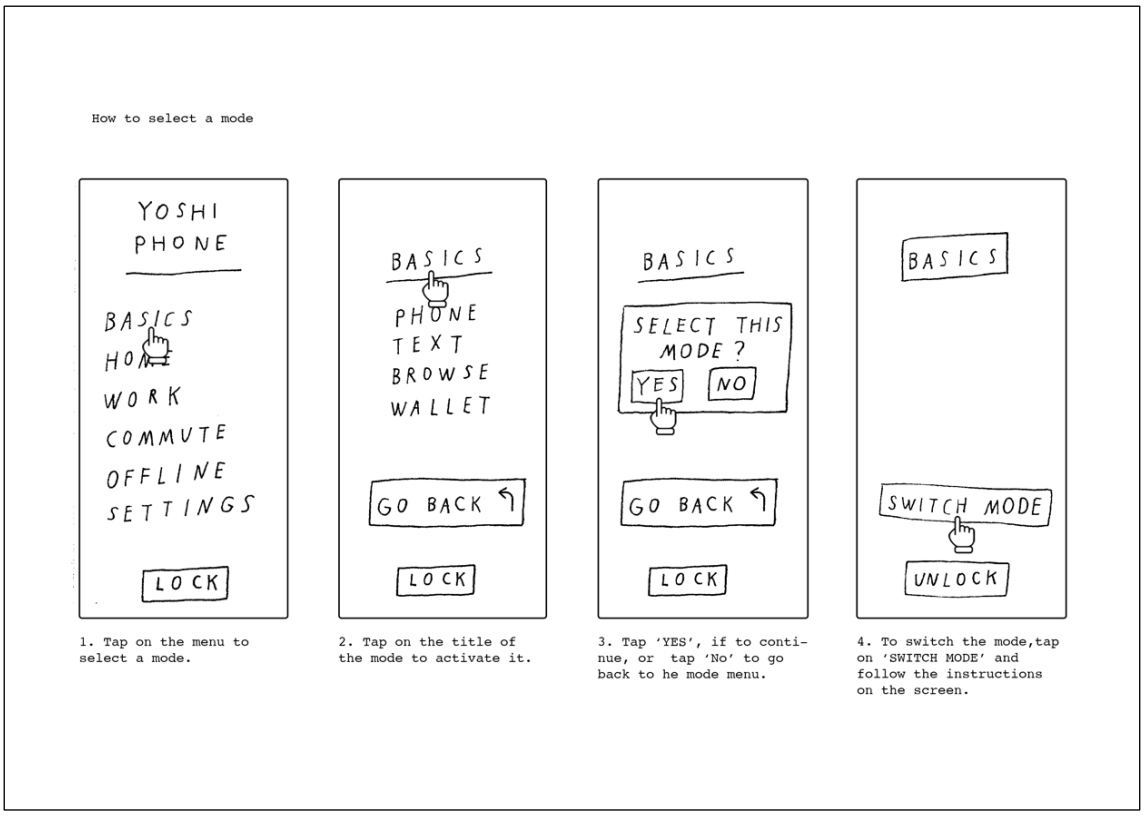



*Figure 47. Page 8 of the Yoshi Phone user manual.*

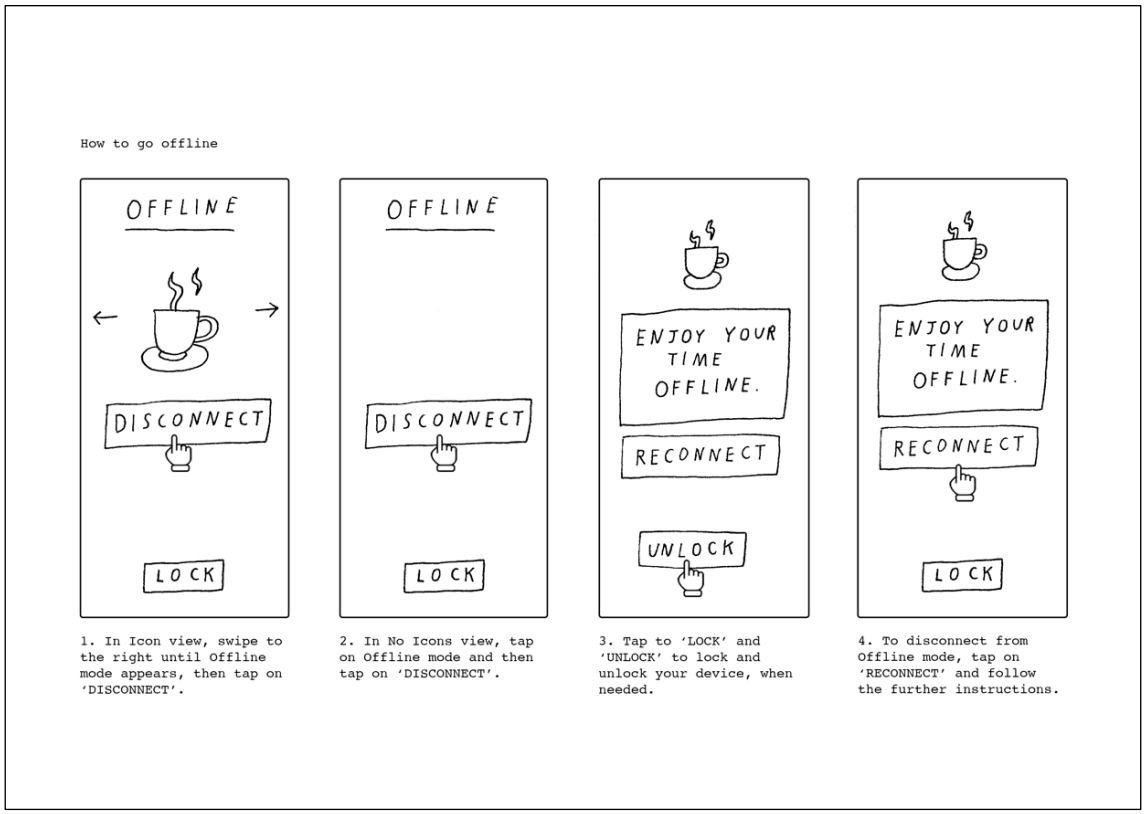



*Figure 48. Page 9 of the Yoshi Phone user manual.*

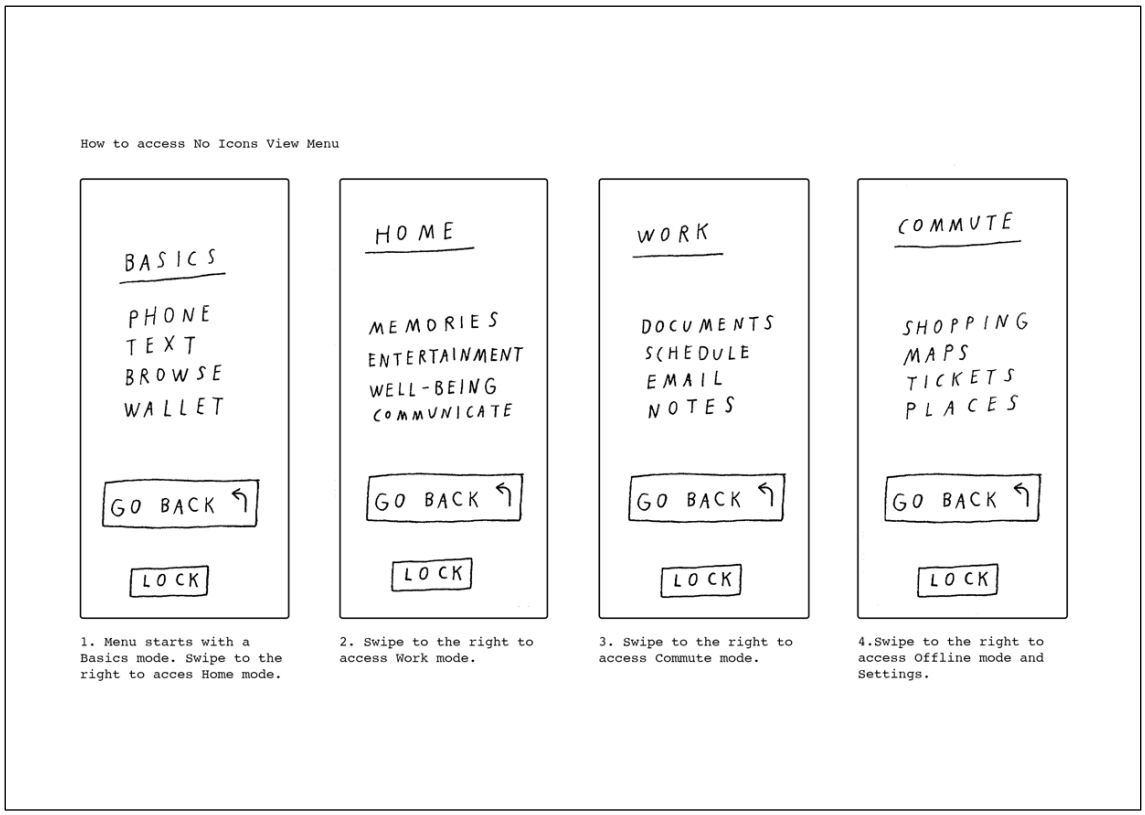



*Figure 49. Page 10 of the Yoshi Phone user manual.*

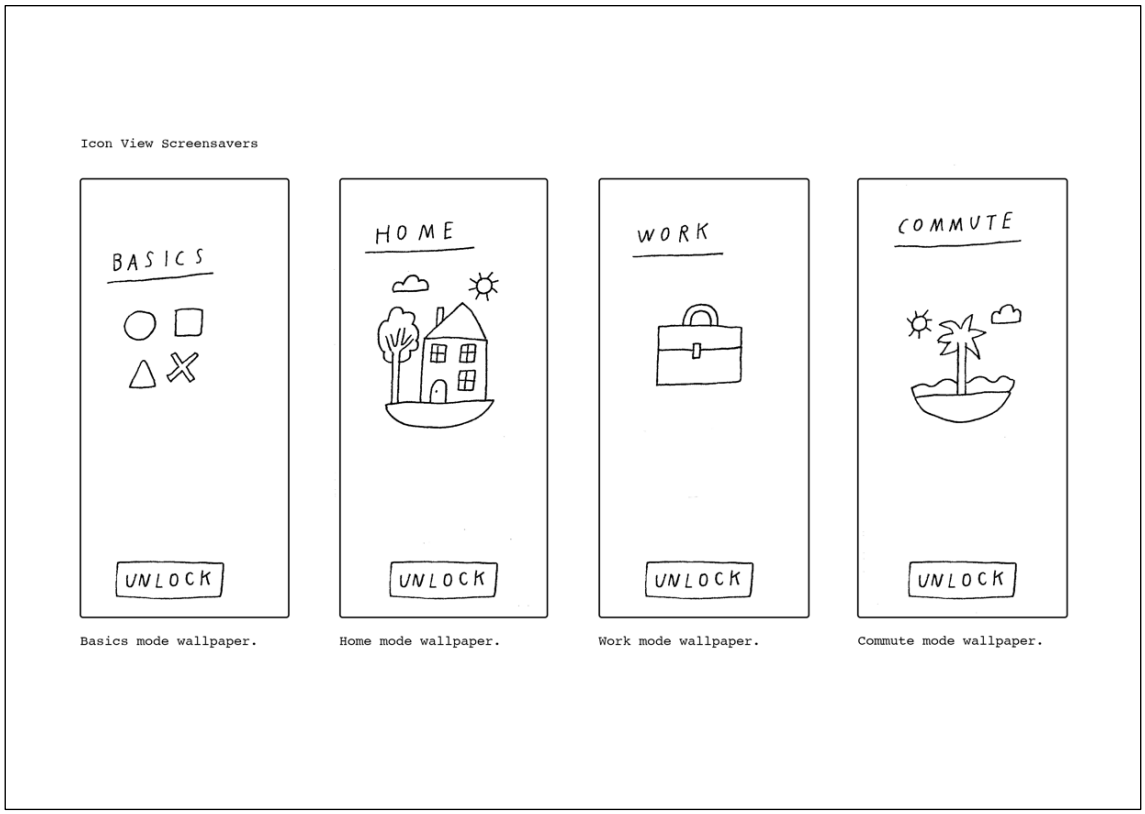



*Figure 50. Page 11 of the Yoshi Phone user manual.*

*Figure 51. Page 1 of the 'Yoshi Phone. Break the Mould' narrative.*

*Figure 52. Page 2 of the 'Yoshi Phone. Break the Mould' narrative.*

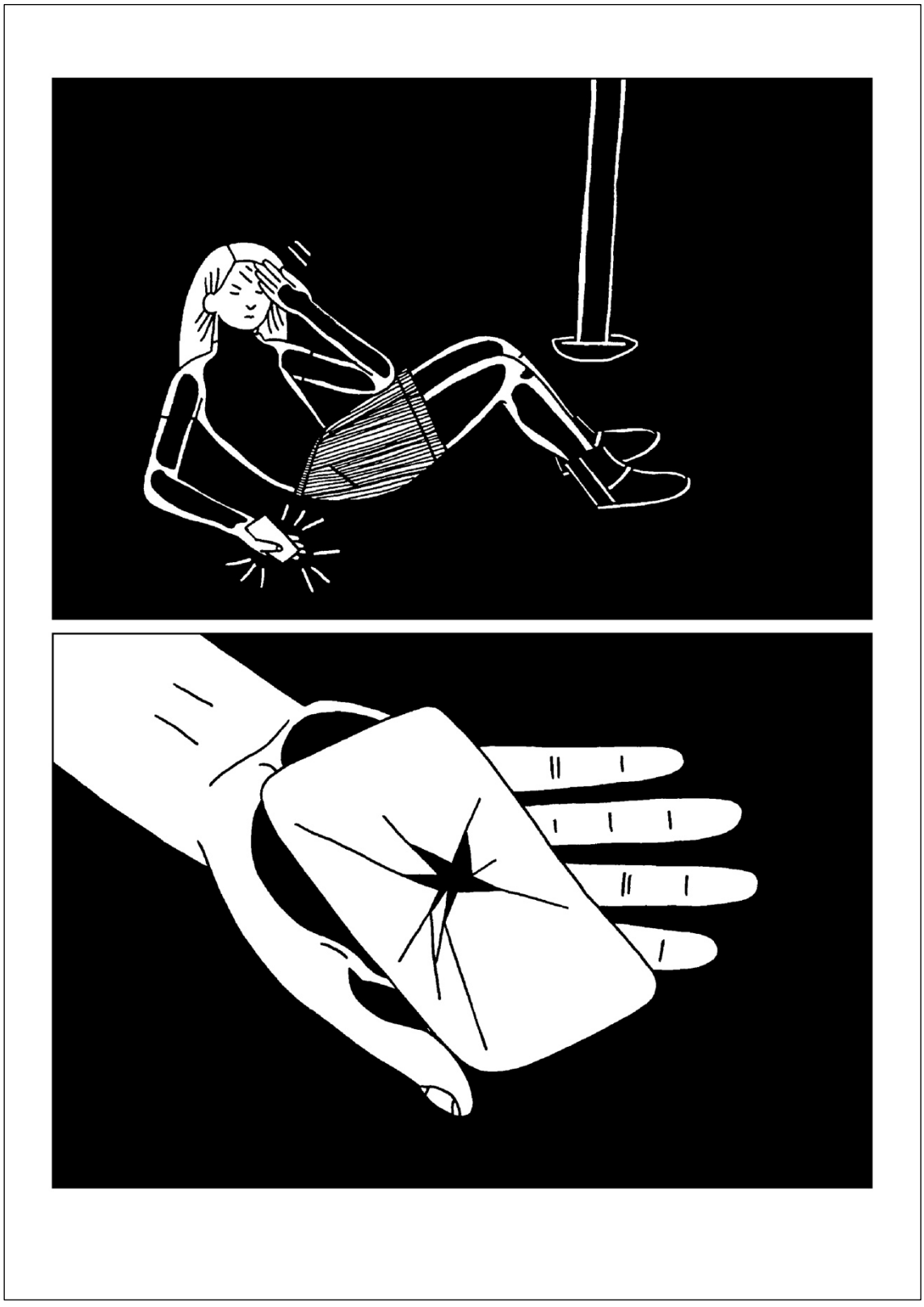


*Figure 53. Page 3 of the 'Yoshi Phone. Break the Mould' narrative.*

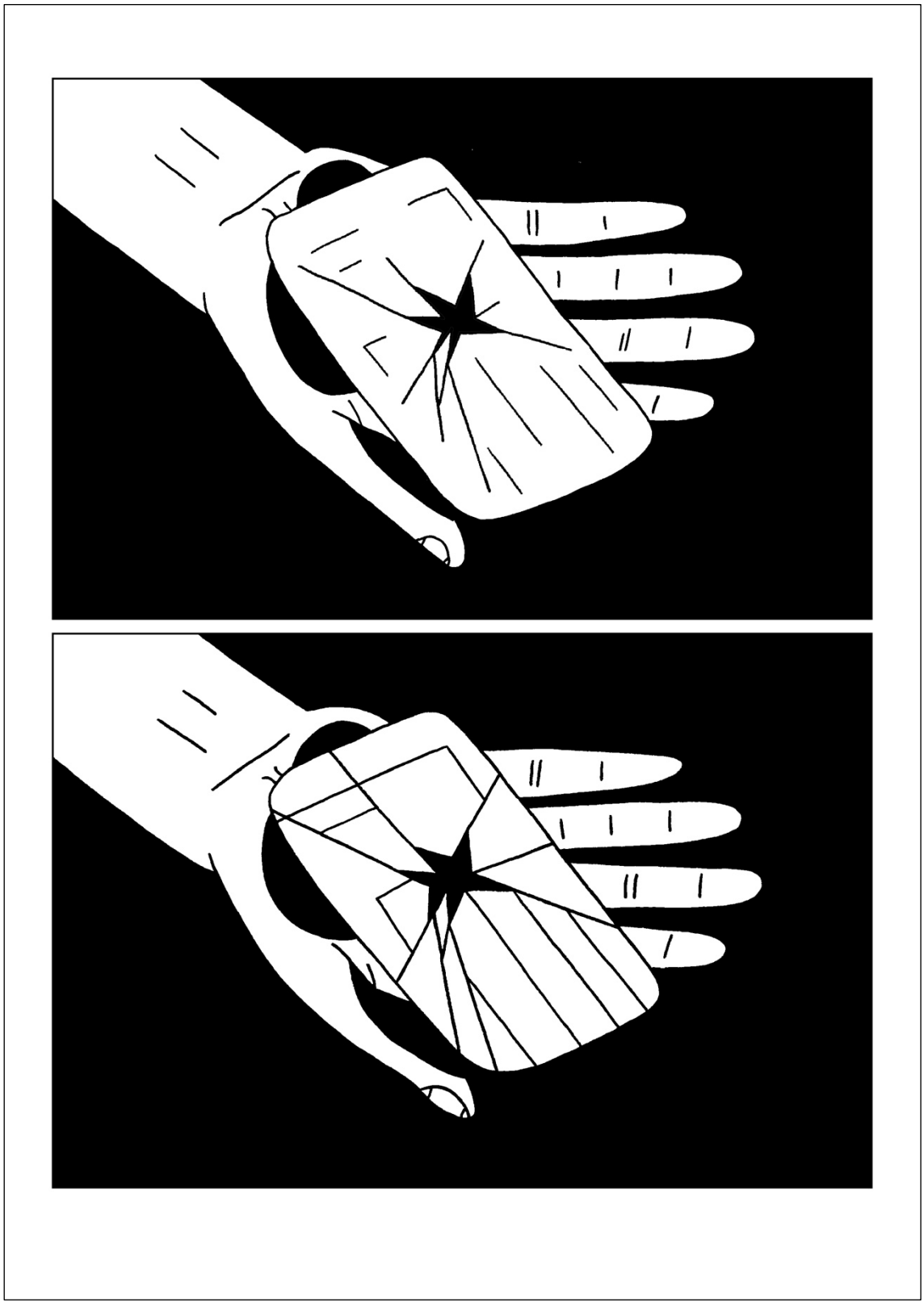


*Figure 54. Page 4 of the 'Yoshi Phone. Break the Mould' narrative.*

*Figure 55. Page 5 of the 'Yoshi Phone. Break the Mould' narrative.*


*Figure 56. Page 6 of the 'Yoshi Phone. Break the Mould' narrative.*


*Figure 57. Page 7 of the 'Yoshi Phone. Break the Mould' narrative.*


*Figure 58. Page 8 of the 'Yoshi Phone. Break the Mould' narrative.*


*Figure 59. Page 9 of the 'Yoshi Phone. Break the Mould' narrative.*


*Figure 60. Yoshi Phone user manual and narrative on my personal website.*

## 6. Birds app and mindful interactions

In stage 1, I identified the design challenge 'screen time overuse' through my literature and practice review. To address this challenge, I developed a proposal for a mindful screen tracker. I needed to develop a 'what if' scenario to progress this proposal. Therefore, in stage 2, I began by thinking about the visual elements that could promote mindfulness and track screen time use. I initially thought the 'what if' scenario could be: what if visual cues could communicate the time to the user? However, this 'what if' scenario was too broad, and I needed to determine the kinds of visual cues so that I could develop a more detailed concept.


*Figure 61. A poster for Alfred Hitchcock's The Birds film.*

The decision to use bird shapes to inform the user was indirectly inspired by the Netflix drama series *Chilling Adventures of Sabrina* (Aguirre-Sacasa 2018). This series is based on a comic book series of the same title published by Archie Horror (Aguirre-Sacasa and Hack 2014). In several episodes in Season 1, sparrow-like birds appeared in the real world to communicate the time left in the hereafter world to the characters. The longer the characters spent in the hereafter world, the more birds appeared. This use of birds to communicate time led me to think about whether the shapes of birds could be adapted to create an app to communicate time spent online in a mindful way. I also considered whether the use of birds could have the opposite effect; for example, in Alfred Hitchcock's *The Birds* film (1963), the sudden appearance of and attacks by birds created fear and horror (see Figure 61). I

decided that birds could mean and symbolise many things, depending on how their appearances was visualised. If they fluttered and flew through the screen – rather than attack the screen – birds could provide a visual solution to communicate the time spent on a device. I hoped that birds used in this way would have a positive connotation. I then began to sketch the birds' appearance and the wireframes of the screen tracker in my sketchbook (see Figure 62). Using my imagination, I developed the following scenario: what if images of birds could communicate overuse and interrupt overuse of a device? (Bleecker 2009). This 'what if' scenario was sufficiently detailed because it enabled me to visualise how this screen tracker would look and work. This demonstrated how my practice progressed from a proposal to a more detailed concept.

In stage 3, I focused on developing the structure of the screen time tracker app and its layout for mock-up design, as well as determining its name and logo or icon. I used the preliminary sketch and 'what if' scenario from stage 2 to refine the structure of the tracker app. The original sketch had five wireframes: the home screen, about the app, two settings sketches, and a successful app setup announcement frame. In the first wireframe, the user entered the app's home screen, which was followed by the 'about' wireframe. The about section provided information on the purpose of the app. Following this, the user was provided with the settings section in which they could select up to four timers to track and limit their screen time use. The images of birds alerted the user to the remaining time online. Three of the timers gently reminded the user about the remaining time; however, after the fourth timer, the device shut down. The second settings page enabled the user to select the type of bird used in the alerts. The wireframe concluded with a section in which the app was set up and ready to use. I thought that this structure was overly inflexible, as the user had to establish it each time they changed or adjusted their settings. I decided that this could be resolved by including the settings on one page and adding on/off buttons to enable the user to activate the timers and adjust them as needed. I then sketched out this idea (see Figure 63). This demonstrates how my practice developed from a 'what if' scenario to a final wireframe sketch of the mindful tracker.

Based on these wireframes, I then developed the final designs for the mindful tracker. I identified a need to illustrate the home page, about page, and settings page with timers on and off. I drew various images of birds, buttons, and typography in my sketchbook with a black fineliner pen. I worked on these illustrations until I had sufficient sizes and shapes of birds, the elements needed for the preferences page, and the typography needed for the home and about wireframes. I worked on the elements separately rather than producing each wireframe on paper because I planned to create the final compositions by manipulating the elements using Adobe Photoshop. I scanned the illustrations, which were then made ready for editing on Adobe Photoshop (see Figure 64). I created six images rather than four because I realised that I needed extra wireframes to communicate how the on and off buttons worked.

Simultaneously, while working on this stage, I also developed the name and logo for the prototype. I called it 'Birds' because of the use of birds to track screen time. First, I checked on the Apple App Store whether there was an app with this name; I could not find one, and so I retained the name. I then experimented with drawing the letters of the word 'Birds' in various styles and determined that capital letters written in fine line were best with the hand-drawn bird shapes rather than thicker, blocked letters. The result was a diegetic prototype called 'Birds' (see figures 64 and 65). Mindful interactions were successfully implemented into it. Compared to the smartphone screen time feature and the cognitively and visually taxing smartphone UI design, the Birds app was designed to provide a calmer, gentler, and more mindful UX by alerting users about their screen time through minimalistic and monochromatic visual cues represented as birds. This created a less noisy experience for the user. This also demonstrates how my practice progressed from creating the final Birds app sketches to the final Birds app illustrations.

In stage 4, I created text, storyboards, illustrations, and designs for the Birds app user manual. I then worked with George Forster on the written narrative for the app, which I illustrated. To develop the user manual, I first decided to document how the app worked in chronological order (Hodges 2003). I used the concepts and wireframes of the Birds app developed in the previous stages as my starting point for the writing. I described how the application worked, how it was set up, how to set its timers, and how to switch the timers off and on again. As in the previous user manual examples mentioned in this thesis (see pages 68 and 69), I included a cover and an 'about' section. The cover would communicate that this was a user manual, and the about section would provide the user with context about the app. I was confident about the information I was intending to include in the user manual (see Appendix C). I used the text to develop a preliminary storyboard. I began with a vertical layout but realised that using four wireframes in two rows created an unsatisfactory composition because it left too much space between the sides of the wireframes and too little space between the top and bottom (see Figure 66). I created another storyboard in which the wireframes were presented in a single row using a horizontal layout, which solved this composition issue (see Figure 67). This solution finalised the user manual storyboard.

Simultaneously, while working on the user manual text and storyboard, I identified where I could use the Birds app wireframes and where I would need to create additional illustrations. I realised that I could use the wireframes for the cover page, about page, how to set timers page, how to switch timers off and on page, and several wireframes for the page detailing how to set up the app on a device. This also led me to realise that I needed to develop additional designs to fully communicate how to set up the app and how the app worked. I developed the idea of visualising the app setup by speculatively finding and downloading the app from the App Store. I screenshot images of my iPhone

home screen and the App Store, which I then edited by adding the Bird's app icon developed from my earlier illustrations of hand-drawn birds (see Figure 68). I also added the wireframes and amended the text so that it appeared that this fictional app was available to download from the App Store (see Figure 69).

I then worked on how to demonstrate the app's functionality. I thought that this could be achieved by showing all of the activated bird timers fluttering through a user's screen. I took various screenshots of my social media, shopping, and entertainment apps. I decided to use a different screenshot for each timer because I wanted to simulate a user using their smartphone. I could have used screenshots of the same app to communicate this, but I was concerned that this may not communicate the user being immersed in their tasks while the timers remind them of the screen time remaining. I used the hand-drawn birds images and screenshots to create the images and drew a 'Your time is up!' frame, which was scanned and edited using Adobe Photoshop (see figures 70 and 71). I carefully edited and inspected all of the screenshots because I was concerned that unclean edits would reveal that this was a fictional app. I structured the images and text so that they had a logical order and were consistent throughout. I realised that the visualisation of how to set the timers on and off could be improved by adding additional images. Therefore, I created a home page screenshot showing the fictional app being downloaded and functional. I added the missing images and inspected the final user manual pages, amending any remaining imperfections until the designs were clean. This demonstrates how my practice developed from storyboarding, planning, and sketching images, producing final illustrations for the written narrative, and writing the user manual text, to producing the final user manual for the Birds app.

The design fiction narrative for the Birds app was written by George Forster (see Appendix I). First, I sent him a brief, and he responded with the narratives as agreed. He produced a web copy and a narrative called 'Birds … Don't get carried away'. I reviewed the narrative and concluded that he had captured the Birds app concept in the story. This was evident in the outline, where he explained the concept: 'I wanted to focus on the freeing grace of birds in contrast with the absorbing, oppressive nature of mindless digital scrolling. I was inspired by videos of starling murmuration (I'll attach some reference footage) and their hypnotic formation flying. I think playing on this enchanting quality will be an effective visual shorthand to use for the narrative'. This demonstrates that choosing birds as a visualisation for this prototype was appropriate because the writer successfully articulated the concept in his story. This also demonstrates how my practice evolved from developing written narratives to finalised texts to be illustrated.

To produce illustrations for the 'Birds … Don't get carried away' narrative, I reviewed the narrative and sketched the associated scenes (see Figure 72). Similar to the Yoshi Phone narrative, the writer

depicted this story using external focalisation (Bal 1985). This meant that the narrative was told from outside the main character rather than through their eyes (Bal 1985). In addition to illustrating birds, I also focused on the emotions and feelings of the main character. I used camera-like angles in my work to portray these aspects (Eisner 2008). I deliberately structured the scenes in a sequence because each panel had to represent a key moment in the story. This was based on the idea that a viewer should be able to comprehend the visual narrative by bridging the gaps between panels (McCloud 2001). I used my imagination to visualise the scenes and developed 15 panels. The Birds app promotional comic did not have a front cover or back cover; therefore, the slogan was incorporated into the final page. I wanted each narrative to differ slightly in format when sent to the research participants. I was concerned that all of the illustrated narratives could appear similar if I used the same format for each story. I thought that this could confuse the expert reviewers because they would find it difficult to identify differences between the narratives and prototypes. Therefore, I divided the panels into three groups of images, which represented the final storyboard (see Figure 73). I then created layouts for each page and sketched out the preliminary illustrations in pencil. My illustration technique involved redrawing the panels until I achieved the best possible composition for each. The final panel contained the slogan. I traced over the pencil outlines with a black fineliner pen and then erased the remaining pencil marks. The illustrations were then ready to be scanned (see Figure 73). After I had scanned the illustrations, I edited them using Adobe Photoshop, and they were then ready to be coloured (see Figure 74). I coloured them in monochrome because I wanted to create a contrast between the reflected light from the screen in a dark room and the light and birds coming through a window (representing the birds from the app). I also considered that the black and white colouring would better communicate the story concept. I considered other colour schemes, but was concerned that this would create problems when incorporating them with the monochrome birds. Therefore, I used a monochrome colour scheme in my final illustrations. These choices were based on my instincts. This demonstrates how my practice progressed from finished texts to storyboarding and creating final illustrations.

This section also shows how my practice developed during stages 1–4. The final results of these four stages were two illustrated narratives. The Birds app user manual was a 10-page, A4-sized user manual that explained the Birds app and how it worked (see figures 75–84). The 'Birds … Don't get carried away' narrative was a three-page, A4-sized comic that imagined how the Birds app would be advertised to potential consumers and clients (see figures 85–87). Both narratives were published on my personal website (see Figure 88). The Birds app user manual and 'Birds … Don't get carried away' narrative can also be accessed at https://www.joskaude.com/my-phd-project-birds.

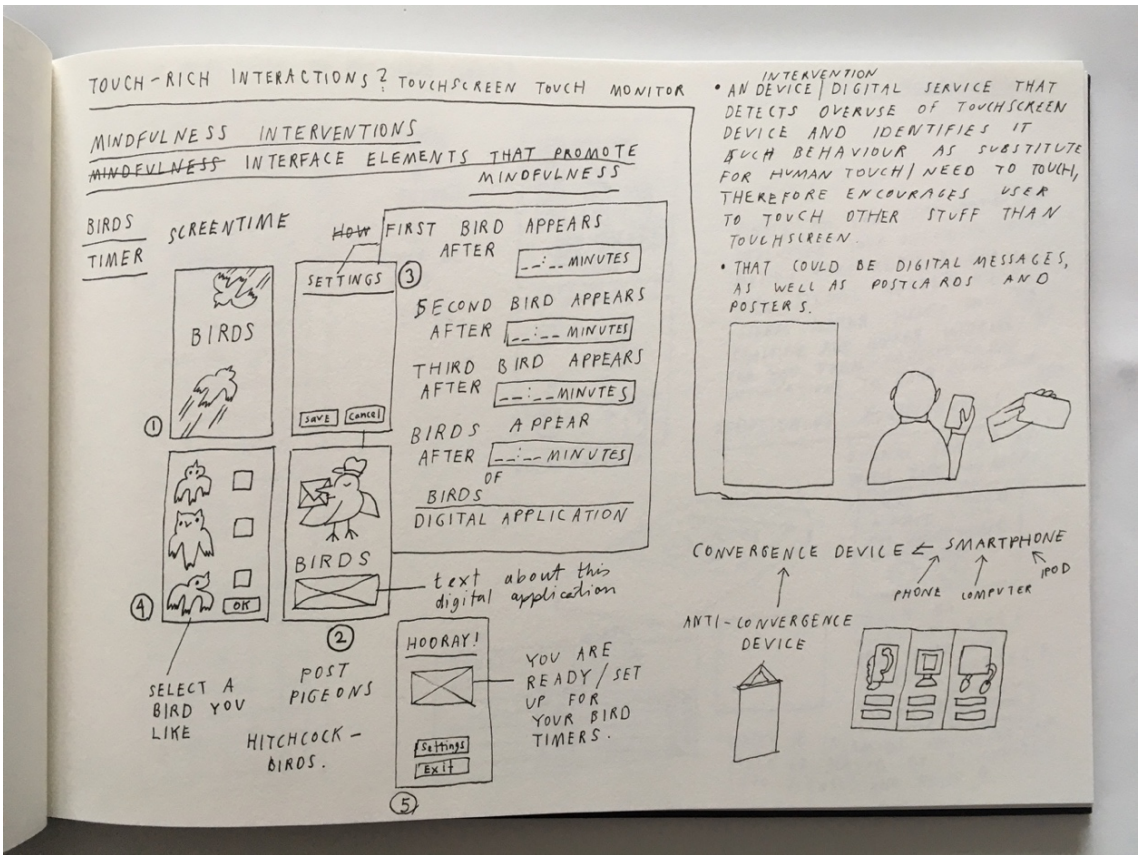



*Figure 62. 'What if' question exploration for the Birds app.*

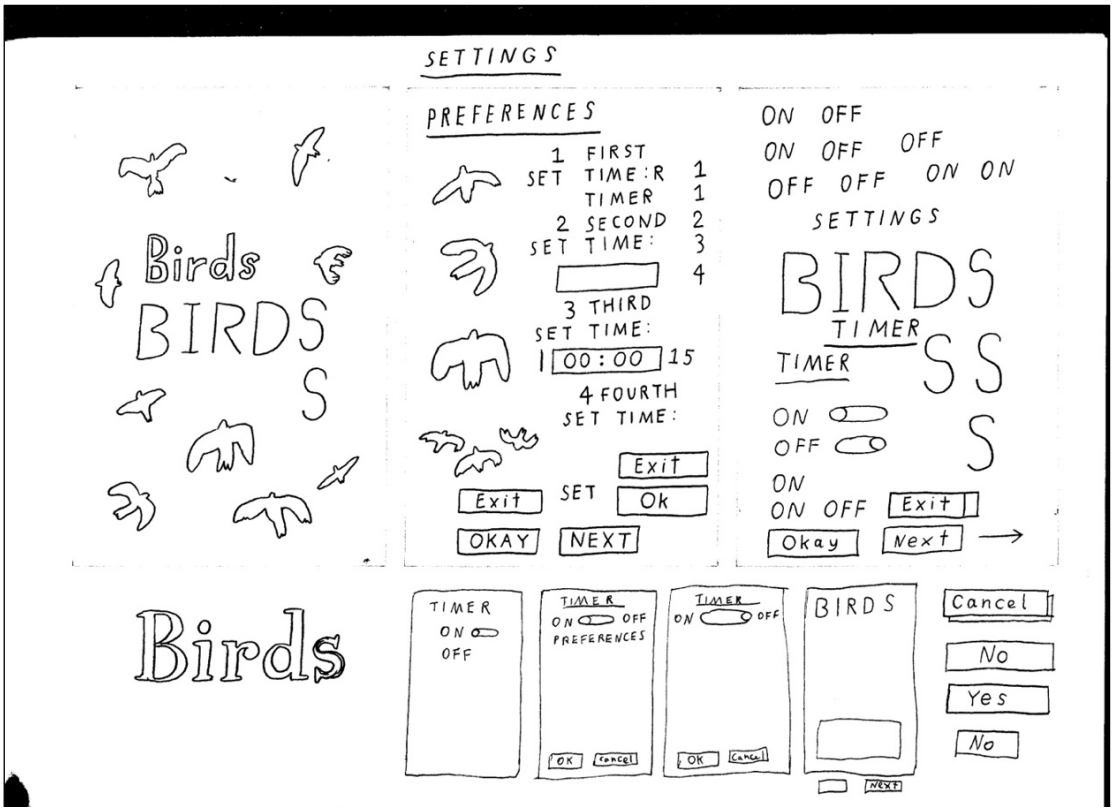



*Figure 63. Birds app sketchbook scan.*

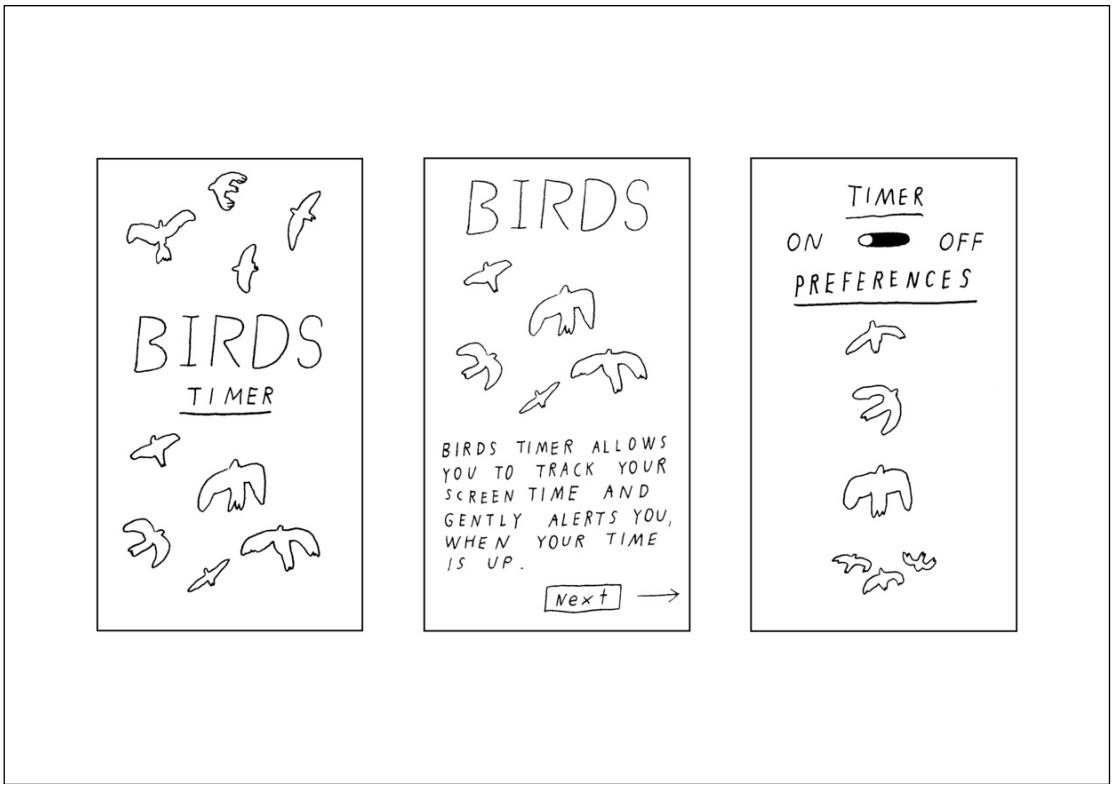



*Figure 64. Birds app prototype.*

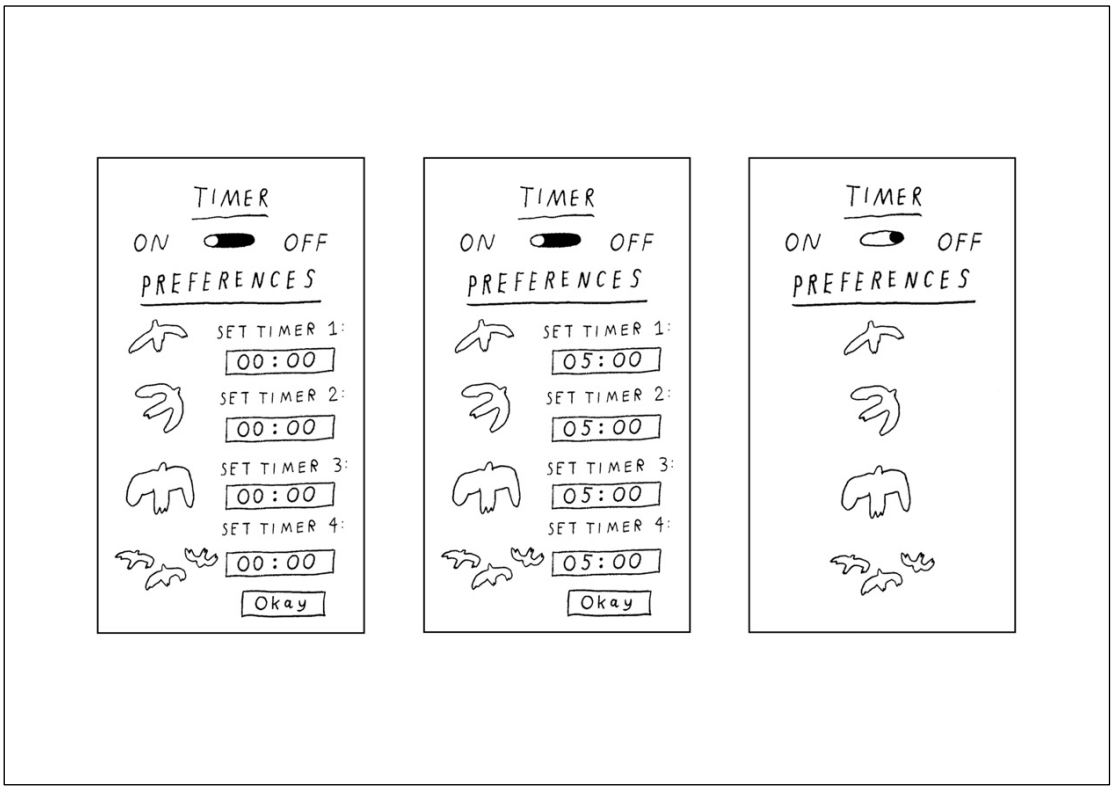



*Figure 65. Birds app prototype.*

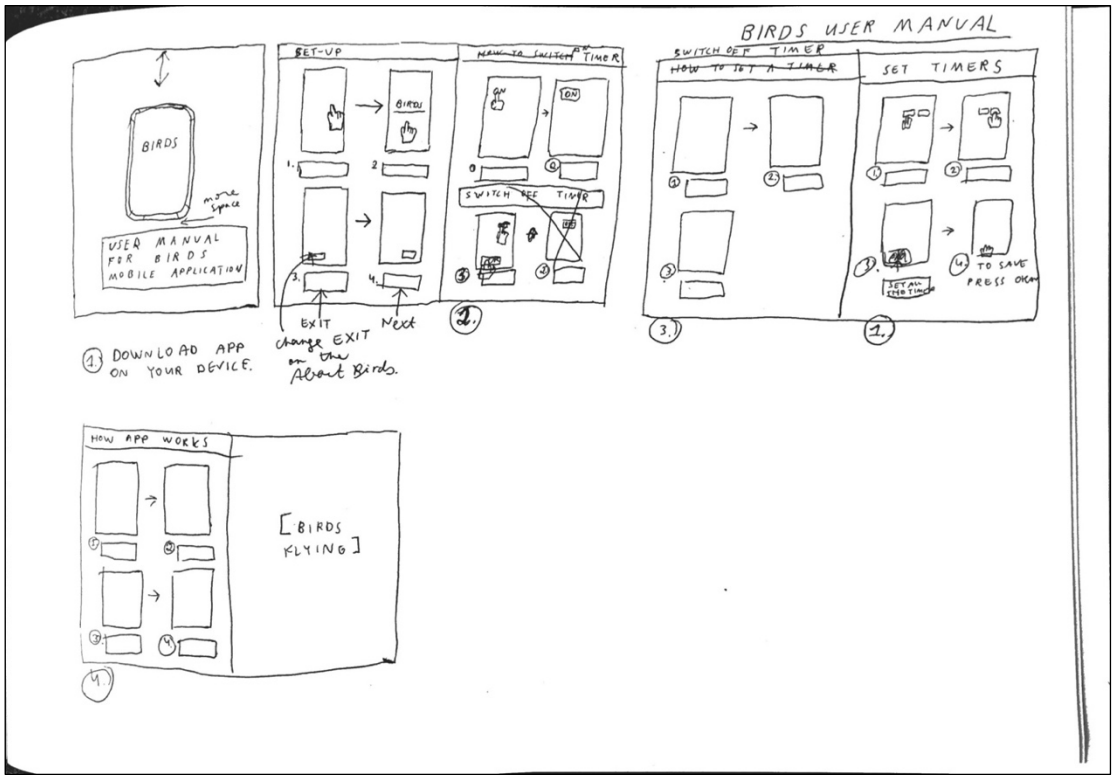



*Figure 66. Birds app user manual layout sketch.*

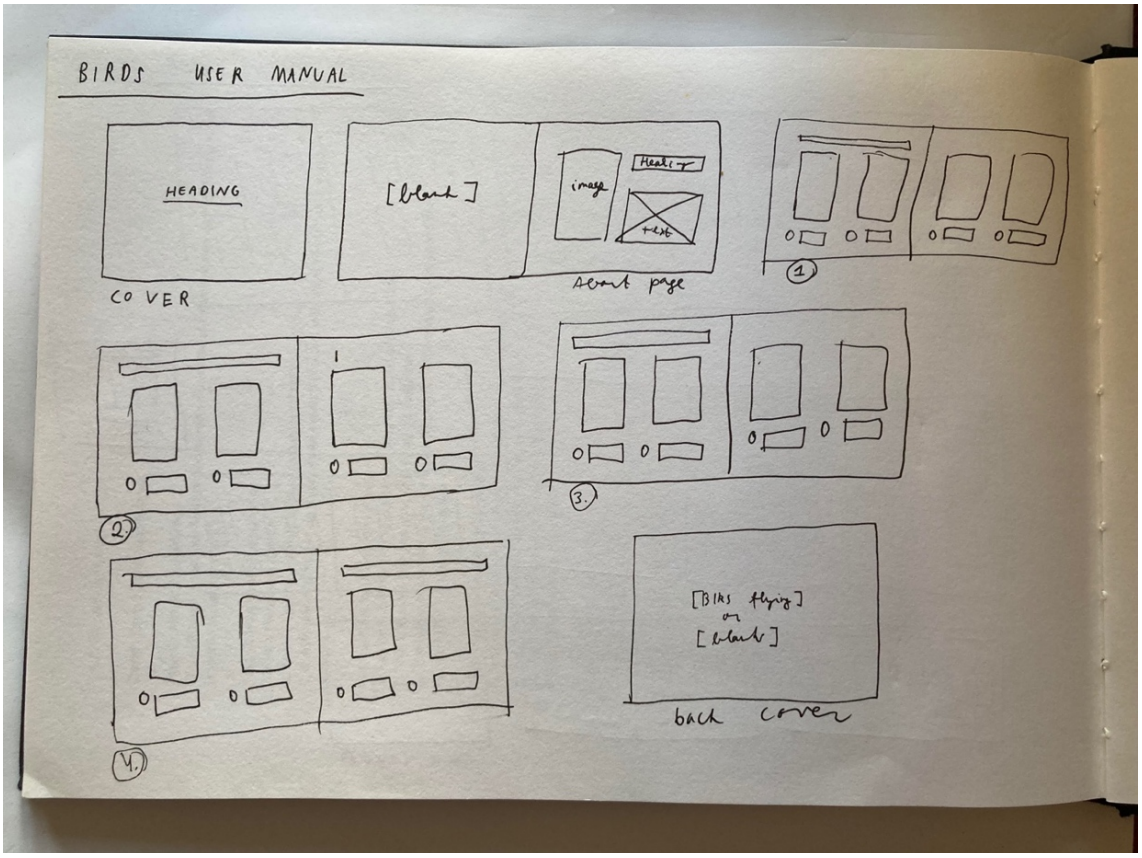



*Figure 67. Birds app user manual final layout sketch.*

*Figure 68. Birds app logo/icon.*

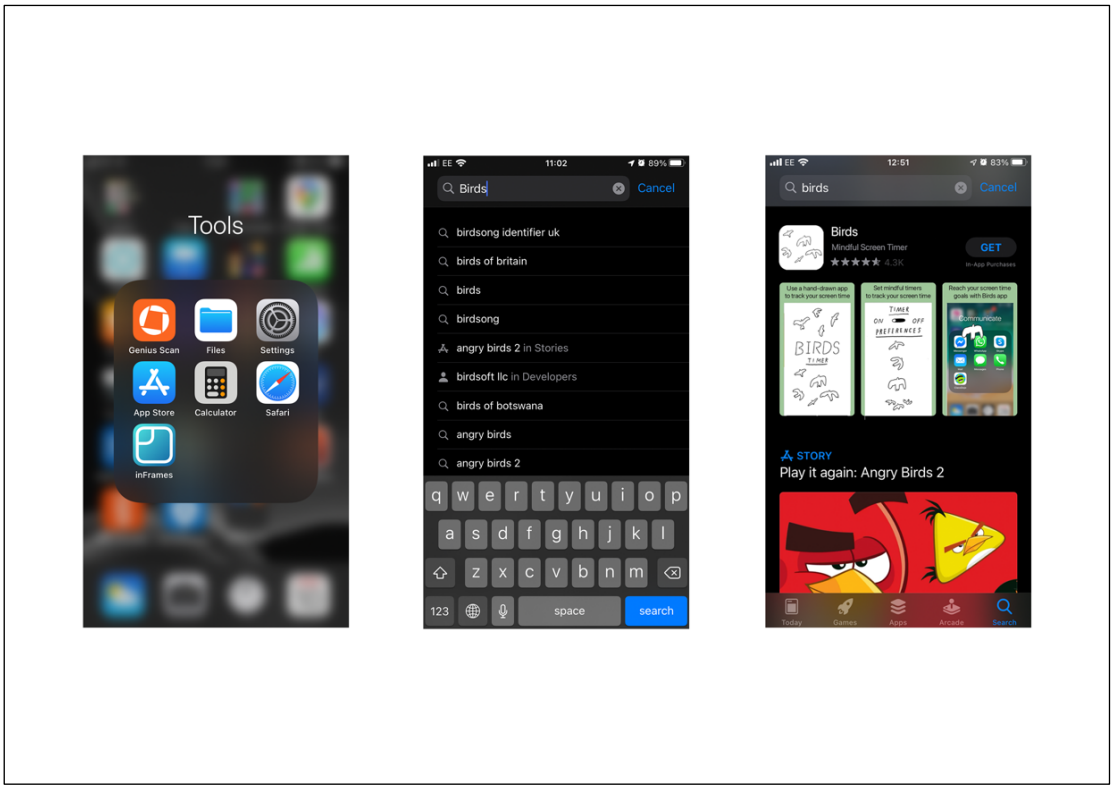



*Figure 69. Designs and screenshots for the Birds app user manual.*

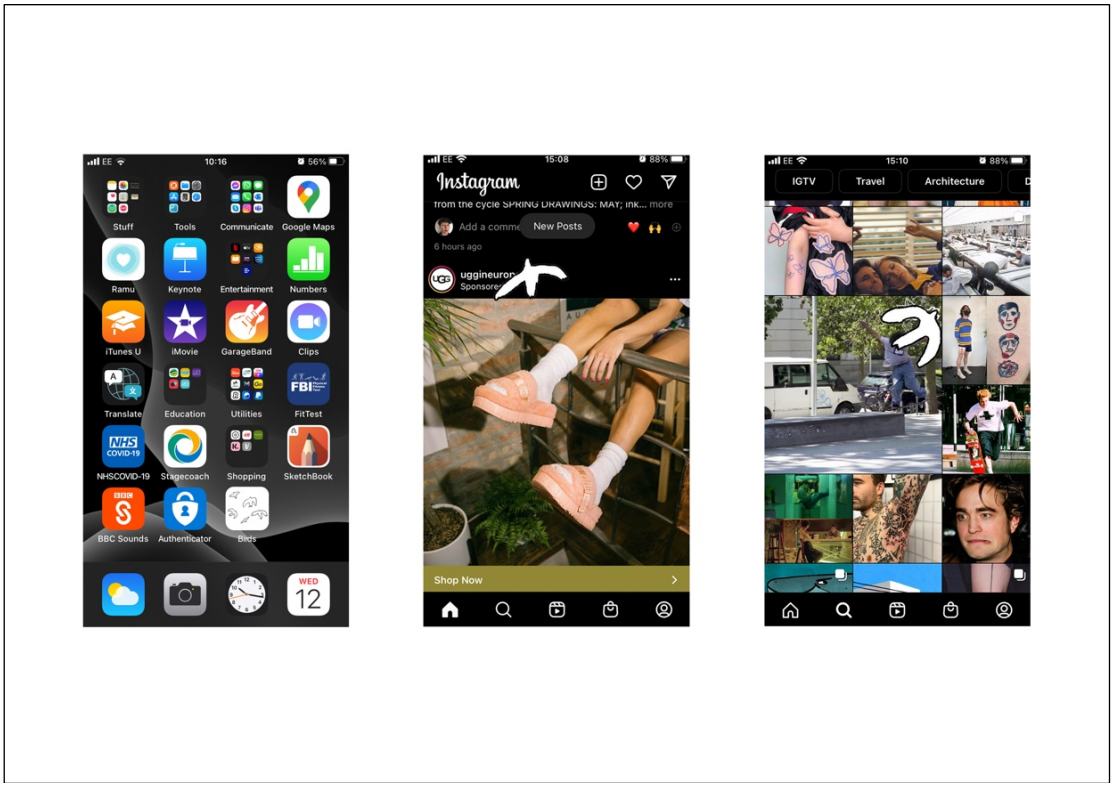



*Figure 70. Designs and screenshots for the Birds app user manual.*

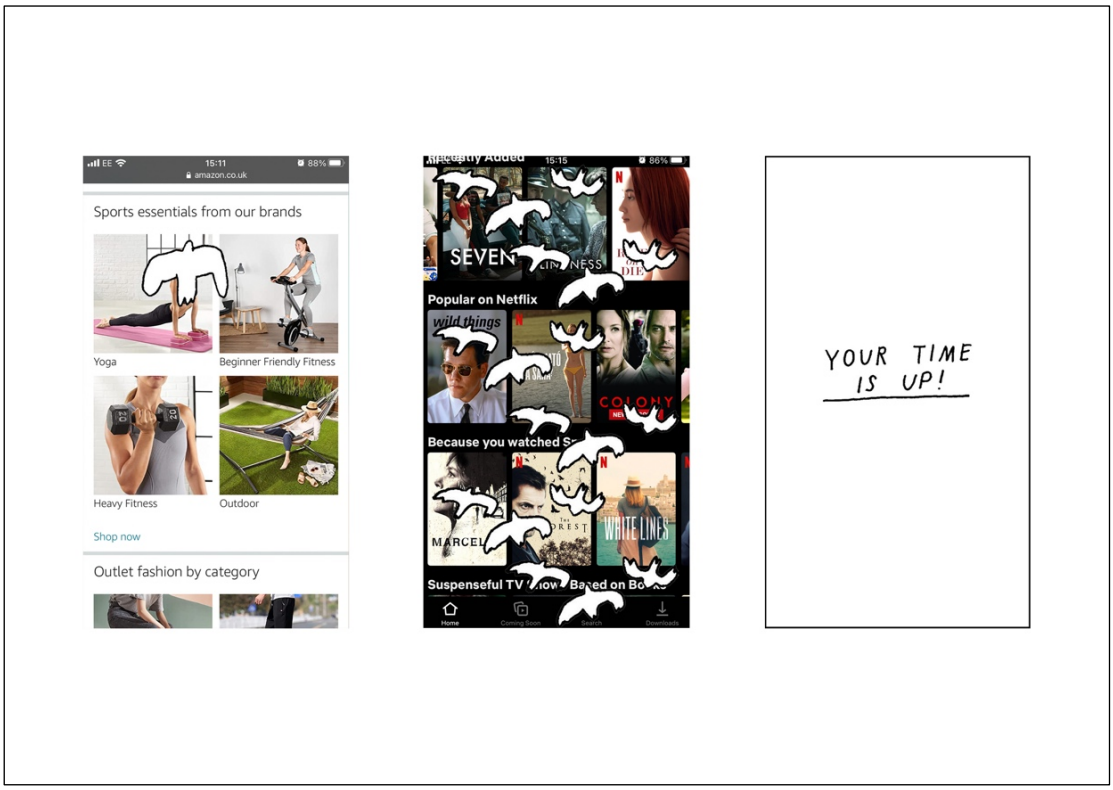



*Figure 71. Designs and screenshots for the Birds app user manual.*

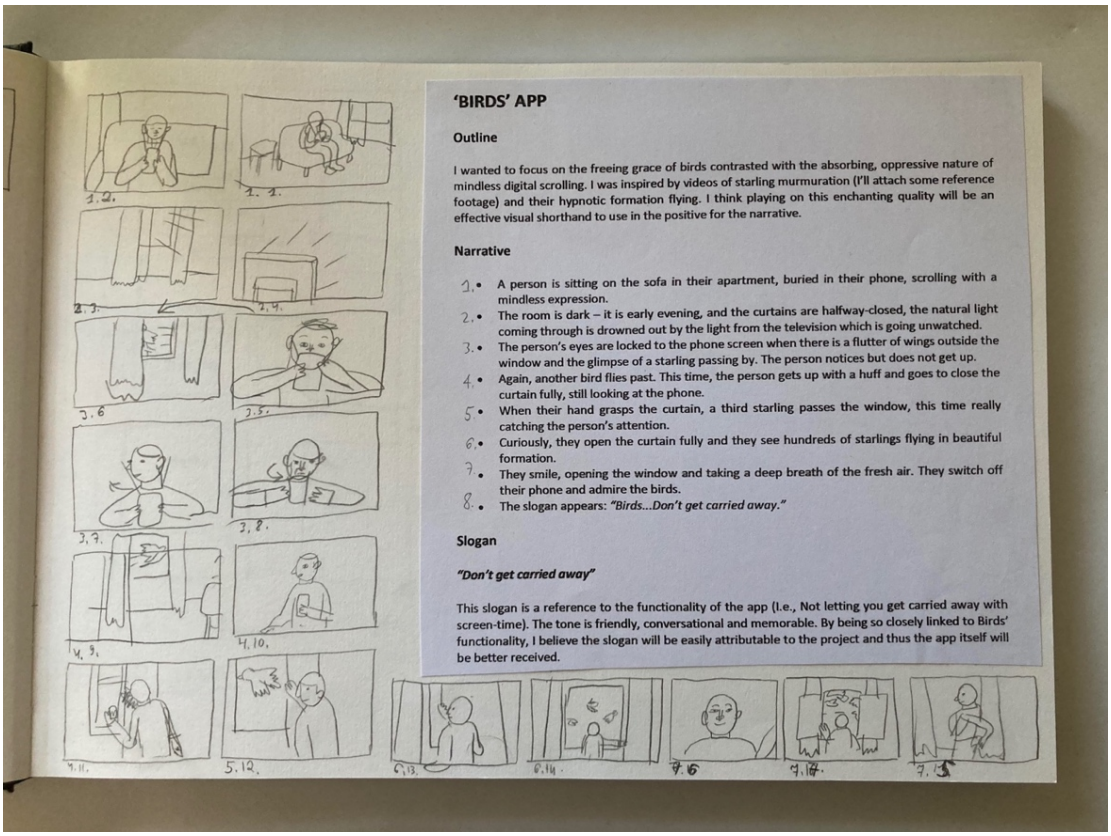



*Figure 72. Birds app narrative storyboard.*


*Figure 73. Final Birds app narrative storyboard and Birds app narrative pages in fineliner pen.*


*Figure 74. Birds app narrative scans without black colouring.*

BIRDS

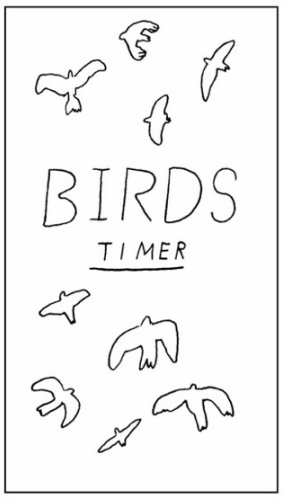
TIMER

User Manual

Yoshi Electronics Ltd.

*Figure 75. Page 1 of the Birds app user manual.*

About

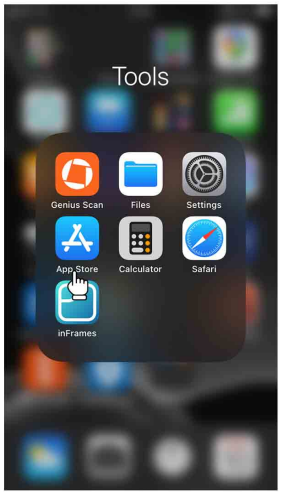




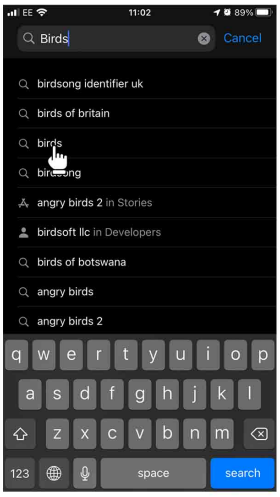
'Birds' is a mindful timer digital app,which allows users to set screen timers and be gently alerted to set time limits of their digital sessions by the hand-drawn images of birds.

*Figure 76. Page 2 of the Birds app user manual.*

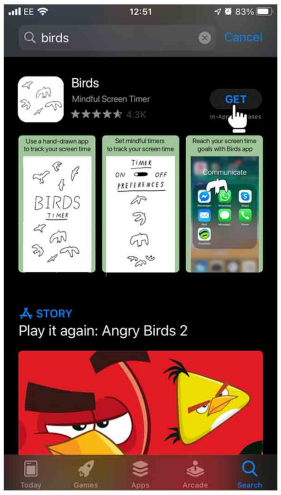
How to set the app on your device




1.Launch the App Store on your device.



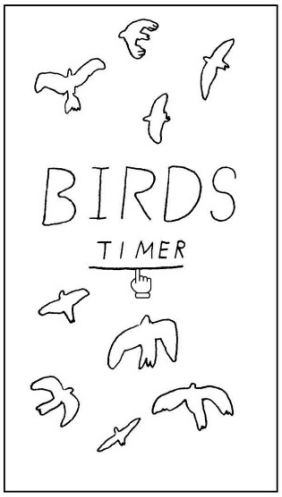

2. Type Birds into the search and click on 'birds'.




3. Tap on 'GET' to download the app on your device.

*Figure 77. Page 3 of the Birds app user manual.*


4. Tap on the Birds app icon to launch it.



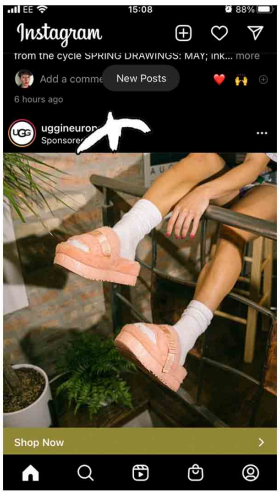

5. It will take you to the homescreen launch page.


6. Tap on the launch screen to set up the app.

*Figure 78. Page 4 of the Birds app user manual.*

How the application works

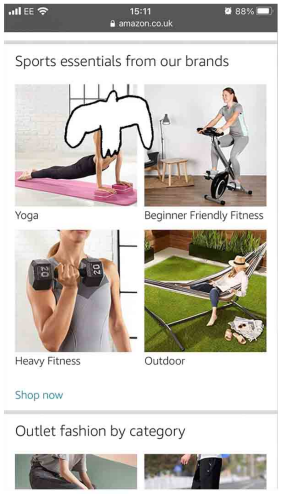
This illustrates how the 'Birds' timer works. The images of birds alert the user to remaining time online.




1.1st timer gently reminds you about remaining time.


2. 2nd timer gently reminds you about remaining time.

*Figure 79. Page 5 of the Birds app user manual.*




3. 3rd timer gently reminds you about remaining time.


4. 4th timer is the final reminder.


5. After the 4th timer, the device shuts down.

*Figure 80. Page 6 of the Birds app user manual.*

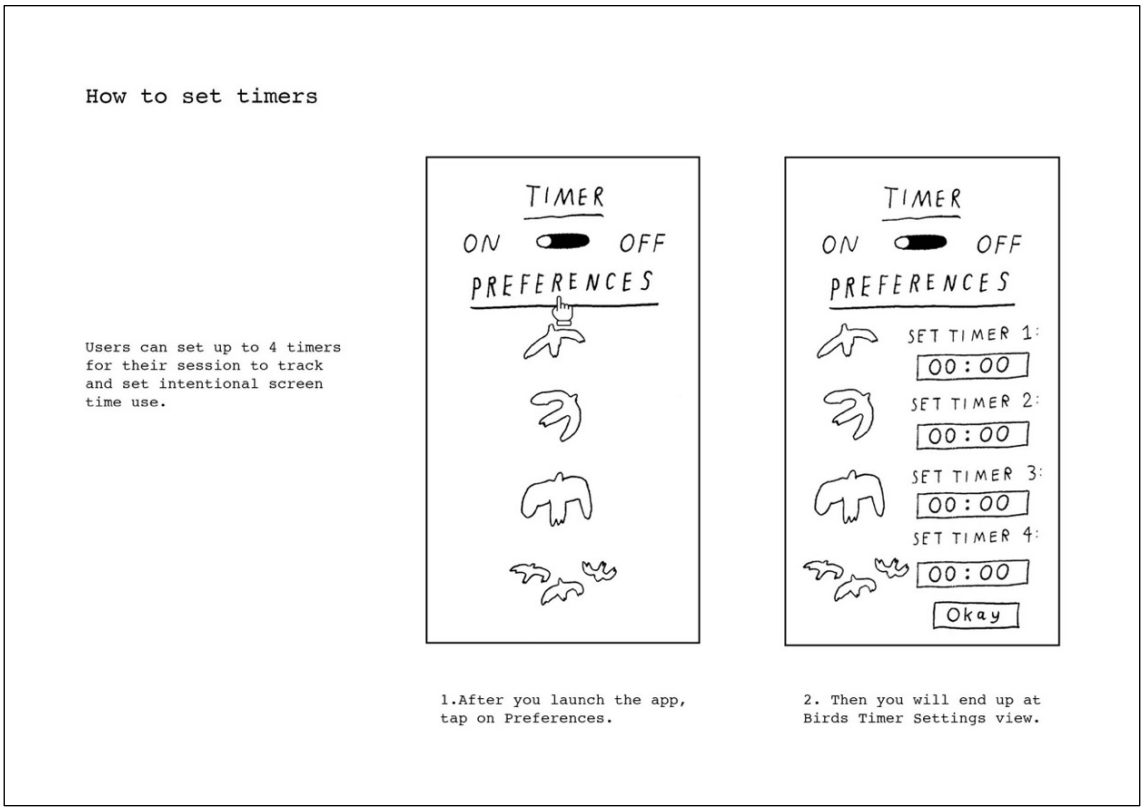



*Figure 81. Page 7 of the Birds app user manual.*

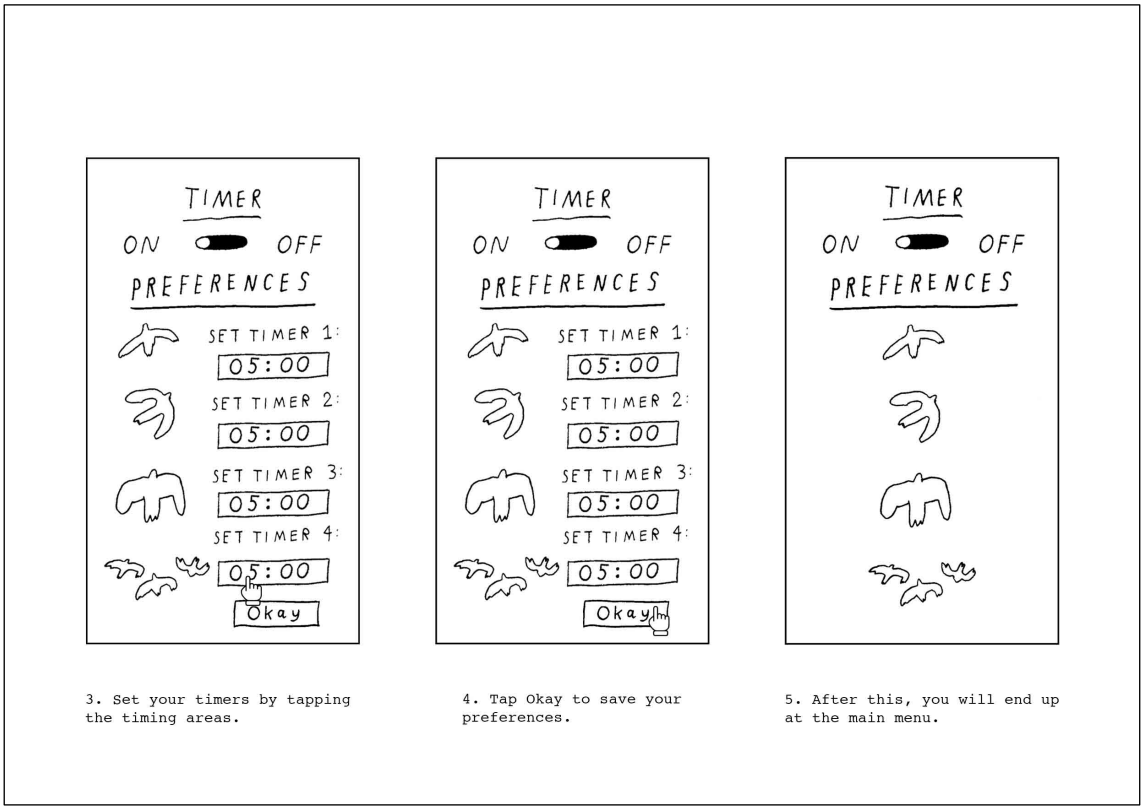
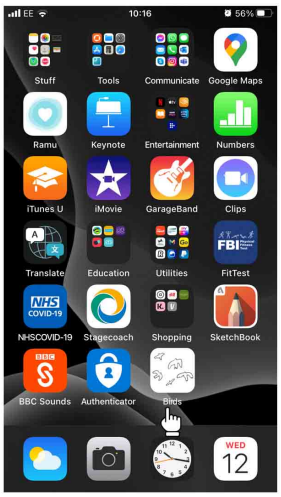



*Figure 82. Page 8 of the Birds app user manual.*

How to switch timers off



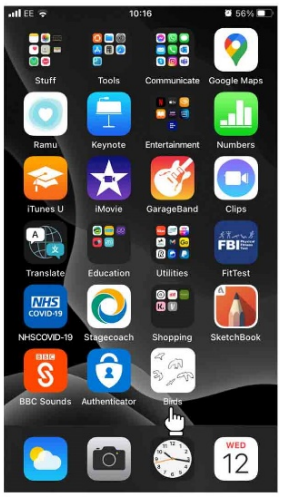

1.Enter the app.


2. Tap on the OFF element.


3. This will switch your timer off.

*Figure 83. Page 9 of the Birds app user manual.*

How to switch timer back on




1. Enter the app.


2. Tap on the ON element.


3. This will switch the timer back on.

*Figure 84. Page 10 of the Birds app user manual.*


*Figure 85. Page 1 of the 'Birds … Don't get carried away' narrative.*

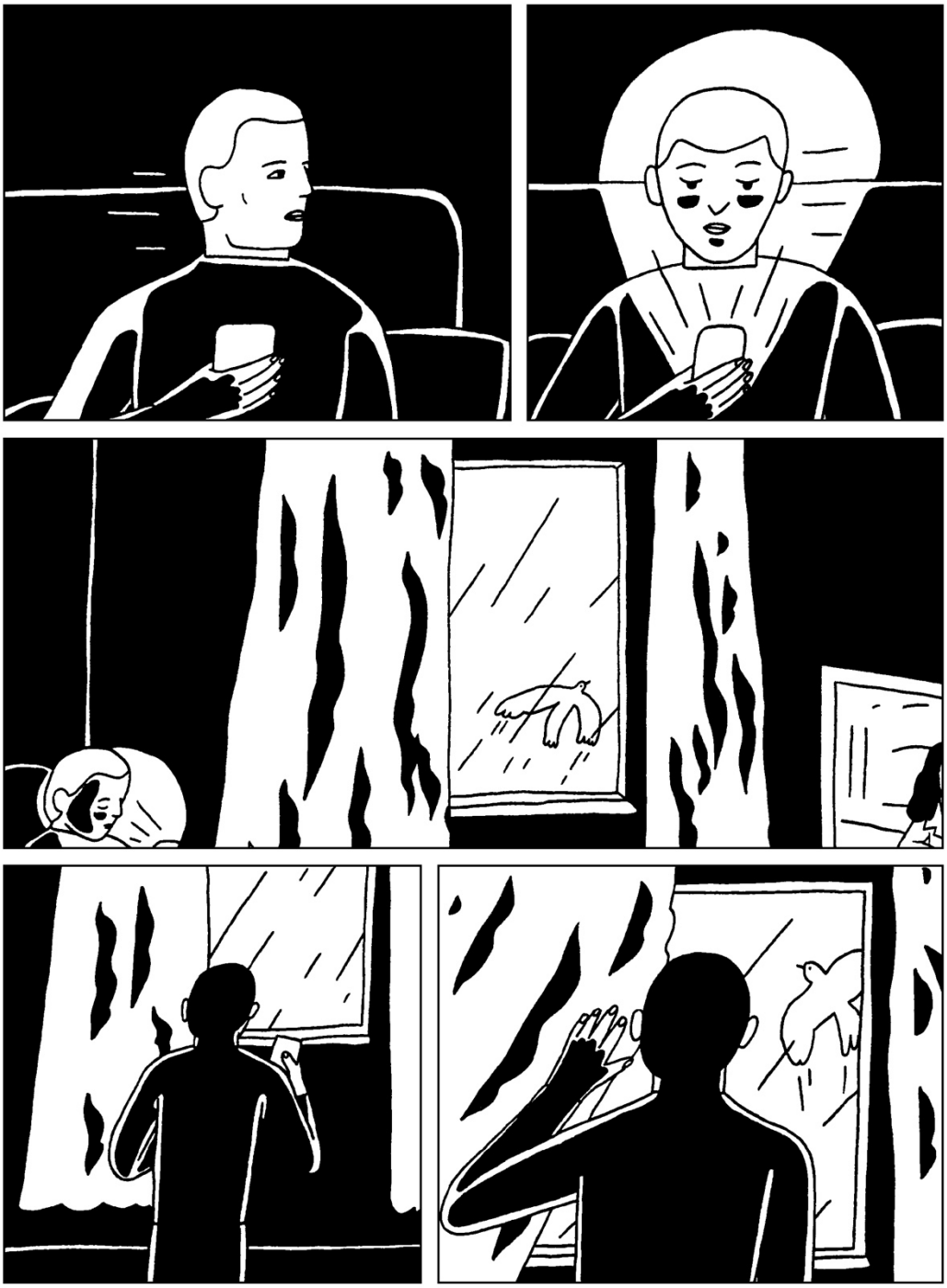


*Figure 86. Page 2 of the 'Birds … Don't get carried away' narrative.*

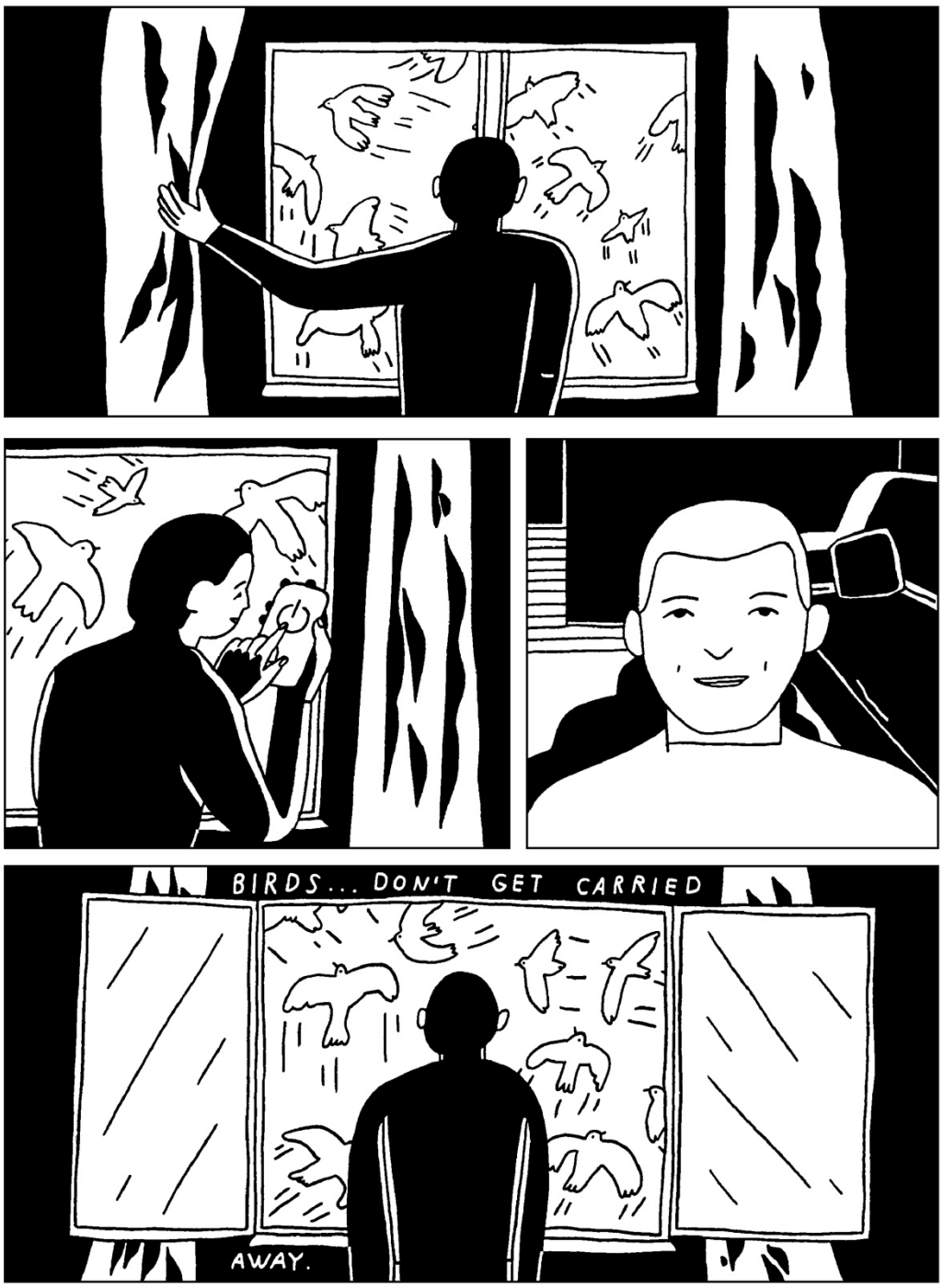



*Figure 87. Page 3 of the 'Birds … Don't get carried away' narrative.*

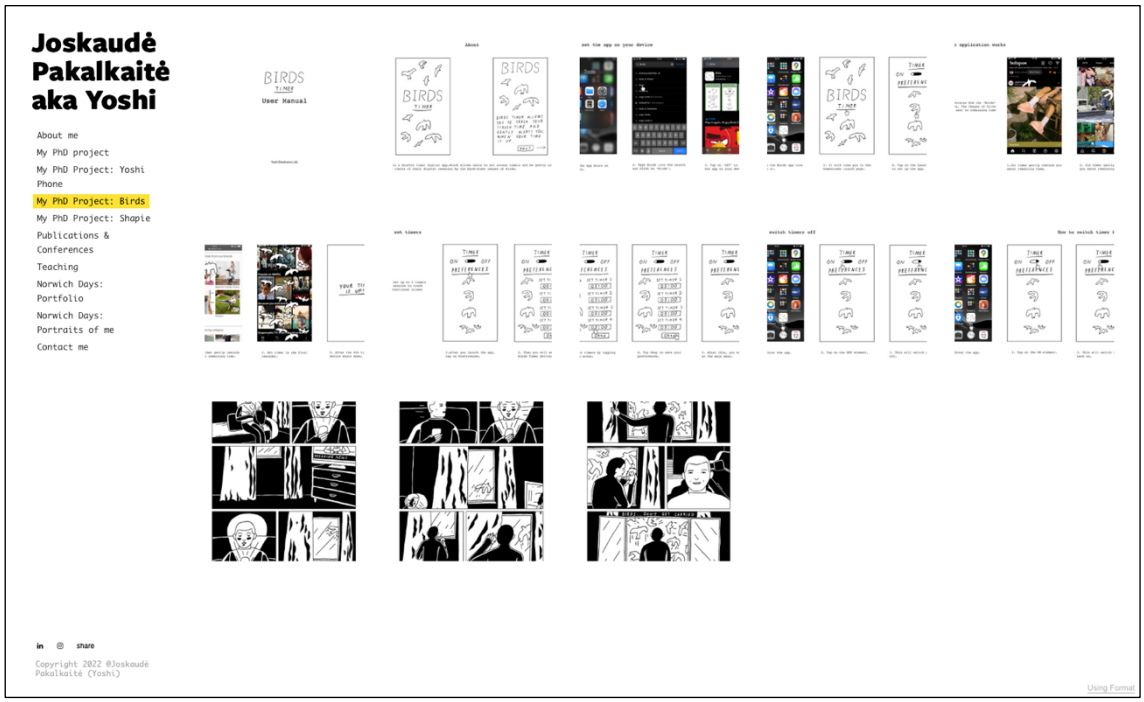



*Figure 88. Birds app user manual and narrative on my personal website.*

## 7. Shapie and touch-rich interactions

In stage 1, I identified the design challenge 'touch-poor interactions' through my literature and practice review. Consequently, I developed a proposal for a touch-rich communication device that could change shape. I created a 'what if' scenario to develop this further. In stage 2, the first question I devised was: what if the device is capable of being moulded into another shape and resume the original shape after use when needed? (see Figure 89). I thought that this scenario was a good starting point, but it did not capture all of the shapeshifting features and elastic properties and was too specific. I decided to use my imagination and list all of the elastic features this touch-rich gadget could have in my sketchbook (Bleecker 2009). I decided to devise a more general 'what if' scenario. This simplified version would provide more flexibility in defining the features when developing a prototype and would not restrict its design to any specific qualities. The result of this stage was the following 'what if' scenario: what if a communication device could change shape? This demonstrates how my practice progressed from a proposal to a more detailed concept.

In stage 3, I progressed from a more detailed concept to a final sketch of the diegetic prototype. In this stage, I focused on devising the name and logo for the prototype and defining its properties and shape. I used the descriptions from stage 2 to define the following prototype features: paper-thin, stickiness, the ability to become soft and hard, and possessing a bending property, a folding property, and a rolling ability. The prototype could have other elastic properties, but I felt that these definitions would best communicate its elasticity. Therefore, these definitions informed the design sketches. I imagined and sketched how the prototype would look with each of these properties (see figures 95–100). During this sketching process, I realised that for the prototype to possess all of these abilities, it would need to be thin and rectangular. Therefore, I sketched an approximate rectangular shape without focusing on its dimensions. After I produced this first sketch, I realised that the prototype would be too long, and it would not form a square when folded. Therefore, I measured and redrew the design. This demonstrates how my practice developed from a 'what if' scenario to a final sketch of a prototype ready to be designed for 3D printing (see Figure 90).

While working on this stage, I also developed the name and logo for the prototype. While sketching the prototype's properties, I focused on its shape; therefore, the word 'shape' was constantly in my mind. I decided to call it 'Shapie'. According to an online English dictionary, adding 'ie' to the end of a name or term denotes familiarity, intimacy, or tenderness (Dictionary 2024). I believed that this name would create a warm, familiar feeling or notion in the user when thinking about the product. I did not consider any other names for the prototype and proceeded to create its logo. I used its name to develop the logo, which is quite common in the technology sector – for example, the Nokia logo (Nokia 2025). I wrote down the Shapie logo on the prototype sketch linearly. I thought that the logo

should reflect the product's elastic properties; therefore, I sketched it so that its letters had a bending motion (see Figure 96). Different versions of the Shapie logo could be developed to represent different types of properties. However, at this stage, I only needed a logo that could be used for visualisation purposes in the user manual. Therefore, this sketch was used to produce the final logo.

The final sketch and dimensions from the sketchbook were used to create the Shapie AutoCAD files. Two designs were created using AutoCAD – with and without fillets – as I was unsure if fillets would impact the prototype's presentation (see figures 91 and 92). I decided to use white materials for the printed prototypes because I needed the logo to be visible, as well as for illustrative purposes when developing the monochromatic user manual and narratives. The prototypes could also be printed in grey or black, but I was advised to use white as white material is easier to colour after printing if required. The first Shapie prototypes were 3D printed in two different materials – hard white rPLA material produced by Fliamentive and flexible white thermoplastic polyurethane (TPU 95A) material produced by Ultimaker – to communicate the device's ability to change between soft and hard. Shapie could also stick to and unstick from surfaces; however, owing to material constraints, I was unable to communicate this by printing a physical prototype. However, this could have been shown visually using the hard mode prototype. Following this, I aimed to develop other Shapie prototypes to communicate its ability to fold, bend, and roll (see Section 8 in this chapter (page 151)).

Following prototype printing, I sanded several of the prototypes so that the surface ridges would not be visible in photographs. I inspected the prototypes, which looked acceptable aesthetically for photographing, as the surface ridges were not visible. To document Shapie in hard and soft modes, I was concerned that a white prototype would disappear if presented against a plain white background or a distracting background. Therefore, I held the prototypes in my hands and photographed them against a plain, dark background. I needed the photographs to document my practice, as well as for the user manual. I composed and photographed the prototypes by adjusting my hand and camera positions for each image. After I had produced a selection of images, I selected the best for editing and use in the user manual (see Figure 94). I then scanned the Shapie logo from my sketchbook and edited it in Adobe Photoshop. The logo was then ready to be used in the user manual. I also experimented with placing the logo on the prototype images to create an image that would visually represent Shapie as a speculative product and could be adapted for different layouts when creating the user manual. The result of stage 3 was a diegetic prototype called 'Shapie' and its associated logo. This demonstrates how my practice progressed from creating the final 3D prototypes to printed 3D designs. Touch-rich interactions were successfully achieved by creating Shapie (see Figure 94). Contrasting with static and inflexible touchscreen devices and foldable smartphones, Shapie possessed shapeshifting and elastic features and could change shape according to a user's needs.

Compared to touch-poor interactions and smartphones, Shapie had high touch-richness and was a better ergonomic solution. This suggests that the UI's touch-poorness and noisiness had reduced.

In stage 4, I developed the text, storyboards, illustrations, and designs for the Shapie user manual. I also worked with writer George Forster to produce the written narratives for the product, which I then illustrated. In stages 2 and 3, I created sketches to show how Shapie worked, drew its logo, and took photographs of the Shapie prototypes. I decided to use my original sketches to inform the structure of the user manual because they communicated all of Shapie's abilities. I sketched storyboards for the manual to identify the pages and information it should contain. I decided that I needed a cover page, an 'about' page, and a page on each of its properties, as this user manual needed to have the feel and look of a 'real' user manual. I then developed a final storyboard, which was used to create the final illustrations and write the text needed for each page. The final user manual storyboard was structured so that the information was presented in a chronological sequence (Hodges 2003). I used the original sketches from stage 2 to produce five monochromatic black and white illustrations. The original sketches in my sketchbook were rough visual representations with different sizes and without a uniform style, drawn in a ballpoint pen, which could not be used to develop the final illustrations using Adobe Photoshop.

However, based on these original sketches, I created a one-size comic strip-like layout that could be tailored to visually communicate Shapie's properties. I depicted its thinness by showing examples of it as a thin device in various situations. Other properties were depicted through a series of images showing how it is activated, what happens when activated, and the potential use of the activated feature. A further series of images communicated how it is deactivated, what happens when it is being deactivated, and what Shapie could be used for when deactivated. While working on these final illustrations, I also developed the user manual text. I wrote about each of Shapie's six properties, and created text for the cover and about page elements (see Appendix D). However, the focus of this design challenge was on Shapie's elastic properties, and this was not reliant on UI elements, illustrated by screenshots or hand-drawn UIs, as used in the Yoshi Phone and Birds app user manuals. Therefore, I created hand-drawn illustrations to demonstrate each of Shapie's elastic properties (see figures 101–105). After I had produced the final artworks, I became aware of the similarity of the illustrations in the user manuals for the three prototypes. I was concerned that the Shapie user manual would be disengaging or create confusion for its reviewers. Therefore, I introduced digital black and white gradients into the scanned Shapie user manual illustrations to distinguish them from those of the other prototypes. I also used the logo and photographs to create the cover and about pages. After I had created all of the user manual pages, I copied and pasted the user manual text onto the relevant pages. The decisions during this process were guided by my instincts. This demonstrates how my

practice developed from storyboarding, planning, and sketching images, producing final illustrations for the written narrative, and writing a user manual text, to producing the Shapie user manual.

The design fiction narratives for Shapie were written by George Forster (see Appendix J), who had also created the narratives for the Yoshi Phone and Birds app. I developed a brief for the Shapie concept, which I sent to George, and he responded with the narratives as agreed. He produced web copy and six short scene narratives, each of which ended with the slogan: 'Shapie: Feel technology like never before'. I reviewed the narratives and realised that George had depicted Shapie incorrectly in three of the six scenes. While the writer had not identified any concerns with the prototypes in the narratives, in one scene, he had written that Shapie had two modes rather than six abilities. He had also misrepresented Shapie's use in three short scenes by stating that Shapie folds over, extends, and sticks to surfaces by itself without a human instruction, which is not what Shapie can do (fictionally). This may have been caused by his misunderstanding of my brief; however, I did not receive any follow-up questions during the narratives' development. Following my review, I provided feedback to George. However, time and budget constraints meant that he could not edit the narratives; therefore, I decided not to use the narratives that portrayed Shapie incorrectly. Notwithstanding the challenge of working with a writer, I decided to illustrate the three narratives that represented the prototype correctly. Similar to the Yoshi Phone and Birds app stories, these narratives had external focalisation, with situations depicted from outside the characters rather than through their eyes (Bal 1985). This meant that I needed to visualise and structure the story so that it depicted not only how the prototype's features worked but also the feelings and emotions of the user. I did this by using camera-like angles and framing in my work (Eisner 2008). This demonstrates how my practice evolved from developing written narratives to finished texts ready for illustration.

To illustrate the 'Shapie: Feel technology like never before' slogan, I re-read the third, fourth, and sixth short scenes from the narrative and sketched preliminary storyboards for these scenes. I had three short stories that each ended with the same slogan, and I needed to create one story from these. I decided to have three pages with a short story on each and then follow this with the slogan on a separate fourth page, rather than repeat it on every page. I sketched the final storyboard and produced five panels for each short scene (see Figure 106). I intentionally structured the scenes so that each panel represented an important moment, which the user could understand by bridging the gaps between each panel (McCloud 2001). I used my imagination to visualise the scenes and then created a layout in my sketchbook that could be tailored to each of the stories. Next, based on the storyboard sketches, I sketched the illustrations and redrew the panels in pencil until I had achieved the best composition for each panel. For the final page, I created one panel and worked on the hand-drawn typography in pencil until I achieved the best composition. I then redrew the pencil outlines in black fineliner pen and erased any pencil marks to reduce the editing work needed after scanning (see Figure

107). After the illustrations were scanned (see Figure 108), I edited them using Adobe Photoshop and coloured them with black as I wanted to direct the viewer's attention to the linework of the monochrome illustrations. These decisions were based on my creative intuition. This demonstrates how my practice developed from finished texts ready for illustration to storyboarding and producing final illustrations.

This section shows how my practice developed during stages 1–4. The final results of these four stages were two illustrated narratives. The Shapie user manual was a seven-page, A4-sized document that explained the Shapie product and how it worked (see figures 109–115). The 'Shapie: Feel technology like never before' narratives were a four-page, A4-sized comic series that imagined how Shapie would be advertised to consumers and clients (see figures 116–119). Both of these documents were published on my personal website (see Figure 120) and can be accessed here: https://www.joskaude.com/my-phd-project-shapie.

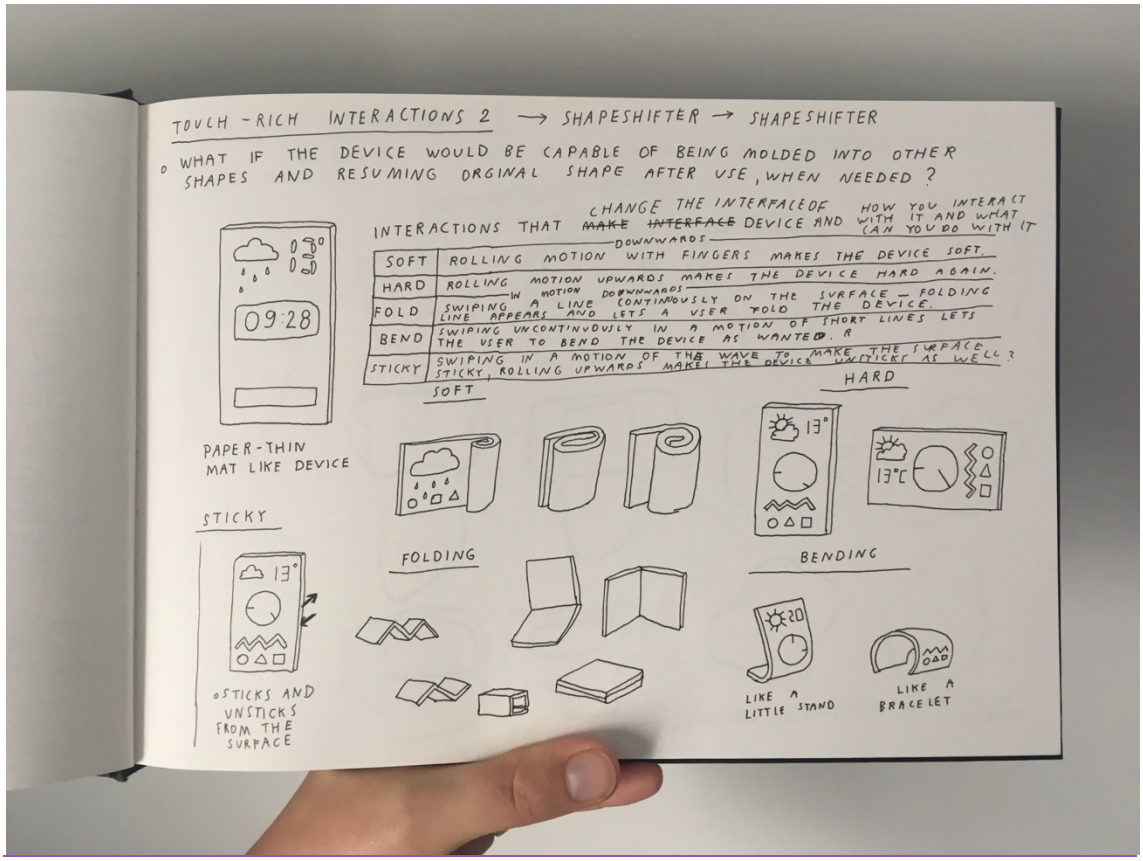



*Figure 89. 'What if' question exploration for Shapie.*

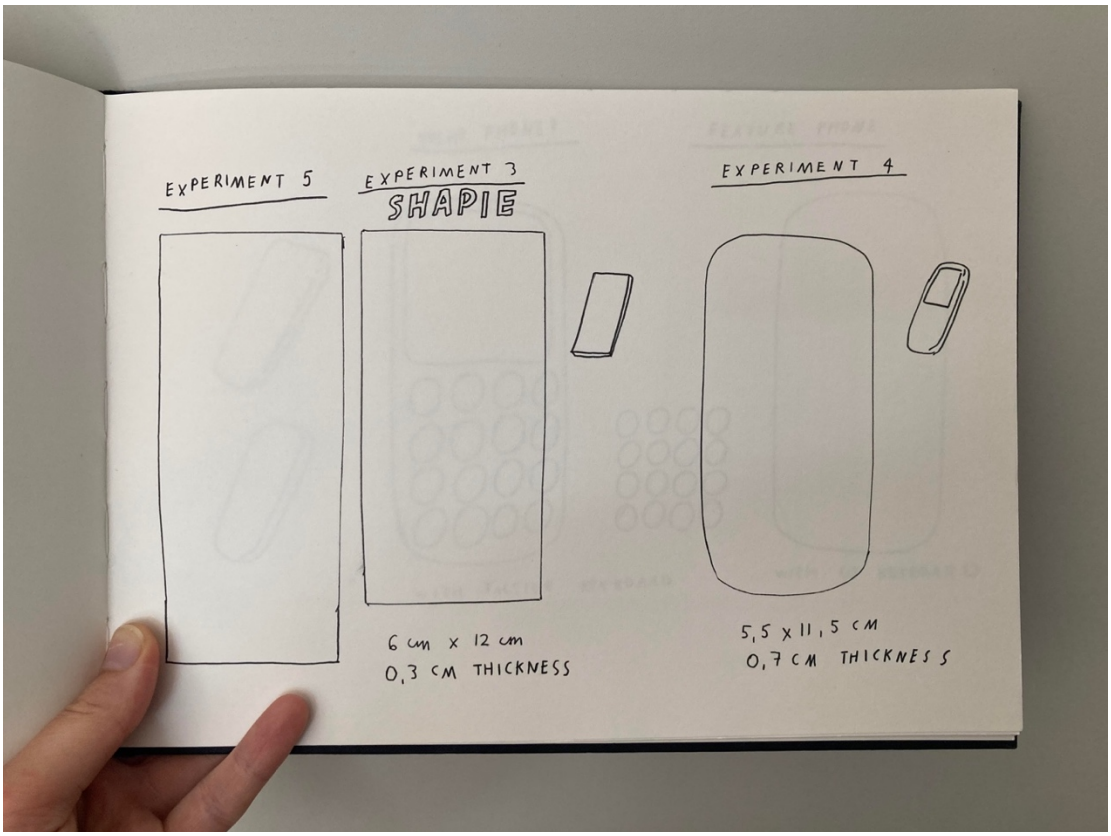



*Figure 90. Shapie 3D prototype sketch.*

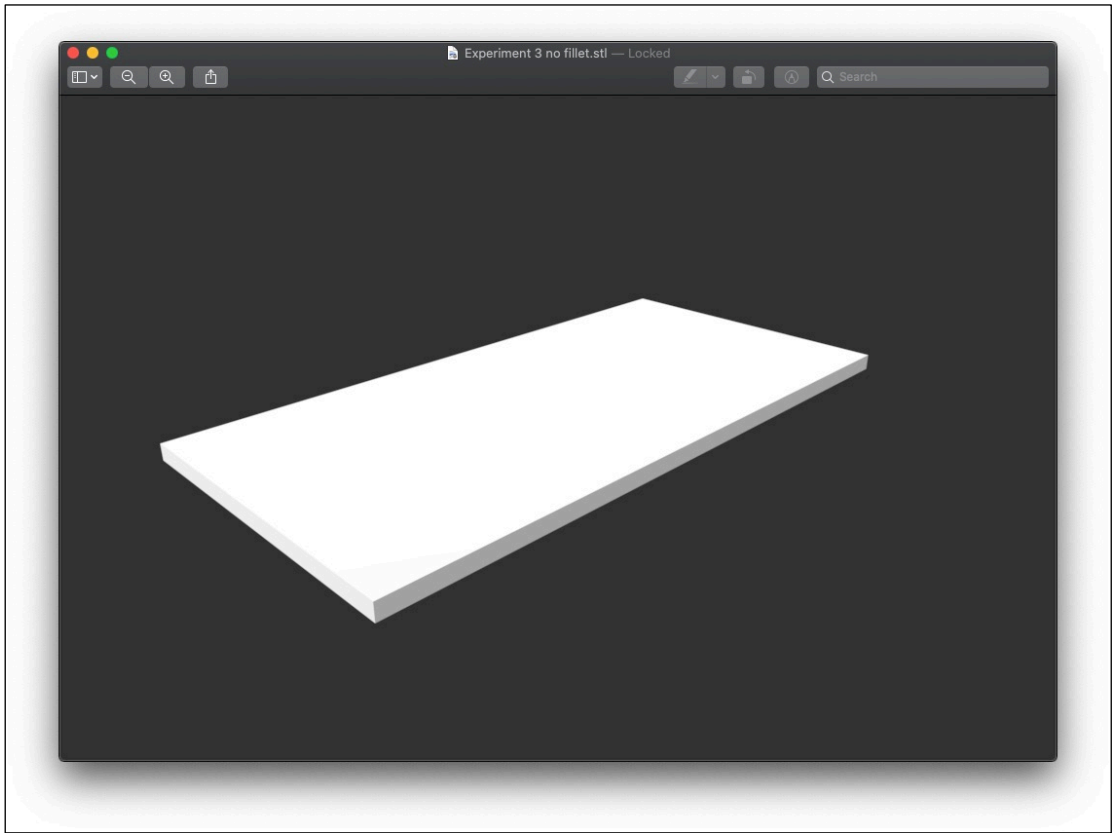



*Figure 91. Shapie 3D print prototype without fillets.*

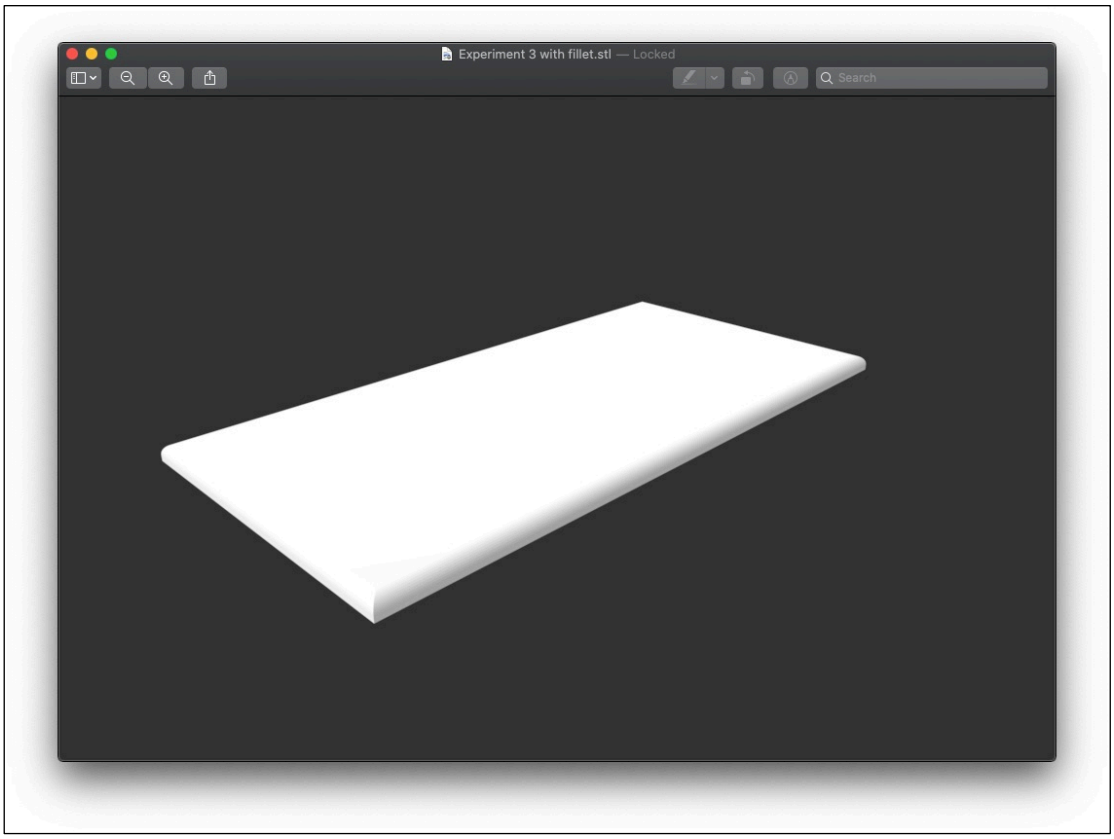



*Figure 92. Shapie 3D print prototype with fillets.*

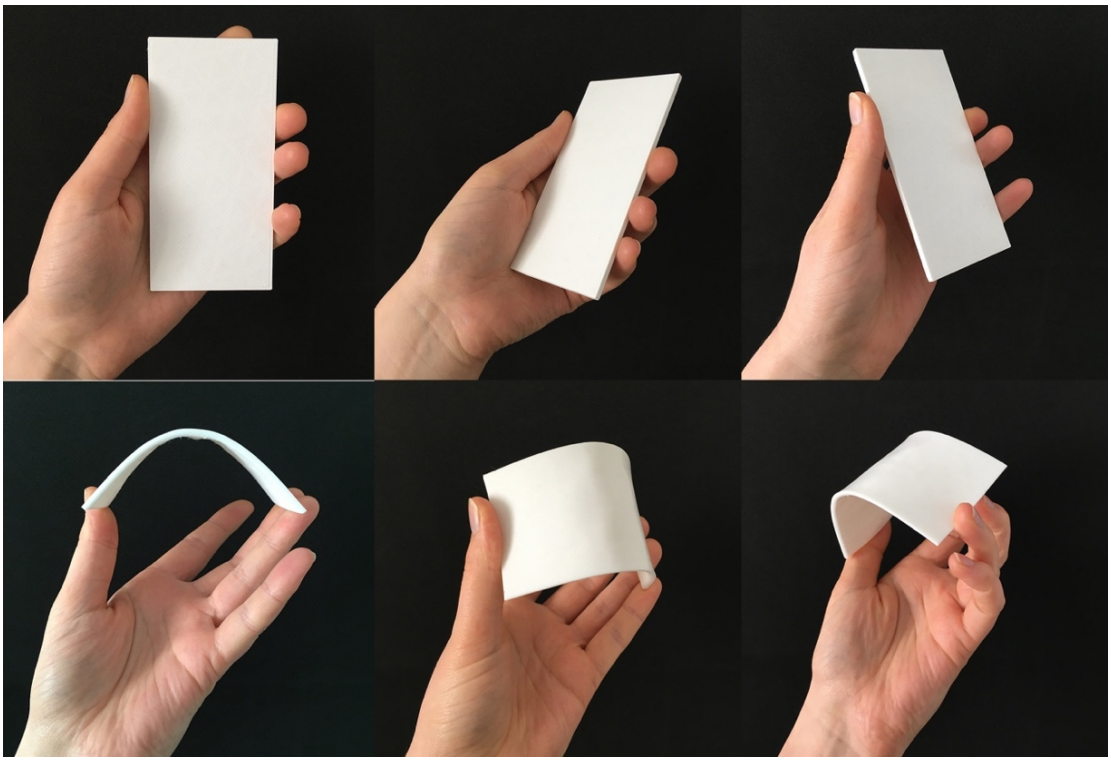


*Figure 93. Shapie 3D prototype photographs.*


*Figure 94. Shapie 3D prototype with logo.*

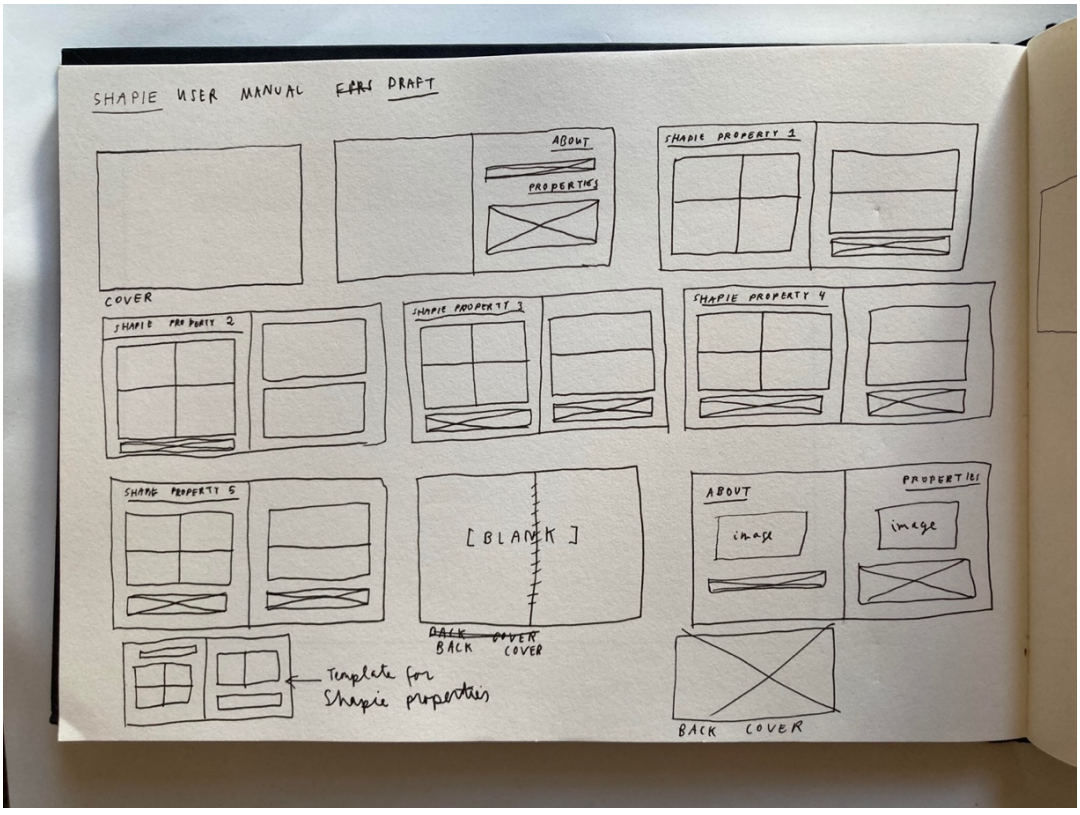



*Figure 95. Shapie user manual layout sketch.*

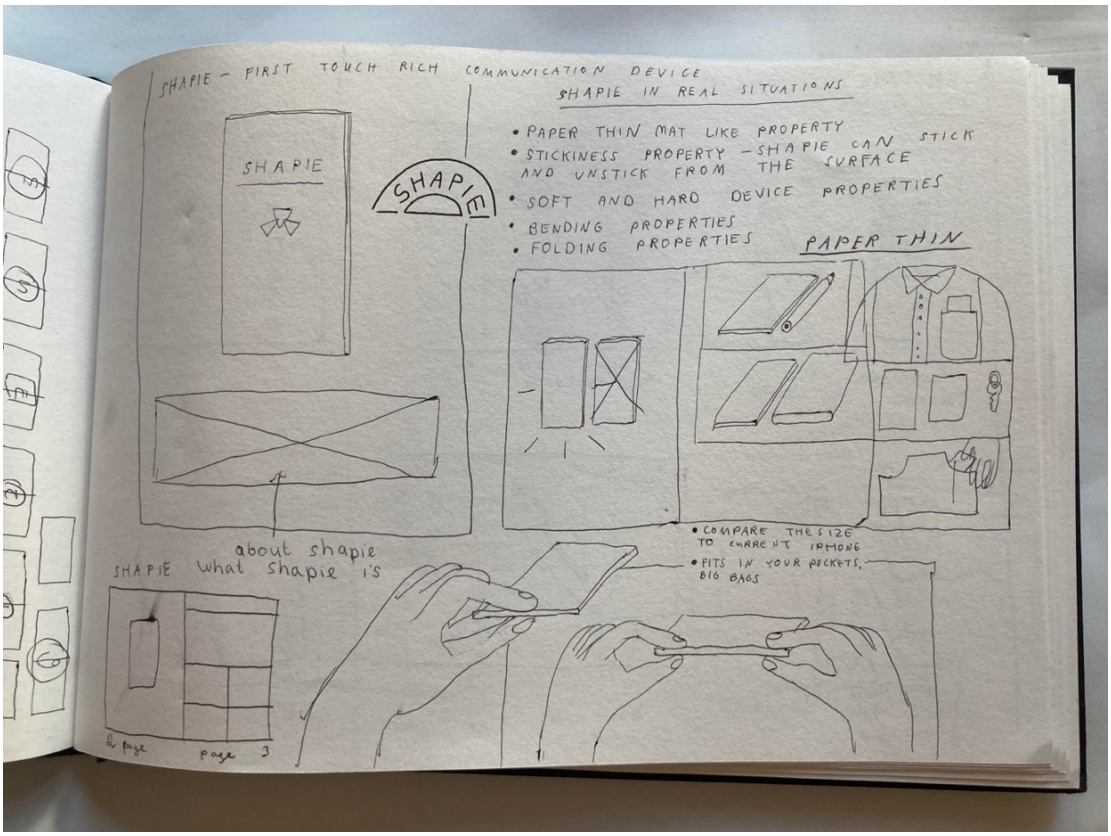



*Figure 96. Shapie user manual sketch 1 and logo sketch.*

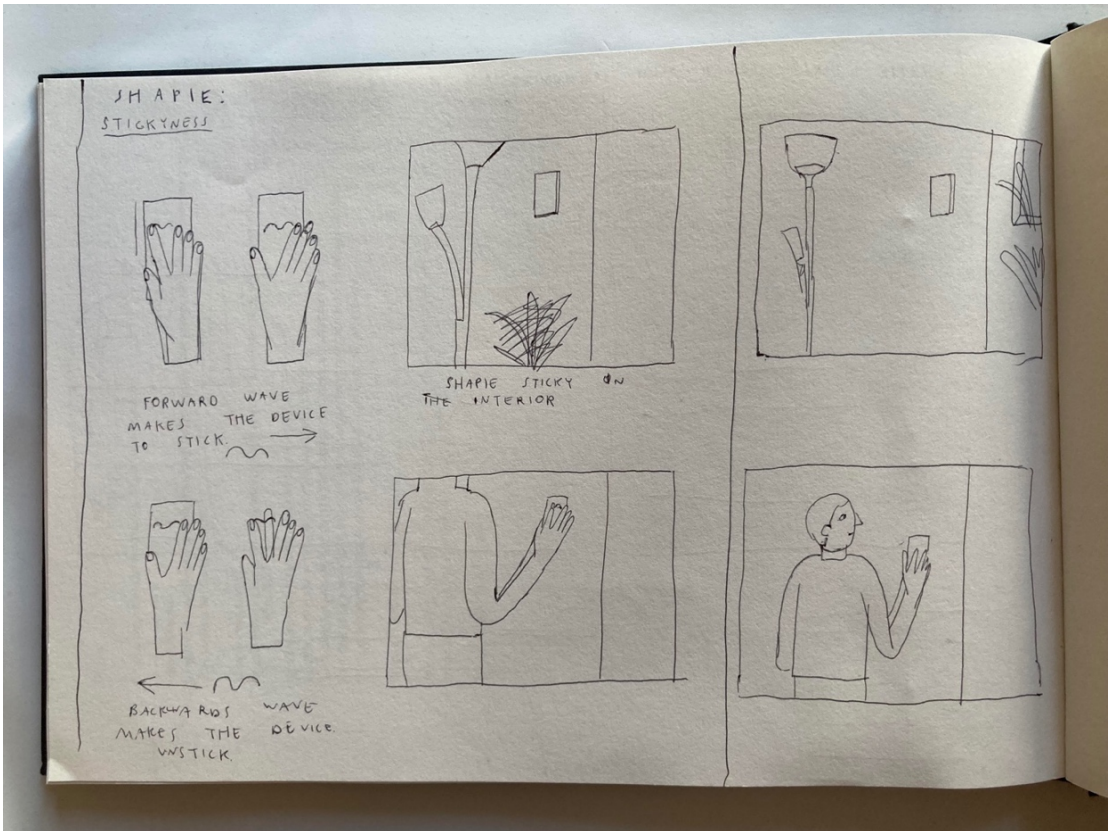



*Figure 97. Shapie user manual sketch 2.*

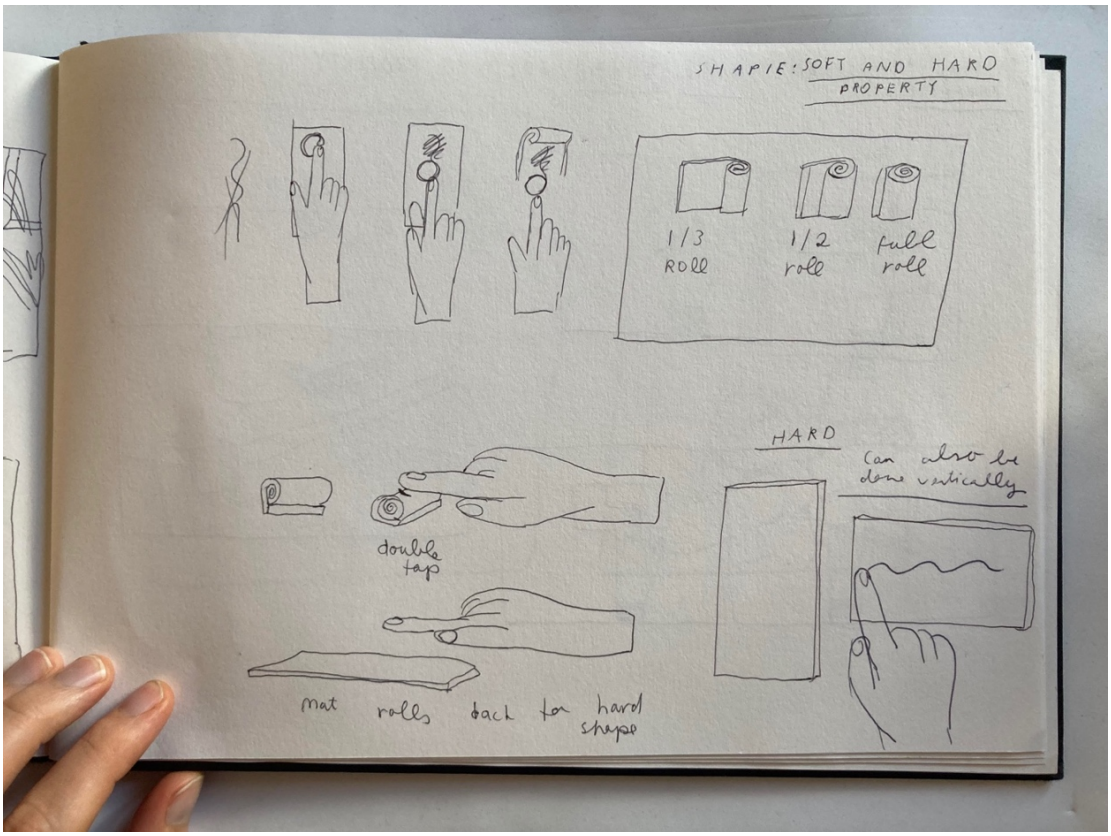



*Figure 98. Shapie user manual sketch 3.*

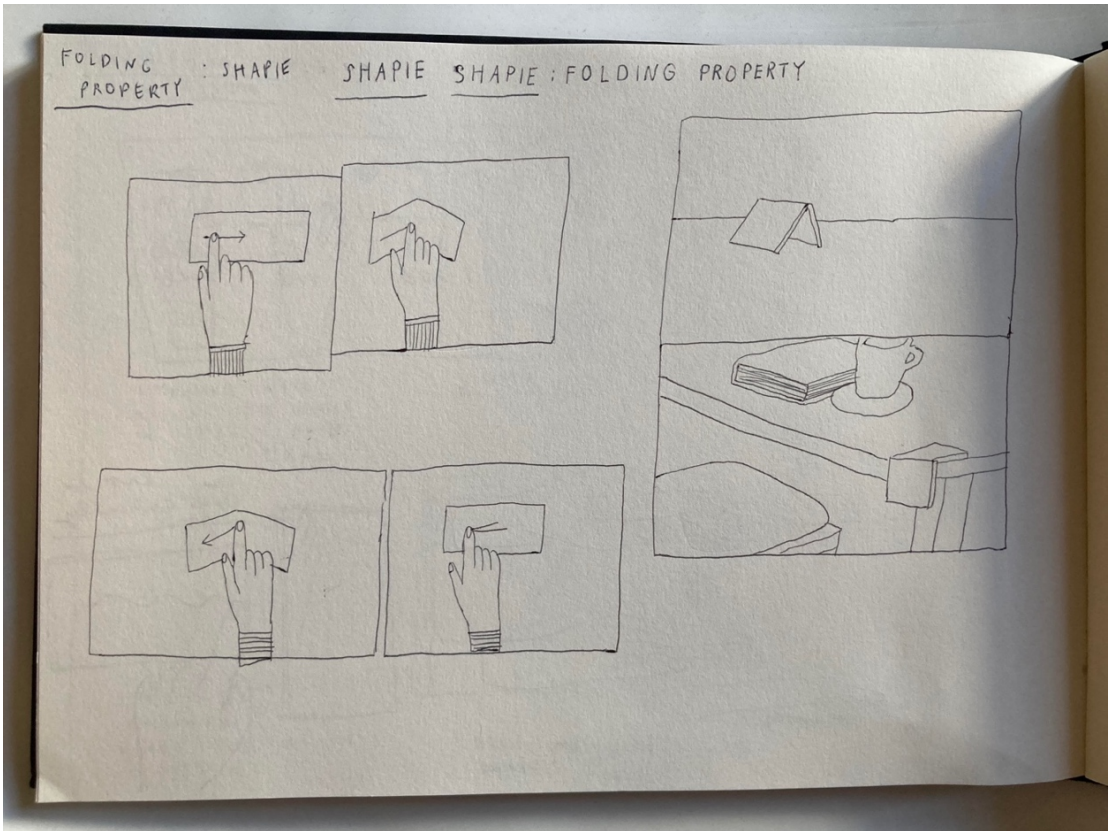



*Figure 99. Shapie user manual sketch 4.*

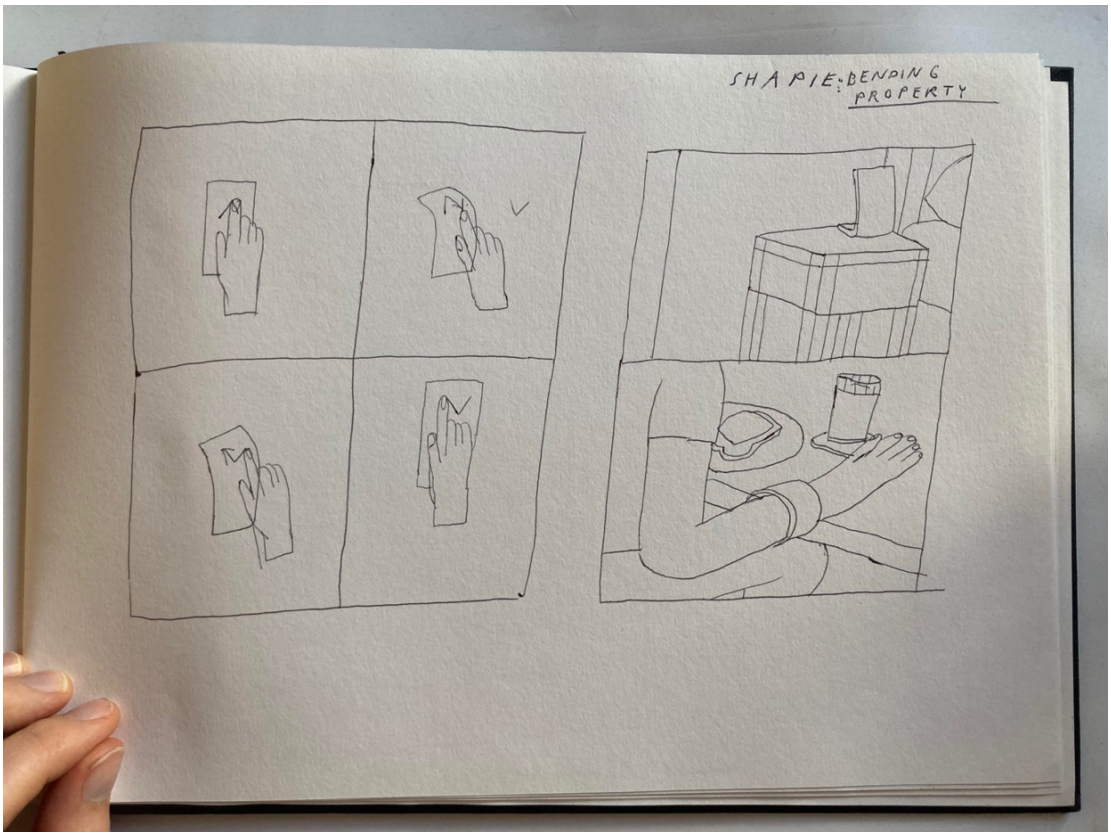



*Figure 100. Shapie user manual sketch 5.*

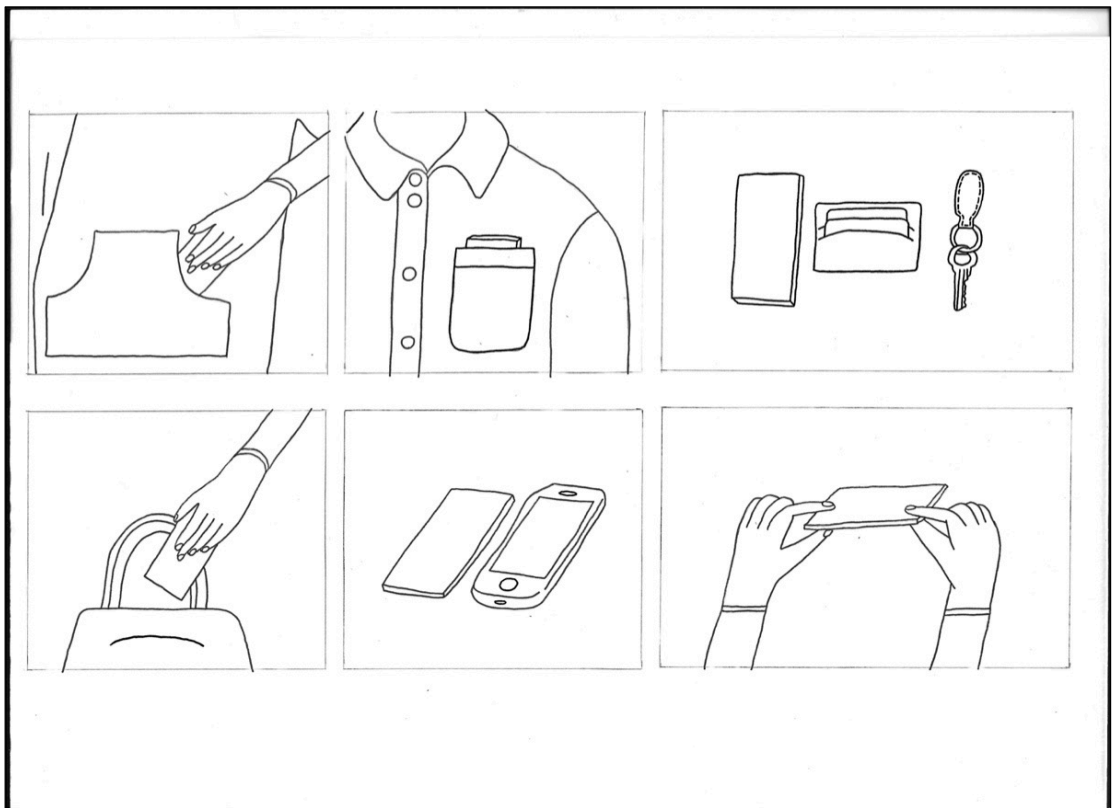


*Figure 101. Shapie user manual scan 1.*

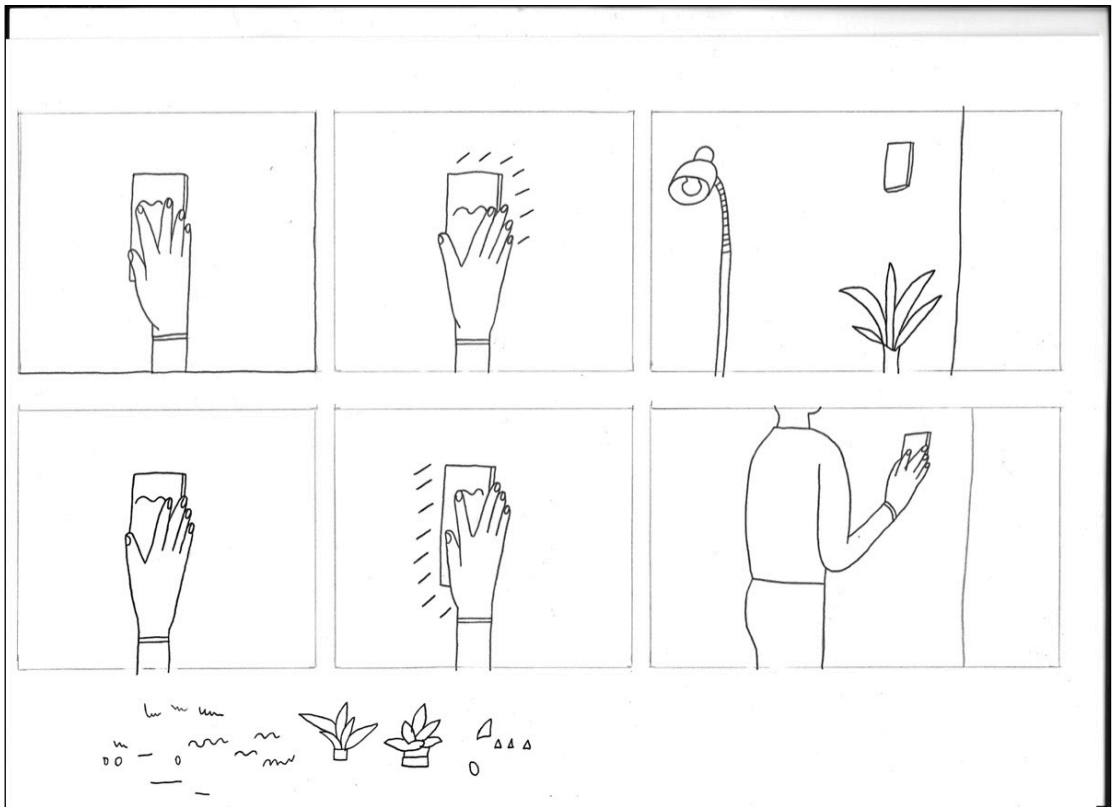


*Figure 102. Shapie user manual scan 2.*

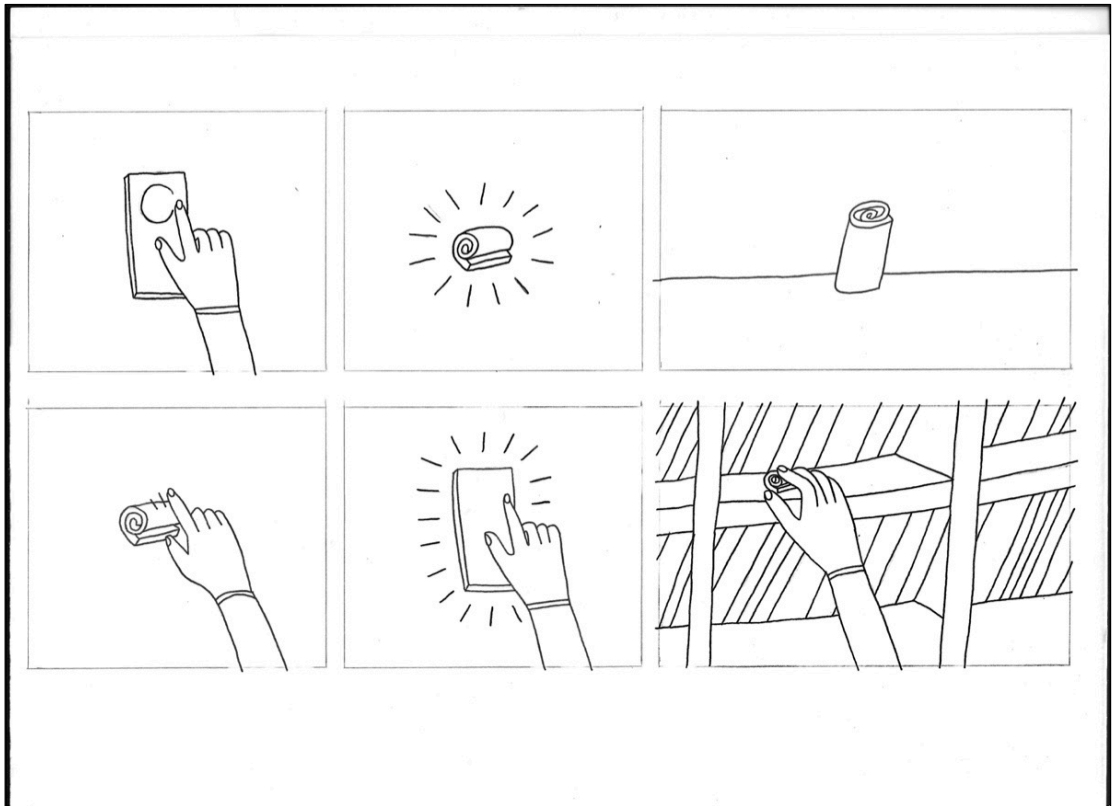


*Figure 103. Shapie user manual scan 3.*

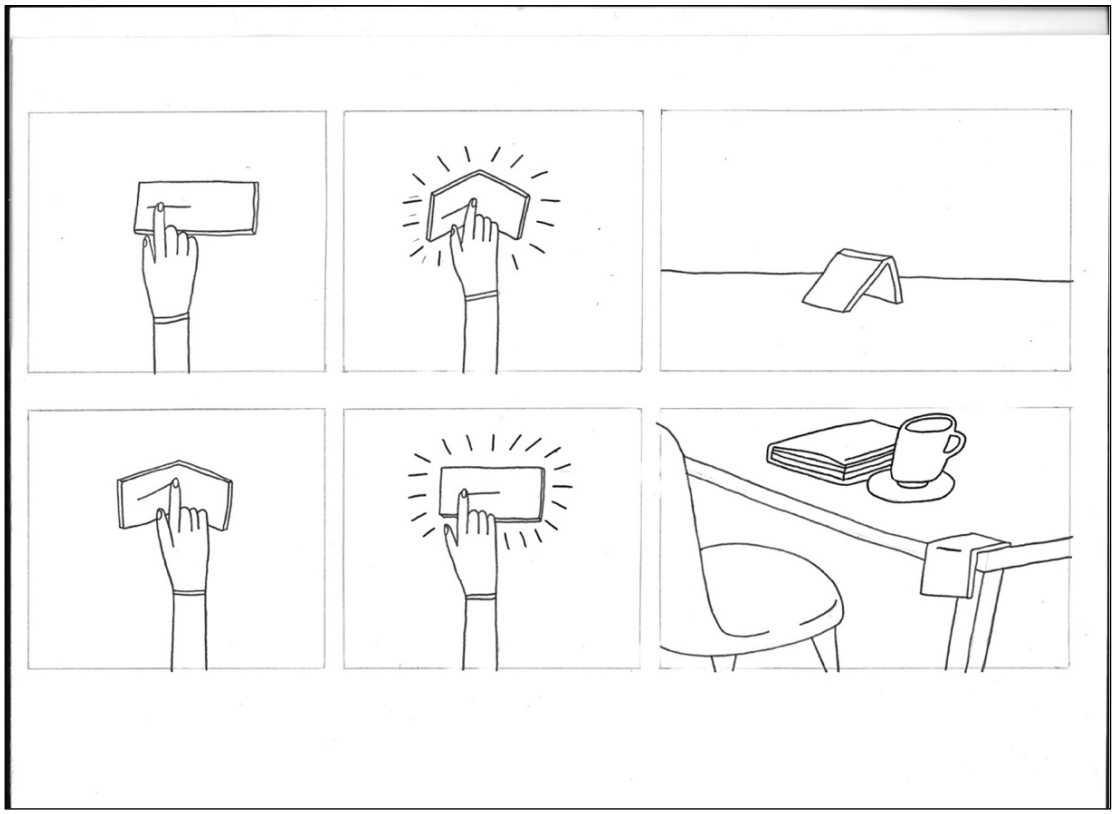


*Figure 104. Shapie user manual scan 4.*

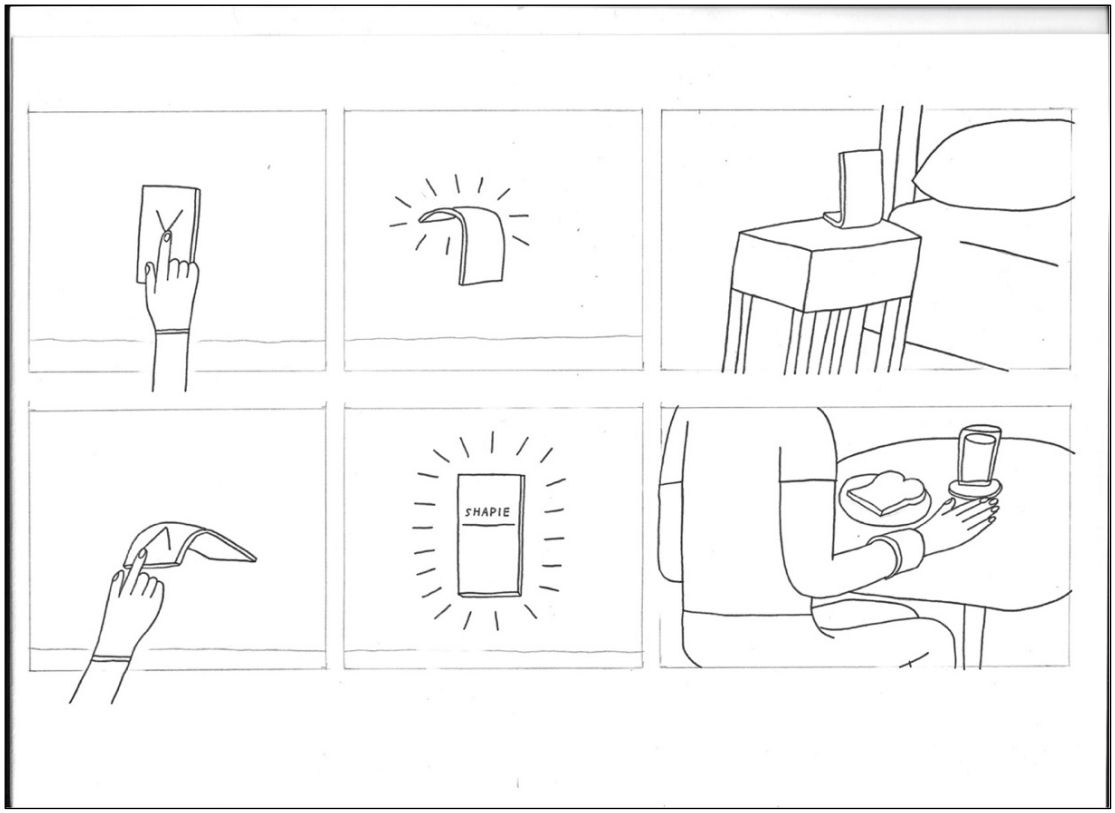



*Figure 105. Shapie user manual scan 5.*

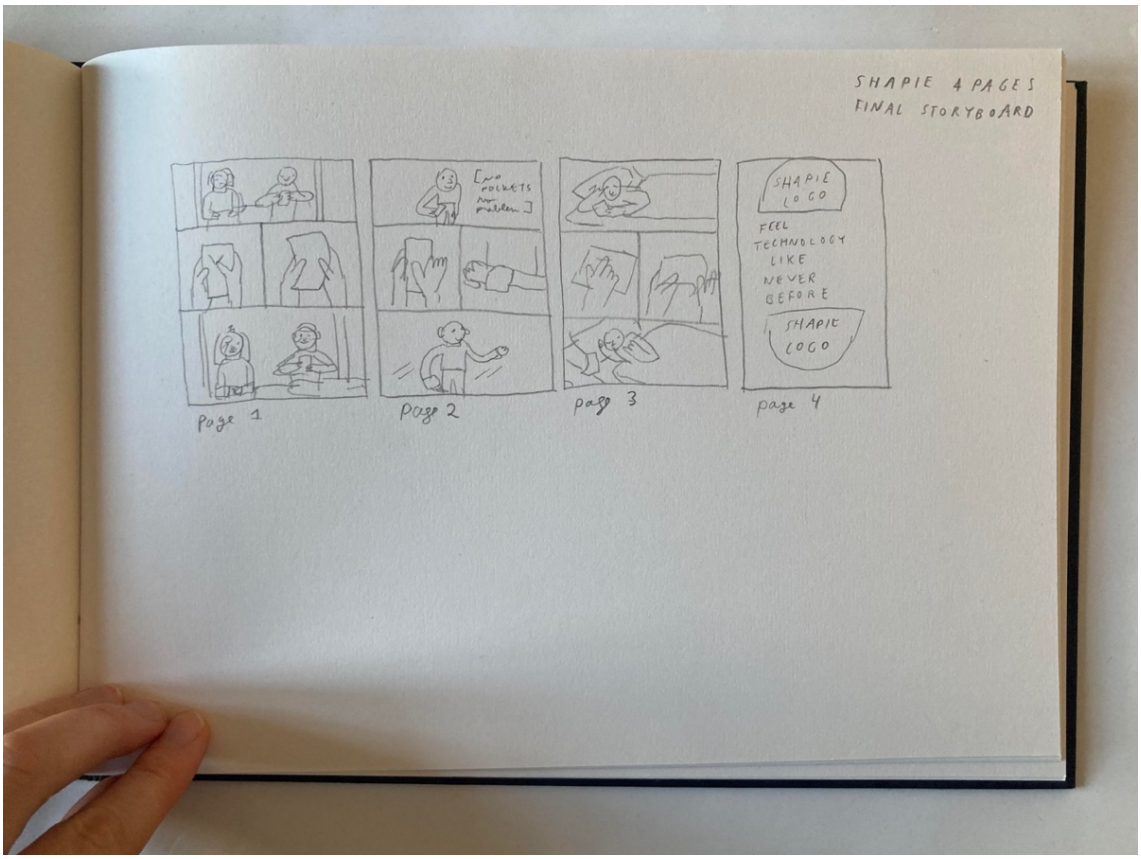



*Figure 106. Shapie narrative final storyboard.*


*Figure 107. Shapie narrative pages in fineliner pen.*

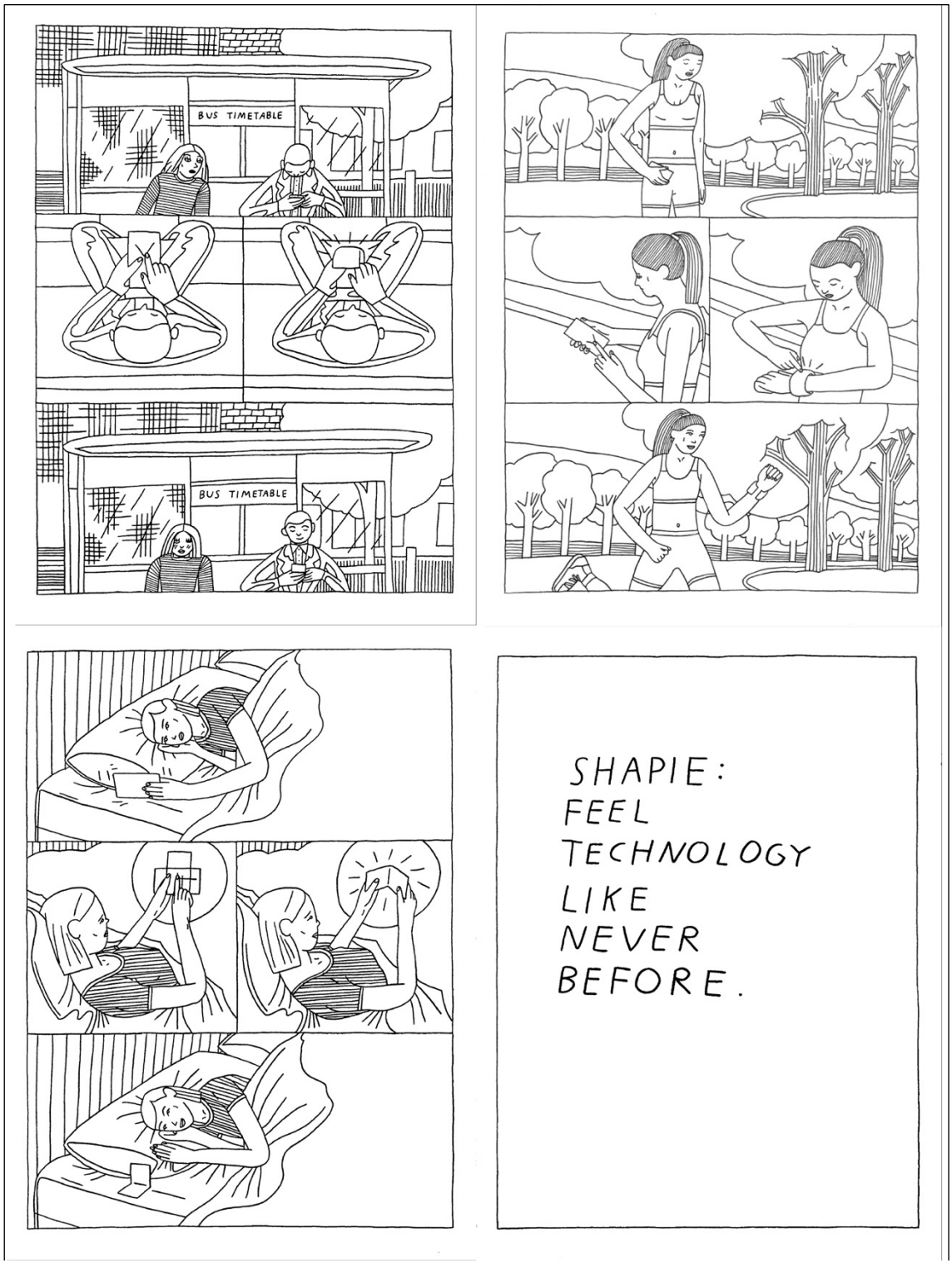



*Figure 108. Shapie narrative scans without black colouring.*

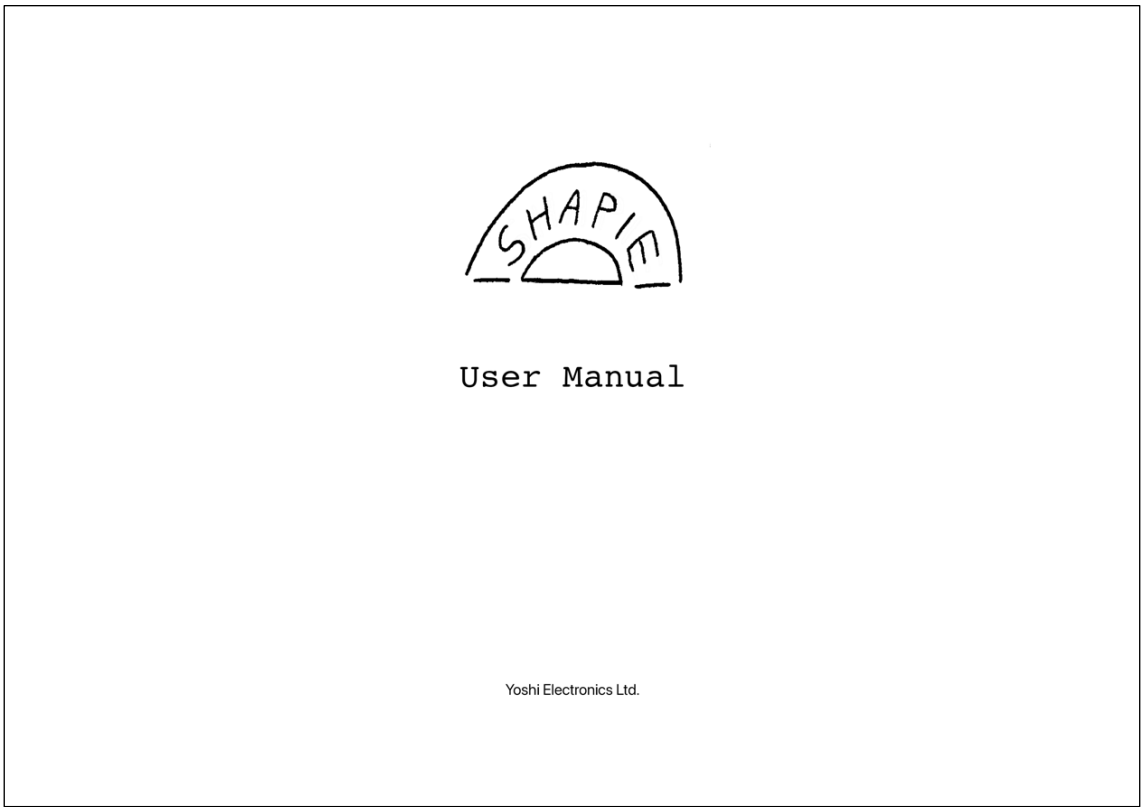



*Figure 109. Page 1 of the Shapie user manual.*

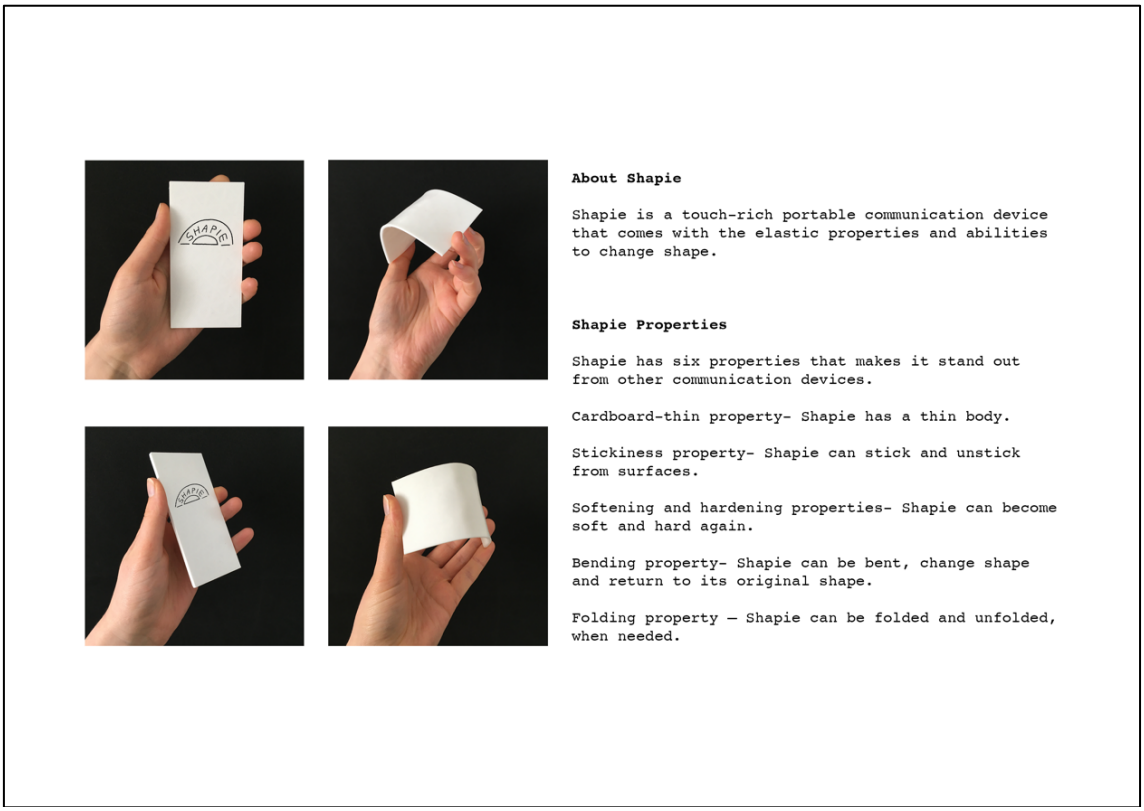
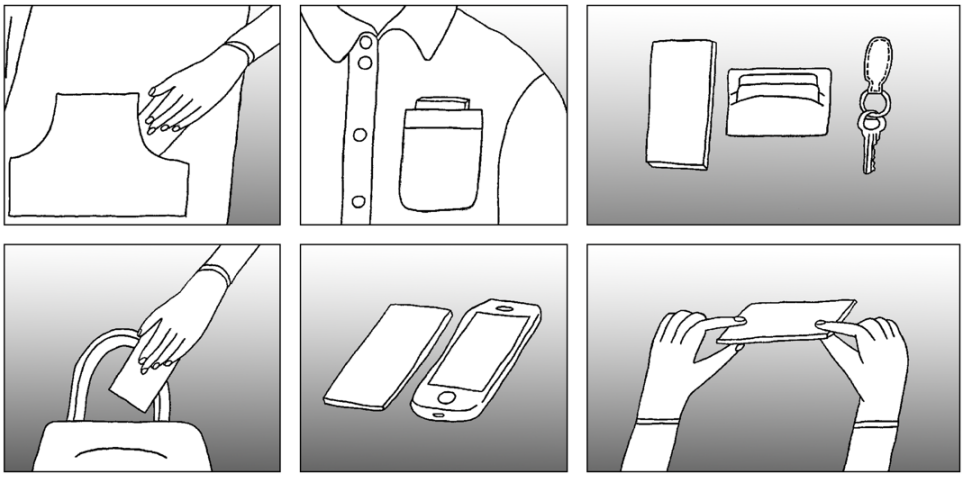



*Figure 110. Page 2 of the Shapie user manual.*

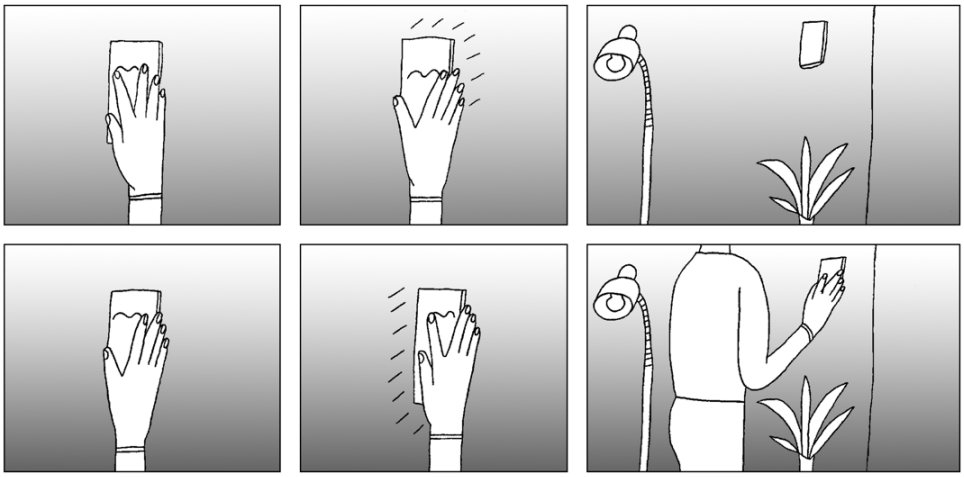
SHAPIE: Cardboard-thin Property



Shapie is easy to carry and store when on the go: Shapie, wallet and keys. It is also quite a thin device compared to other phones.

*Figure 111. Page 3 of the Shapie user manual.*

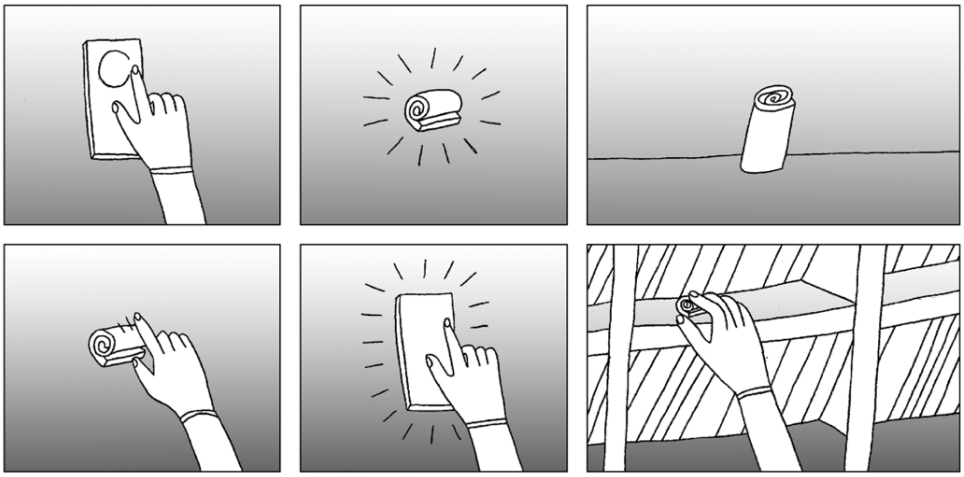
SHAPIE: Stickiness Property



If you tap the device in a wavy motion on the right, Shapie will become sticky and will stick to the surface. If you tap the device in a wavy motion on the left, Shapie will unstick and become its original shape. For example, you can stick and unstick Shapie onto the wall and also use it as a wall clock.

*Figure 112. Page 4 of the Shapie user manual.*

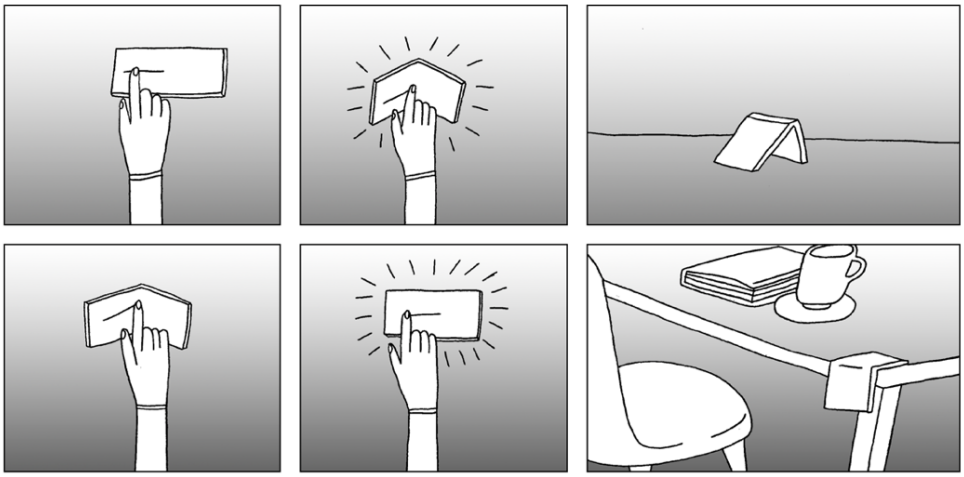
SHAPIE: Softening and Hardening Properties



If you drag your finger in a circular motion on the surface, the device will become soft and roll up. If you double tap on a rolled device, Shapie will roll back into its original shape and become hard. You can roll it when you don't need to use it and for easier storage.

*Figure 113. Page 5 of the Shapie user manual.*

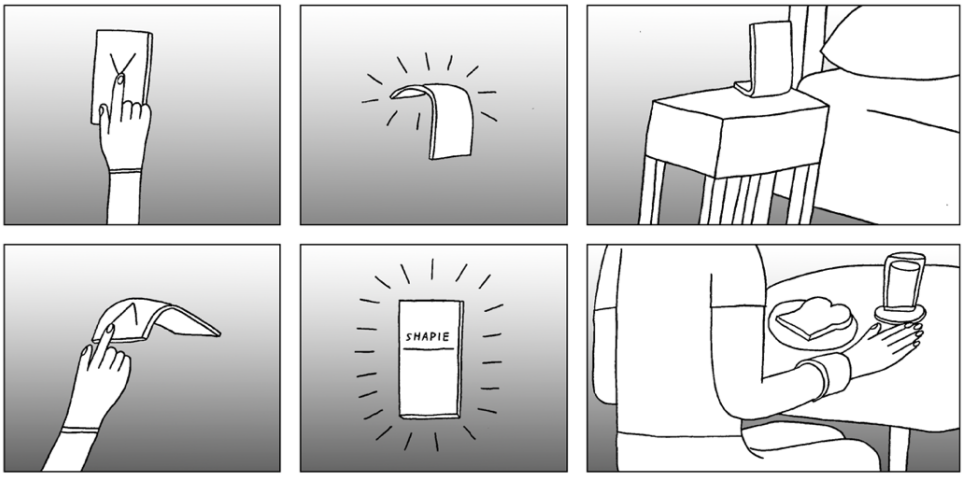
SHAPIE: Folding Property



Shapie is easy to carry and store when on the go: Shapie, wallet and keys. It is also quite a thin device compared to other phones.

*Figure 114. Page 6 of the Shapie user manual.*

SHAPIE: Bending Property




If you swipe in a tick shape on Shapie's surface, the device will bend in that place. If you swipe the tick shape backwards, Shapie will return to its original shape. You can use it as a standing phone and place it on your furniture or use it as a bracelet-phone and wear it on your wrist.

*Figure 115. Page 7 of the Shapie user manual.*


*Figure 116. Page 1 of the 'Shapie: Feel technology like never before' narrative.*

*Figure 117. Page 2 of the 'Shapie: Feel technology like never before' narrative.*

*Figure 118. Page 3 of the 'Shapie: Feel technology like never before' narrative.*


*Figure 119. Page 4 of the 'Shapie: Feel technology like never before' narrative.*


*Figure 120. Shapie user manual and narrative on my personal website.*

## 8. Impact on practice and presenting practice during the COVID-19 lockdown and associated restrictions

The COVID-19 pandemic began during my project's practice phase. At that stage, the 3D Yoshi Phone prototypes had been printed and collected from the 3D printing lab at Falmouth University and were ready to be photographed. This was the first national lockdown, which lasted from March to June 2020. I followed the lockdown rules, such as exercising outside once a day; therefore, I took the photographs of the Yoshi Phone during one of these lockdown walks. I was the model for this photoshoot. The streets were empty, and most places in the community were closed. This produced a limited photographic representation and lower quality images than originally envisaged. The outcomes may have been of a higher quality and with a richer representation had I been able to use Falmouth University's resources, cast other people as models, and used other places, including public transport or community spaces, for the image backgrounds.

The Birds app prototype was also finished; however, only a few of the Shapie 3D prototypes had been printed and collected. The missing designs showed Shapie in folded, rolled, and bent positions. I needed all of the Shapie prototypes in different modes, which I could then photograph for use in the user manual. Owing to the missing prototypes, these modes had to be presented using a different medium, which would have produced an inconsistent visual representation of Shapie in the user manual. Therefore, I decided to illustrate all of Shapie's abilities in the user manual rather than use photographs. This also had an impact on the documentation of the prototypes. I photographed the prototypes with a digital camera in the environment I had access to during that period. The outcomes may have been different had I been able to use the university's resources to produce the photographs. As with the Yoshi Phone, I was the model for this photoshoot, which resulted in less professional photographs taken from a limited range of angles.

Last, the final impact of COVID-19 was on the presentation of my practice. I had initially planned to organise a public exhibition, where the diegetic prototypes and printed design fiction narratives would be presented at a physical venue. Its purpose would have been to probe the audience to engage with the practice. I thought that this public showcase would generate a discussion that could provide me with unexpected insights and feedback. However, owing to the COVID-19 lockdown restrictions, I had to cancel this plan. Instead, I presented my work on my personal website. This resulted in a less interactive presentation and less feedback. I thought it would be useful to include links to my practice when sending the expert review to the research participants.

## 9. Reflections on my practice and development as a creative practitioner

In this section, I provide reflection-in-action (Schön 1984), where I reflect on how the methods employed in Phase 1 of this project formed my development as a creative practitioner. This section focuses on the professional growth and learning that emerged from employing the research through design approach and 'The Poetics of Design Fiction' framework (Markussen and Knutz 2013). I specifically focus on the creation of the diegetic prototypes and 3D prototyping. I also provide suggestions on what I could have done differently and/or better.

Upon reflection, I was unsure whether the diegetic prototypes needed to be 3D printed. The photographs of the 3D diegetic prototypes were used to develop the user manuals; however, the quality of the photographs was lower than expected, and they did not necessarily fit with the illustrations stylistically or aesthetically. This occurred because the main focus was on the prototypes rather than the narratives. During this project, the focus shifted as the illustrated narratives and user manuals became the main outcomes of the project (which were presented to the experts in Phase 2). I wondered what the outcomes would have been had the diegetic prototypes been illustrated rather than 3D printed. I felt that there was an unspoken design fiction rule that diegetic prototypes must use or have elements of photorealism; however, this project has changed my view on this. Practice research enabled me to challenge this assumption as well as discover the value of illustration in developing diegetic prototypes.

I still believe that diegetic prototypes have an important role in design fiction; however, they can be created using illustration/graphic design, and they do not necessarily need to be photorealistic in terms of style. If I were able to undertake the project again, I would push my creative boundaries and create illustrated diegetic prototypes rather than producing 3D prototypes and then visually manipulating them. Furthermore, during the project, a new approach termed 'research through illustration' emerged (Gannon and Fauchon 2021). 'The Poetics of Design Fiction' framework could also have potentially been adapted by modifying this approach (Markussen and Knutz 2013). It is possible that adapting this approach, rather than research through design, would have been better because it would have enabled me to focus on illustrative outcomes in more depth. I felt that the research through design approach distracted me from pushing the boundaries of the illustrated narratives because of its focus on diegetic prototypes.

The final important factor to consider is the need to create diegetic prototypes in industry environments or by other illustrators/graphic designers and their access to and budgets for 3D printing. In an ideation context, the process focuses on quick prototyping. While 3D prototyping can be quick, it produces low-fidelity prototypes. In my experience, if higher fidelity prototypes are

required, the process would need to be elongated to acquire and produce such prototypes. The ideation process can also have many stages, beginning with sketches and lower fidelity mock-ups and then developing 3D printed prototypes, which can be repeated and improved further using higher fidelity outcomes. I would have benefited from exploring the ideation process and its phases in more depth, and these explorations could have informed my creative practice and outcomes.

# CHAPTER 4

# PHASE 2 – EXPERT REVIEW

I sought feedback from industry professionals on the development of the hand-drawn interfaces and mindful and touch-rich interactions through an expert review process. This chapter considers my two research sub-questions. It also explains how the practice research led to the choice of using expert review and justifies it as a method for the next phase of the project. The design, process, and question development used are described, as is the use of coding to analyse feedback. The chapter concludes with the results of the expert review, which form the basis of the discussion on the research question and sub-questions in Chapter 5.

## 1. Research sub-questions

To answer the sub-question, 'How do design fictions stimulate designers to create healthier IT tools and generate insights for the design process?', I applied my thoughts on how hand-drawn interfaces and mindful and touch-rich interactions can reduce noise in digital interfaces, and how professionals from large IT companies can adapt these concepts to develop better IT tools and benefit from these speculative design solutions. Therefore, I needed to obtain insights on how hand-drawn interfaces and mindful and touch-rich interactions can help UI and UX designers and software developers to develop better IT tools. I created an expert review form and sent it to my research participants together with the documentation on the diegetic prototypes and narratives to gain their feedback. The expert review was also used to collect insights into how large IT companies can benefit from hand-drawn interfaces and mindful and touch-rich interactions. To answer the sub-question, 'How do design fictions generate innovation opportunities that would be valuable and beneficial for large IT companies?', I used insights gained from the qualitative data from the expert review. I used coding – an interpretative method – to analyse the open-ended comments from the expert review. This represented the last stage of the project.

## 2. Expert review

As described in Chapter 3: Phase 1 (see page 62), this project did not adapt the co-design element from 'The Poetics of Design Fiction' framework (Markussen and Knutz 2013). This specific aspect facilitated the debate in their framework; therefore, I replaced this aspect with another method to facilitate discussion. I considered the feedback collection methods used by the HCI, UX, and UI disciplines and decided to focus on the feedback methods orientated towards the UI discipline. This

is because my project was orientated towards the development of less noisy digital interfaces, and I felt that the review process closest to this field would provide the most useful insights. According to my review, there are two approaches to collecting expert feedback in the UI discipline: heuristic evaluation and expert review (Nielsen and Molich 1990). Heuristic evaluation is an inspection performed by experts to evaluate UI usability, report issues, and enhance usability (Nielsen and Molich 1990; Nielsen 1994). Heuristic evaluation relies on established design principles; for example, the usability heuristics method (Nielsen and Molich 1990; Nielsen 1994). In contrast, the expert review method focuses on both the design principles and expert knowledge and professional experience (Nielsen and Molich 1990; Nielsen 1994). I assumed that expert reviewers would be familiar with the format of the expert review process because they would have already engaged with similar standards and guidelines (Mayhew 1999; Rosenzweig 2015). Therefore, I selected the expert review method because it enabled me to collect a wider range of information and personalised feedback on my project rather than simply focusing on usability inspection principles.

During Phase 1, I actively networked using social media, sought introductions, and developed and maintained relationships with potential expert reviewers. The aim was to identify a group of expert reviewers who would be able to provide feedback during Phase 2. The criteria I used for the expert reviewers were relatively unrestricted. I defined an expert as someone who has knowledge of usability and UI and UX design principles and has acquired this knowledge through their experience (Nielsen and Molich 1990; Nielsen 1994). As this project aimed to provide benefits for big tech companies, it could be assumed that the selection of the expert reviewers would focus on such companies. However, using my intuition, I did not limit the project's scope to expert reviewers working for such corporations, as this may have produced biased results (Hornbæk 2006; Rogers et al. 2011; Cooper et al. 2014). Hornbæk (2006) argued that research participants from diverse backgrounds increase the validity of usability evaluations and suggested that experts from controlled backgrounds pose a greater risk of biased results in usability research. Rogers et al. (2011) explained that experts from the same company can produce biased outcomes, which can then narrow their applicability. Furthermore, Cooper et al. (2014) explained that selecting expert reviewers from the same corporate environment produces inaccurate usability evaluation results because it reinforces organisational bias rather than the identification of usability issues. In contrast, the involvement of a small number of expert reviewers from similar backgrounds and leading companies and environments can produce a more reliable and consistent usability evaluation because they are the most knowledgeable and experienced in their field (Nielsen 1994; Molich et al. 2004). However, this view of the expert review may be outdated compared to the other sources mentioned in this paragraph. Nevertheless, the selection of expert reviewers is a limitation of this project.

## 3. Expert review design

I hoped that using open-ended questions would help me to test the market and gain the views of experts in the IT field on my proposed designs and how these designs could benefit large IT companies, and reveal unexpected insights on how to improve the expert review design and the quality of the questions. This would also provide validation of the expert review design and question development.

I decided to create an expert review to obtain feedback on each of my designs as I needed separate feedback on each of the different aspects (hand-drawn interfaces, mindful interactions, and touch-rich interactions). This led me to think about how I should group the questions in the expert review. I needed to determine the eligibility of the research participants and collect their feedback and demographic information (to confirm that they were an expert reviewer). Therefore, I grouped the questions into three sections: eligibility, feedback, and demographics.

To determine the expert reviewers' eligibility, the screening questions should be asked at the beginning of the expert review and are then followed by questions that engage with the designs (Nielsen and Molich 1990; Nielsen 1994). Therefore, I structured the expert review so that the eligibility section was first, which was followed by the feedback section, and then the demographics section. The feedback section consisted of three sub-sections titled 'Yoshi Phone Feedback', 'Shapie Feedback', and 'Birds App Feedback'. The feedback section design was based on the data that I needed to collect for each prototype (development) and how it could benefit large IT companies.

## 4. Eligibility questions

Ethical approval to perform the expert review was obtained from the Falmouth Research Degrees Committee (see appendices K and L). It was emphasised that all of the expert reviewers should be aged over 18 and should not be a vulnerable adult (according to Section 59 of the Safeguarding Vulnerable Groups Act 2006). I used these as eligibility criteria in my expert review, alongside their full names and email addresses. I decided to use closed-ended questions and a list of answer choices that participants could select from to determine their eligibility. I did not need to collect qualitative data in this section; therefore, closed-ended questions were suitable.

## 5. Feedback questions

Open-ended questions would enable me to collect qualitative data on each of my designs. Therefore, I decided to use open-ended questions in which the research participants were asked to provide answers on each of the designs in their own words. I wanted feedback on the application of each aspect in the prototypes, what was successful and what was not, and how each aspect could be applied in different contexts or developed further. I also needed to include a question in the feedback section on how these innovations could stimulate UI and UX designers and software developers to design healthier IT tools, and the benefits to large IT companies.

Therefore, I included text and images of the Yoshi Phone prototype, links to the user manuals, and narratives to communicate what the Yoshi Phone was and how it looked and worked. In addition, I included an open-ended section for the research participants to provide any other insights, recommendations, or comments. These questions reflected the kind of data I needed to collect at this stage. I used a similar process to the Yoshi Phone feedback section to produce the questions for the Shapie and Birds app feedback sections, and added information, links, and images relevant to each prototype to reflect their development.

## 6. Demographic questions

I defined an expert reviewer as a professional who currently worked or had worked in the IT industry and/or had alternative knowledge and/or technical skills regarding UI or UX research or design, such as a relevant degree or work experience. Therefore, during the first phase of my project, I strategically networked with UI and UX designers and software developers. I approached these people to be research participants and provide feedback on my design fictions. I hoped that these connections would lead to meaningful insights into my project. I mainly used social media, including LinkedIn and Instagram, to approach these people. To monitor these contacts, I created a separate email list in my email inbox. I also emailed them regularly to maintain the relationship. I created a demographics section in the expert review to document how they had qualified as an expert reviewer. This consisted of seven closed-ended questions in which the reviewers were asked to provide information on their place of work, the area they worked in, their occupation, their work experience in their current occupation, their total experience in their field of expertise, and their academic qualifications.

## 7. Expert review process

After I had developed all of the questions in a Word document, I created a Microsoft Forms evaluation sheet for the expert review. I inserted the title and a description of the study and the expert review questions into the form. I then generated a link to the expert review form to share with the industry professionals. After I had finished with the expert review design, it was ready to be distributed to the potential expert reviewers via email.

Inclusion of a participation information sheet and consent forms with the expert review was a requirement of the Falmouth Research Degrees Committee. I developed a participation information sheet (see Appendix M) and consent form (see appendices N and O), which were distributed by email to the potential expert reviewers. I then reviewed the consent form responses, which I downloaded as an Excel spreadsheet and stored on OneDrive. I then emailed the expert review link to the reviewers who had submitted consent forms and demonstrated their eligibility to participate in the project (see Appendix P). I subsequently downloaded an Excel spreadsheet containing the expert review responses, which I stored on my OneDrive. I then anonymised the responses and saved them as a Microsoft Word document on my OneDrive. I sent an email to all of the expert reviewers to thank them for their input. All of the data from the expert review was then ready to be analysed.

## 8. Coding to analyse open-ended comments from the expert review

I needed an appropriate data analysis method for the qualitative data from the expert review. Before selecting this method, I re-read the insights I had gained. Several interesting themes emerged from this review. This directed me towards research data analysis methods that would enable me to extract key insights from the open-ended comments. I decided to use the interpretative method of coding to analyse the open-ended comments. I explain this method in the following paragraphs.

According to Müller et al. (2014), the interpretative method of coding (Saldaña 2009) can be used to organise and categorise open-ended comments, which may lead to the identification of important insights. This method works by assigning a code or several codes to each comment (Müller et al. 2014). A code is a word or a short phrase that provides a summary of the comment (Müller et al. 2014). This system of codes can either be adapted from a previous study or a researcher can create their own (Müller et al. 2014). This provides validation for using the coding method to categorise and organise the feedback on each of my developments and prototypes. I needed to create a coding system as my questions were customised. The coding system can be established by using a deductive or inductive approach (Müller et al. 2014). A deductive approach produces a list of codes in advance,

before the data is reviewed, while an inductive approach generates the codes while reading and re-reading the open-ended comments (Müller et al. 2014). According to these researchers, the inductive approach is recommended because it can provide unexpected insights (and codes) that would not have been identified before reading the open-ended comments (Müller et al. 2014). As such, I decided to use an inductive approach to create the coding system after reading and re-reading the open-ended comments, and I then used this analysis to describe, identify, and discuss the findings on each development and prototype.

After reading the expert reviewers' comments several times, I created a 12-code coding system. I used numbers as well as hashtags to identify the codes. However, I used the following four codes for each prototype: 'prototype', 'potential risks and further considerations', 'inspiration to design healthier IT tools', and 'potential benefits for large IT companies'. I then inserted 12 tables for each code. Next, I re-read the expert reviewers' comments several times until I had identified the emerging themes for each code. As such, I created additional columns for the themes section in each of the 12 tables. I then inserted their titles into the tabs on the left-hand side. Next, I created another column for the expert reviewers' comments, which I inserted next to each relevant theme in the 12 tables. Following this, I added their comments into the tabs next to each relevant theme in the 12 tables.

The extracted themes from the feedback recorded under codes 1, 5, and 9 (see Appendix Q, U, and Y, respectively) were useful when considering the prototypes' benefits. The themes obtained under codes 2, 6, and 10 (see Appendix R, V, and Z, respectively) were beneficial when examining the potential risks and further considerations associated with the prototypes, as well as how they could be improved and redesigned for better use. All of these codes helped to answer the main research question. The themes from codes 3, 7, and 11 (see Appendix S, W, and AA, respectively) were helpful when considering the first research sub-question on how these design fictions could stimulate designers to create healthier IT tools and generate insights for the design process. The themes from codes 4, 8, and 12 (see Appendix T, X, and BB, respectively) were helpful when considering the second research sub-question on how design fictions could generate innovation opportunities that would be beneficial to large IT companies.

## 9. Results of the expert review

This section presents the results of the expert review. The expert review was distributed to industry professionals to gain their views on how each development could potentially benefit large IT companies. All of the expert reviewers were eligible to participate in this research because they were aged over 18 years and were not vulnerable adults. They also completed the necessary consent forms.

The 13 consent forms corresponded with the 13 research participants who had submitted responses. Therefore, all of the responses could be used in the data analysis. The data analysis was then performed to identify the recurring themes and insights for each of the three prototypes, including any potential risks and further considerations, opportunities to design healthier IT tools, and potential benefits for large IT companies. The results of this expert review were anonymised. The analysed qualitative data for the Yoshi Phone is provided in appendices Q–T, for the Birds app in appendices U–X, and for Shapie in appendices Y–BB.

# CHAPTER 5

# DISCUSSION

This chapter discusses my research results and relates them to the literature and practice review, gaps in the literature, and methodological approaches. The focus of this discussion is the expert review responses to the Yoshi Phone (hand-drawn interfaces), Birds app (mindful interactions), and Shapie (touch-rich interactions) design fictions. I was satisfied with the amount of feedback I received and the unexpected insights gained. Analysis of these insights shows how these speculative innovations can stimulate discussion, support industry professionals to design healthier IT tools, and generate recommendations for the design process. This chapter also considers the innovation opportunities associated with the Yoshi Phone, Birds app, and Shapie for large IT companies. In addition, this chapter also addresses the research question and sub-questions.

## 1. Illustrated narratives as provocations

### 1.1 Yoshi Phone stimulates debate on habit-forming, distractive, colourful, 'cold' generic interfaces and monochromatic, minimalistic, hand-drawn interfaces

Current research shows that smartphone home screens are designed to be engaging but also addictive and attention-grabbing, which can negatively impact user wellbeing (Harris 2016; Levy 2017). Alongside pop-up notifications, colourful, sleek, and generic smartphone interfaces are the main reason for the cold, draining, and distracting UX that induces habit-forming use (Fogg 2003; Norman 2013; Cooper et al. 2014; Eyal 2014). In contrast, minimalistic and monochromatic digital UIs are better for user wellbeing because they provide a less overwhelming and distracting UX (Case 2016). The challenge of habit-forming, distractive, and colourful 'cold' generic interfaces provoked this proposal to create a less distracting, minimalistic, calmer, and gentler UI that could provide a warmer UX. Based on this research, I designed a diegetic prototype called the Yoshi Phone, which had a minimalistic and monochromatic hand-drawn interface with different modes. Compared to a typical smartphone, the Yoshi Phone was designed to be free from colour and 'generic' UI elements, to reduce the cognitive load and distractions for its users. I also developed an accompanying user manual to showcase how the Yoshi Phone and its modes would work. I illustrated a narrative that described how this feature phone would be visually communicated to stakeholders and consumers. I aimed to test whether these research outcomes could stimulate debate on monochromatic, hand-drawn interfaces (Bleecker 2009; Dunne and Raby 2013).

One of the strengths of the Yoshi Phone was the visual appeal of its hand-drawn UI. Expert reviewer 1 suggested that using hand-drawn elements in UI and UX could change how users interact with technologies. They also explained that habit-forming apps and smartphone interfaces encourage users to use their devices in a maladaptive way because they are too accustomed to them. This review relates to research that has suggested that technologies are designed to be addictive and habit-forming (Eyal 2014). This reviewer also commented that this kind of unconventional, hand-drawn interface (as seen on the Yoshi Phone) could shift user mindsets and help to build new, healthier habits. This also correlates with my previous research, which suggests that hand-drawn interfaces promote digital wellbeing by reducing noise and providing a better UX (Pakalkaitė 2021). Expert reviewer 7 also complimented the concept, noting that using the interface engendered a more mindful and less anxiety-provoking experience. According to this reviewer, the hand-drawn aspect also made the Yoshi Phone interface more user-friendly and reduced some of the noise associated with social media and apps, which use habit-forming models to increase use. Expert reviewer 11 also agreed that the hand-drawn UI features provided a user-friendly experience. They commented that the design style achieved its aim of minimising noise in the digital interface. These findings suggest that hand-drawn interfaces reduce noise in digital interfaces.

Another advantage of the Yoshi Phone design was its use of modes. On the one hand, expert reviewer 2 proposed that the concept of using hand-drawn interfaces was charming and eye-catching because they differ from conventional interfaces. However, they preferred the view with icons because they created an engaging, interactive interface and better communicated how to understand and navigate the modes between the Yoshi Phone screens. This implies that hand-drawn interfaces with an icon view reduce noise in digital interfaces. On the other hand, expert reviewer 12 indicated that the aim of creating a gentler and less distracting interface was successful because of the paper-like and hand-drawn designs. This was particularly evident in the non-icon view because 'the user is compelled to slow down a little and read each menu item'. They also complimented the interface as being intuitive because the swiping motions would be familiar to smartphone users. This implies that hand-drawn interfaces with a non-icon view also reduce noise in digital interfaces. Expert reviewer 10 commented that the Yoshi Phone design significantly decreased visual 'noise' and prevented informational overload for the user. They explained that this was evident in the modes in the Yoshi Phone interface design because they simplified the device's functions into main categories. This enables users to access important documents at home and on the go in a more organised way and without the need to search in different potential locations, such as folders, downloads, and emails. They also asserted that if the Yoshi Phone simplifies actions and can be developed into a working prototype, then the use of hand-drawn interfaces with modes may represent the next evolutionary step in regular smartphone use. This also indicates that hand-drawn interfaces with modes and non-modes minimise noise in digital interfaces.

The final benefit of the Yoshi Phone design is its monochromatic UI. Expert reviewer 5 complimented this minimalist approach and set-up, and the removal of distractions associated with the use of typical smartphones. They also noted that monochromatic UIs could be developed using e-ink displays. I agree that this would be a better solution than smartphones because e-ink displays cause less visual fatigue than liquid-crystal display (LCD) or light-emitting diode (LED) screens (Benedetto et al. 2013). E-ink was used in the Mudita Pure feature phone and Light Phone models. Expert reviewer 13 commented that it would be difficult for designers to work with hand-drawn interfaces because 'there are no standardised coding frameworks which could support it and there are no defined patterns that we already know in the common [graphical user interface] GUI world'. They also highlighted that this is a practical issue and that it may not be important in a speculative project. However, they stated that they would be reluctant to use such hand-drawn interfaces because they are so uncommon, would require considerable effort, and would not necessarily produce better outcomes. Owing to practical issues, hand-drawn interfaces may not be the most effective solution; however, I question whether monochromatic design, rather than hand-drawn interfaces, reduces noise in digital interfaces. This correlates with research that has shown that the colours and contrast of a smartphone interface keep users in a constant state of attentional recruitment (Fogg 2003; Eyal 2014). Therefore, monochromatic interfaces are better for users. This also suggests that a combination of monochromatic interfaces and touch-rich interactions minimises noise in digital interfaces, as seen in examples such as the Light Phone and Punkt phones.

According to several expert reviews, digital interfaces in which noise is minimised could be developed by exploring further possibilities. Expert reviewer 8 recommended exploring the use of other fonts and designs that already exist to make UIs noise-free or reduce noise; however, the reviewer did not provide any specific suggestions. Furthermore, expert reviewer 13 questioned the motive for using hand-drawn elements in the UI to create less distracting interactions. They explained that the use of spatial – or any type of ubiquitous computing – would be the most feasible strategy to address the challenges of distractions, attention, and wellbeing because users would not need to excessively interact with the UI. *Spatial computing* is defined as 'human interaction with a machine in which the machine retains and manipulates referents to real objects and spaces' (Greenwold 2003). Large IT companies have already developed and released spatial computing products, such as Apple Vision Pro, Microsoft HoloLens, and Magic Leap 2 headsets, that enable users to interact with virtual 3D objects in their surroundings (Apple 2025b; Magic Leap 2025; Microsoft 2025). Further research is needed to explore and identify how 'noisiness' affects spatial computing-related experiences. *Ubiquitous computing* refers to everyday small computers, such as wearables, handhelds, and display devices (Weiser 1991). Similar to spatial computing, further research is needed to explore how noisy digital experiences can be reduced; however, aspects of this were explored through the touch-richness

dimension of the Shapie prototype. These unexpected insights are relevant to researchers studying the development of noise-free and less noisy digital interfaces. This suggests that hand-drawn interfaces do not reduce noise in digital interfaces.

### 1.2 Birds app provokes discussion on screen time overuse and mindful interactions

Recent research has suggested that excessive screen time is associated with a screen time 'addiction' and problematic media use (Domoff et al. 2019). Screen time replaces activities that positively contribute to user wellbeing (Vandewater et al. 2007) and can itself negatively impact user wellbeing (Hale and Guan 2015). The main underlying issue is that current touchscreen product design induces screen time overuse and a lack of mindfulness (Kelly 2010; Sheenan 2018). Furthermore, the screen time solutions provided by large IT companies are inadequate (Maier et al. 2025). The solution is to incorporate mindful interactions to support screen time tracking, which could also provide a more mindful UX (Hassenzahl 2010; Hiniker 2017). This challenge prompted my research into whether mindful interactions and the creation of a screen time tracker could address these issues. Based on these ideas, I developed the Birds app diegetic prototype, which uses hand-drawn birds and time trackers to gently communicate the time spent online, helping to reduce overuse. The Birds app aimed to provide a calmer, gentler, and more mindful UX in contrast to the Screen Time feature and cognitively and visually taxing smartphone UI design. I also created a user manual to explain the app's operation and illustrated a narrative that showed how this app could be visually communicated to stakeholders and consumers. The aim was to test whether the Birds app could provoke discussion on mindful interactions (Bleecker 2009; Dunne and Raby 2013).

The strength of the Birds app design was its use of low-impact visual cues to remind the user of their screen time. Expert reviewer 1 commented that the Birds app was a pleasantly unexpected solution that 'breaks the rules' of conventional smartphone interface design. This corresponds to research that has shown how design fiction challenges traditional design norms (Bleecker 2009; Dunne and Raby 2013). The reviewer highlighted that the outstanding feature of this app was its visual cues rather than sounds to indicate to users their time limits. This suggests that the decision to use hand-drawn interfaces for this app was appropriate. The reviewer also commented that the Birds app could help users to break the bad habit of snoozing alarms or timers. This indicates that users misuse screen time trackers and confirms the need for a different solution – a mindful way of tracking screen time. They also highlighted that the use of visual elements could potentially 'break the pattern of thinking of how users relate to timers and time apps'. This reviewer also reflected the idea that products are designed to be habit-forming, which is built on concepts from behavioural science (Eyal 2014). In addition, expert reviewer 9 identified that the images of birds did not completely distract their attention from their task because the interaction was designed to subtly inform the user of the limits

they had set. Expert reviewer 5 also agreed that the Birds app was an effective approach because it reminded the user of their screen time use. According to the comments of these expert reviewers, visual cues minimise noise in digital interfaces.

Another strength of this design was the use of bird imagery. Expert reviewer 2 complimented the symbolism of using birds because they represent the freedom and relaxation a user gains when switching off their device. When developing the Birds app, I established that the use of birds can represent various things; however, this representation relies on the user's interpretation. The reviewer's comment corresponds to my proposition that if the birds gently flutter across the screen – rather than flying aggressively, as in Hitchcock's *The Birds* – they are an appropriate visual solution. This positive feedback suggests that the use of birds engenders positive feelings and emotions when using this app. Expert reviewer 12 noted that the juxtaposition of the hand-drawn birds with the phone screen was the best feature of the app because it was gentle and textural. This reviewer also observed that the birds had a different texture, which 'softly alerts the users to a world beyond the device screen'. This corresponds to research on calm technology that argues that technology should create calm as well as calmly exist in a user's periphery rather than be the focus of their attention (Case 2016). Hand-drawn birds contrast with the sleek feel of 'cold', generic interfaces, which are distracting, addictive, and lack mindfulness (Kelly 2010; Eyal 2014). This suggests that hand-drawn textural interfaces reduce noise in digital interfaces. These positive reviews indicate that the Birds app is an appropriate and effective solution and imply that mindfulness minimises noise in digital interfaces.

However, negative emotions and feelings towards seeing the same birds on a screen may occur over time, influencing the user to stop using the device. Paradoxically, repetition in traditional UX and UI has positive connotations because it decreases cognitive load (Norman 1983; Sweller 1988; Shneiderman et al. 2016). This may also have negative connotations because it can reinforce a user's impression of a certain image (Shneiderman et al. 2016). The symbolism of birds may have negative connotations, which I considered when designing the app. For example, the sudden appearance of birds – rather than gentle fluttering – contributed to the fear and a horror response from viewers of Hitchcock's *The Birds*. According to expert reviewer 4, this could be addressed by regularly updating the app with different types of birds or even different types of animals, plants, or shapes. This could also be addressed by having two versions of the app. The free version would allow users to use the bird images, while the paid version would be customisable and would allow users to pick different types of images. This reviewer also suggested that the app may stop the user from interacting with their device; however, this view contrasts with how this app works. The app enables a user to set their screen time limits in advance; therefore, the user is in control of their decisions. In addition, expert reviewer 8 argued that the Birds app would not be able to mitigate visual noise in a digital

interface because it could not contend with the large quantity of noise, and users may disengage because of this. These opinions may mean that visual cues and mindfulness do not minimise noise in digital interfaces.

There are other ways to create mindful interactions and track screen time other than hand-drawn birds. Expert reviewer 13 noted that the issue with this solution was that the visual cues forced the user to look at their screen to comprehend the timer's progression. They proposed that a sound interface would be a better solution because it would be less conspicuous. Expert reviewer 1 reiterated this suggestion of exploring how sound design could break the bad habit of users who snooze their alarms or timers. Expert reviewer 4 echoed these other two expert reviewers and suggested using sound to make the reminders less obtrusive than visual cues. Three expert reviewers suggested exploring how sound could be used as a timer to communicate device overuse. The calm technology concept focuses on 'creating ambient awareness through different senses' (Case 2016). Furthermore, *auditory interfaces* explore how HCI can be enhanced by using audio; therefore, the use of sound is a valid suggestion and should be considered in future research on noise mitigation in interfaces (Serafin et al. 2023). This also raises a new question of whether sound reduces noise in digital interfaces. Expert reviewer 4 also suggested that a discreet screen colour change would provide a better solution. They commented that a pulsing colour effect, such as a fade out or warning colours, would be a better solution because it would be less obtrusive than other visual cues. This again correlates with the calm technology concept, which focuses on unobtrusive design (Case 2016). This is another interesting insight that would require further research on how colour could be used to design calm and nonobtrusive interfaces. It creates a further question of whether colour minimises noise in digital interfaces. However, research has indicated that this is paradoxical because the misuse of colour contributes to noisiness in digital interfaces and negatively affects users (Fogg 2003; Eyal 2014). This also differs from my design because I used black and white images to minimise colour overuse and create a mindful interaction. Black and white shades could be used to develop a fading effect. Therefore, this raises the question of whether the purposeful use of sound, colour, and shades may reduce noise in digital interfaces.

### 1.3 Shapie stimulates debate on touch-poor and touch-rich interactions

The staticness and flatness of touchscreens can negatively impact user wellbeing, causing increased physical fatigue and problematic touchscreen use (MacLean and Hayward 2008). Recent research has suggested that this also negatively affects human development as well as the UX (MacLean and Hayward 2007, 2008; Turkle 2012; Roudaut et al. 2013). The underlying causes of this are touch-poor interactions and a lack of touch-richness, such as shapeshifting features (Turkle 2012; Roudaut et al. 2013; Barrios-O'Neill and Pakalkaitė 2022). Shapeshifting can increase touch richness and provide

better ergonomics (Roudaut et al. 2013; Barrios-O'Neill and Pakalkaitė 2022). This aspect provoked the proposal to develop a touch-rich device with elastic features, such as shapeshifting, to provide a more ergonomic UX. Building on these ideas, I designed the Shapie diegetic prototype that possessed several shapeshifting abilities to reduce touch-poor interactions and enrich the UX. Compared to touch-poor interactions, static and inflexible touchscreens, and foldable smartphones, Shapie was created to shapeshift according to a user's needs, making it a touch-rich device. I also developed a user manual and an illustrated narrative that provided instructions on how Shapie worked and would be used as a visual advert for users and stakeholders. The aim was to test whether illustrated narratives can be thought-provoking and to gain unexpected insights into touch-rich interactions that would benefit designers and large IT companies (Bleecker 2009; Dunne and Raby 2013).

Shapie provided a touch-rich experience. Expert reviewer 1 commented that Shapie created the sense of adapting to the user rather than the other way around. Therefore, Shapie enables the user to feel more in control of their device, suppressing habitual smartphone use. They suggested that this was evident in the feature in which Shapie could only be kept in the back pocket of a pair of trousers. This correlates with research that has shown that smartphone use is designed to be habit-forming and addictive (Eyal 2014). Expert reviewer 10 noted that switching the focus from visual elements to a touch-rich experience enabled other senses, such as touch, to be engaged. They also explained that minimising visual stimulation would lower and reduce the addiction to noise in digital interfaces. This review correlates with research that has shown that touchscreens are linked to visual dependency and increased cognitive load because they rely on visual cues and guidance over physical features to communicate information (MacLean and Hayward 2007, 2008; MacLean 2008; Norman 2013). This also suggests that touch-rich interactions replace noise in digital interfaces because they promote tactile senses rather than visual attention (Barrios-O'Neill and Pakalkaitė 2022). This review also implies that touch minimises noise in digital interfaces.

Shapie also provided the benefits of elastic design. Expert reviewer 7 noted that Shapie was much more human; therefore, it was a less artificial device. Expert reviewer 11 commented that Shapie would be a fantastic device to own because it could be used and would be accessible in almost any environment. Expert reviewer 5 complimented the idea of increasing utility through shapeshifting. This correlates with research that has shown that shapeshifting increases ergonomics and touch-richness (Roudaut et al. 2013; Barrios-O'Neill and Pakalkaitė 2022). Expert reviewer 12 noted that the Shapie prototype promoted touch-rich interactions because it appeared fluid and multifunctional. Expert reviewer 2 also complimented the freedom of using Shapie and the multiple ways that a user could interact with it. Expert reviewer 9 highlighted that morphing technology would be useful in many applications, such as folding Shapie like a book, having it stand up, and wrapping it around a wrist. They found this concept interesting. These reviews relate to research that suggests that Shapie

is an example of a touch-rich dimension (called elasticity) because it has elastic and shapeshifting abilities (Barrios-O'Neill and Pakalkaitė 2022). Therefore, Shapie had high touch-richness (Barrios-O'Neill and Pakalkaitė 2022). This indicates that the touch-rich dimension of elastic design reduces noise in digital interfaces.

In contrast, several expert reviewers argued that the use of Shapie may have a negative impact on user wellbeing. Expert reviewer 11 highlighted that Shapie may influence users to overuse the device rather than disconnect from it. Expert reviewer 7 reiterated this by suggesting that touch-rich interactions could encourage more use rather than being mindful of use, and therefore negatively impact wellbeing. These insights also suggest that touch does not minimise noise in digital interfaces. Expert reviewer 11 noted that Shapie's elastic properties would likely engender lots of different ways to use the device, which could lead to misuse. This implies that touch does minimise noise in digital interfaces, but can also contribute to noise creation. These insights are valid, and any user wellbeing concerns should be addressed. Design fiction enabled me to identify any potential misuse issues associated with Shapie (Sterling 2005; Lindley et al. 2017). However, this raises a further question of how elastic design interactions could be redesigned to avoid misuse and overuse.

### 1.4 Summary of the research results

Applying the insights described previously (see pages 1.1–1.3), this section provides answers to my main research question: How can noise in digital interfaces be reduced using unconventional design approaches, and how can this enhance the UX? Some experts have argued that hand-drawn, monochromatic interfaces with or without modes minimise noise. Others have suggested that monochromatic design may provide a solution. The unexpected insights gained from using monochromatic design to develop less noisy digital interfaces could be used by researchers interested in further research in this field. Therefore, these dimensions enhance the UX by providing a warmer experience for users. The aim of the Yoshi Phone prototype, user manual, and illustrated narrative was to facilitate debate, which was achieved by provoking responses from the expert reviewers (Bleecker 2009; Dunne and Raby 2013).

On the one hand, some of the experts agreed that visual cues, hand-drawn textural interfaces, and mindfulness can reduce noise. These dimensions also enhance the UX by providing a more mindful experience for users. In contrast, some of the researchers suggested that sound and colour may be more effective. It is important to acknowledge that validation of the initial design was not provided by all of the expert reviewers; however, the main aim of the prototype and illustrative outcomes was to provoke thought. These differing views are evidence that debate occurred, adding value to this project. These unexpected insights also provide a basis for further research on developing less noisy

digital interfaces. Therefore, the use of illustrated narratives stimulated debate, which was achieved by creating and then presenting the Birds app prototype, user manual, and illustrated narrative to the expert reviewers (Bleecker 2009; Dunne and Raby 2013).

In addition, several of the experts agreed that touch-richness and elastic design reduce noise in digital interfaces. Therefore, these dimensions also enhance the UX by facilitating a touch-rich experience for users. Other experts disagreed and argued that a touch-rich device could promote overuse; therefore, touch-richness and elastic design do not minimise noisy digital experiences but may induce them. These perspectives demonstrate that discussion occurred. The use of the expert review with the Shapie diegetic prototype, user manual, and illustrated narratives was instrumental to obtaining these views. This demonstrates that illustrated narratives can stimulate debate (Bleecker 2009; Dunne and Raby 2013).

## 2. Insights for the design process

### 2.1 Yoshi Phone and hand-drawn interfaces as inspiration for the design process

The Yoshi Phone is an example of a human-centred, gentle, mindful, and organic interface. Expert reviewer 5 complimented the concept of calm and unintrusive technology; however, they questioned how this could be designed to be more human. They explained that the imperfect lines of hand-drawn interfaces already provided an organic experience, but that this aspect could be increased further. They also noted that the Yoshi Phone could be improved by adding a feature that allowed users to customise the interface with their own writing and sketched icons. They suggested that a conversational UI could help create this and that further research is needed to determine what makes hand-drawn interfaces useful rather than basic. This reviewer also recommended exploring how different people use the phone in different scenarios, as users are used to having features such as cameras, music, money, and sports on their phones. They questioned whether such attributes could be available in unconventional ways that are also useful, stylish, and undistracting. Expert reviewer 7 suggested that hand-drawn interfaces could inspire industry professionals to design more mindful UIs and UXs. They suggested that this would ensure that users interacted with their devices intentionally rather than mindlessly. Expert reviewer 12 highlighted how much information users need to use a new service or product productively, what information or noise can be removed from the interface, and how much designers can encourage gentleness in all HCI aspects. This reviewer suggested that these are three questions that remain unanswered by designers in the design process. They also noted that the issues raised by the Yoshi Phone are pertinent and that it could stimulate discourse between UI and UX designers and hardware and software developers. This suggests that

hand-drawn interfaces provide inspiration for imagining more human-centred, gentle, mindful, and organic interfaces.

The Yoshi Phone is also an example of a low-fidelity and minimum viable interface. Expert reviewer 11 commented that the hand-drawn interfaces illustrate an important aspect and that designers do not need to invest significant resources to prototype possible designs and interfaces to test new solutions. They stated that the Yoshi Phone could inspire a physical device, in combination with Arduino or Raspberry Pi hardware, that would enable designers to test UIs without acquiring advanced software and technical skills. Arduino and Raspberry Pi provide low-cost hardware that can be used to create fully functional prototype devices (Arduino 2025; Raspberry Pi n.d.). It would be interesting to develop such a creative computing device that could be used to test UIs. Expert reviewer 4 commented that the normalisation of low-fidelity interfaces is exceptionally beneficial because it would help identify workflows and produce UI solutions faster. They also stated that this approach would help develop consensus between design teams and stakeholders on choices for future developments. This correlates with research that has shown that monochromatic, hand-drawn wireframes are a valid way to create products and services because they enable designers to develop low-fidelity solutions rapidly (Buxton 2007; Case and Day 2019). This suggests that hand-drawn interfaces stimulate designers to consider how to apply low-fidelity and minimum viable interfaces in design processes.

The Yoshi Phone software could be redesigned to provide better usability by incorporating additional tabs and pages in its navigation and by customising the UI. The Yoshi Phone should also possess haptic feedback, sound, different font types, and a dark mode. Expert reviewer 10 suggested that additional tabs or pages would be essential to further customising and personalising the phone, particularly in 'home' mode, or a supplementary page could be included that would prompt the user to add additional apps to each mode. This reviewer suggested that this was needed because of the large number of apps available on the App Store and Google Play store. However, they agreed that additional tabs and pages may compromise the Yoshi Phone concept because they would considerably increase interface noise. This shows that the inclusion of additional tabs should be carefully considered to avoid increased nosiness from apps. Three of the reviewers suggested that the Yoshi Phone prototype needed a dark mode (white lines on a black background) to reduce user eye strain or an option to switch between modes. However, I think that visual fatigue would not be an issue because the phone would be developed using an e-ink display, which causes considerably less visual fatigue than LCD or LED screens (Benedetto et al. 2013). However, a dark mode could be added, as seen in examples such as the Kindle Oasis and Kindle Paperwhite (ninth-generation models onwards) (Amazon n.d.). Expert reviewer 6 recommended thicker text in the UI. This could be readily addressed by creating a thicker typeface or providing typeface customisation, which would also

address the need to implement more customisation features. This shows that illustrated narratives can provide usability recommendations for software development.

The Yoshi Phone hardware could be improved to enhance usability by integrating hardware buttons or gestures. Expert reviewer 5 suggested that certain features could be improved in this way; for example, an 'offline mode' or 'go back' command. They also advised that the Yoshi Phone would benefit from some UI customisation; for example, shortcuts on the home screen. They recommended the Light Phone because it has a basic UI and a good range of hardware buttons. Expert reviewer 3 questioned whether the Yoshi Phone would provide haptic feedback or sound to indicate to the user that an interaction had occurred. These are sensible suggestions and build on the market of successful feature phones. They also correspond to touch-rich research, which has shown that the tactile keyboards of feature phones are an example of touch-richness termed 'interpolation' (Barrios-O'Neill and Pakalkaitė 2022). This then raises the question of whether a combination of hand-drawn interfaces and touch-rich interactions reduces noise in digital interfaces. In addition, this suggests that illustrated narratives can also produce usability recommendations for hardware.

The Yoshi Phone is a user-centric design that has successfully passed usability evaluation. Expert reviewer 2 commented that this is a good project because it could be used to remind designers and practitioners that they need to keep the user in mind when making design decisions. The reviewer explained that designers exaggerate when designing digital products for specific challenges, creating new and unexpected design problems. This shows that by focusing on the need for a calmer UX, even though this may not fit existing design norms, it is possible to develop user-centric solutions similar to traditional approaches (Blythe and Wright 2006; Bleecker 2009; Dunne and Raby 2013; Penney et al. 2024). Expert reviewer 12 noted that the Yoshi Phone UI did not adversely affect the usability of the design. This links to the idea that usability enhances the UX because it facilitates usability assessment (Gould and Lewis 1985; Nielsen 1993; ISO 2019). They also complimented the comic narrative for the Yoshi Phone and explained that it provided an accurate representation of a user's need for a less distracting interface. First, this point links to the notion that design fiction can facilitate usability evaluation (Penney et al. 2024). Second, this discussion represents a usability assessment of the Yoshi Phone, which is followed by suggestions on its improvement (Nielsen 1993; Shneiderman et al. 2016; ISO 2019). Third, the illustrated narrative can visually and precisely communicate user needs to stakeholders (Tanenbaum 2014). This shows that illustrated narratives can facilitate usability testing in the same way as a UCD approach, as well as provoke debate on usability issues with the design. This also validates the use of illustrated narratives as a legitimate framework for designers to address usability issues.

In contrast, hand-drawn interfaces create a potential risk to user cognition because they are more cognitively demanding than 'generic' interfaces. Expert reviewer 9 speculated that while hand-drawn interfaces reduce distractions, they may also slow down a user's cognition. They argued that an icon, rather than a word, can be instantly associated with a particular task; however, they noted that this suggestion may not be valid, but did not provide a further explanation. Expert reviewer 8 complimented the concept of noise-reduced digital interfaces; however, they identified issues with the hand-drawn interfaces. The reviewer stated that hand-drawn interfaces do not have a common universal coding language; therefore, they would be hard – but not impossible – to implement and manage. As such, there could be accessibility challenges with this interface. This shows that design fiction can be used to identify accessibility issues (Ahmadpour et al. 2019; Sharma et al. 2022). This links to research and policies that have suggested that accessibility enhances usability and the UX for all users and that this can be achieved through accessibility evaluation (W3C WAI 2016, 2022, 2024; The Public Sector Bodies (Websites and Mobile Applications) Accessibility Regulations 2018; Government Digital Service and Central Digital and Data Office 2024; UK Government 2024). This research recommended exploring other noise-reducing digital concepts using fonts and symbols, which could be implemented and managed using universal coding languages. Expert reviewer 13 argued that hand-drawn interfaces may be more difficult to design for mainstream use; therefore, they would be more cognitively demanding. The reviewer explained that interface elements are clearly defined in standard UIs and are typically known by users. They also stated that hand-drawn interfaces have significantly lower fidelity; therefore, it would be more difficult to convey more advanced functions, such as selecting a command or navigating between areas. These insights relate to cognitive load theory and how conventional design elements are less cognitively demanding for users (Norman 1983; Sweller 1988; Shneiderman et al. 2016). As such, these expert reviewers were correct in that unfamiliar UIs increase cognitive load for users; however, they failed to mention that this negative impact can be resolved by educating users on how to navigate such interfaces (Norman 1983; Sweller 1988; Shneiderman et al. 2016).

Alternatively, expert reviewer 3 stated that the Yoshi Phone would help users with slower motor skills because of how it operates and its simplified approach. This reviewer identified the benefits of such a design to more niche consumer markets. Expert reviewer 2 agreed with the use of a monochromatic interface to reduce visual noise. However, they questioned how the Yoshi Phone would resolve the issues of constant notifications and stimuli when using a phone. They also queried how a hand-drawn interface could be used in an information-heavy or data-based digital product. They also questioned whether the lack of colour and use of hand-drawn typography would impact the usability and legibility, and therefore the accessibility, of the Yoshi Phone. This relates to the usability and accessibility themes discussed in the previous section. This correlates with research that has shown that unconventional interfaces expose users to unfamiliarity and increase the cognitive

load because users have to learn how to interact with them (Norman 1983; Sweller 1988; Shneiderman et al. 2016). However, this review conflicts with other research that has suggested that efforts to minimise cognitive load, such as removing colour from an interface to avoid attentional recruitment, may produce the opposite by increasing usability rather than reducing it (Fogg 2003; Norman 2013; Eyal 2014). This demonstrates that reviewers can detect issues related not only to the usability and accessibility of new technology but also its legibility (Sterling 2005; Lindley et al. 2017).

### 2.2 Birds app and mindful interactions as inspiration for the design process

The Birds app timers could be redesigned to provide better usability. Expert reviewer 12 proposed two solutions for this. First, warn users about the content that they may not want to view. Second, have the app detect whether 'users have been scrolling a single app for a long time and ask them if they want to continue or take a break'. These are two valid proposals that could be used to test and improve usability. Expert reviewer 11 questioned whether the timers could be specific or customised according to a user's needs. Expert reviewer 5 recommended that one timer setting (with three warnings given at set times before the time expires) is sufficient in the Birds app. However, they also suggested a feature that would enable users to set timers for different uses, such as games and social media. This is interesting because it coincides with the previous review, indicating that these expert reviewers had identified the same usability issue. This could be addressed by adding another feature to the app. This would be the same solution as used in Apple and Android devices, which aims to raise awareness of screen time habits but may not be sufficient to track screen time on its own (Apple 2018; Google Digital Wellbeing 2023).

These reviewers also noted that the 'on/off switch seems to be the other way around (see standard toggle UI)'. This issue is very minor and can be readily addressed. How the phone would work during an emergency when the Birds app is activated was a valid point raised by expert reviewer 3. There was no 'emergency mode' in the Birds app to allow users to use their device in an emergency. However, this helpful point could be addressed when developing a final prototype. Such an 'emergency mode' should also have limits to avoid its misuse, as has happened with Apple's Screen Time tool, where users have found creative ways to disable this feature (Apple Discussions 2020; Maier et al. 2025). Recent research has shown that design fiction can provide usability evaluation, as evident in the previous expert reviewer comments (Penney et al. 2024). This links to research and standards that have suggested that usability enhances the UX, which can be facilitated by usability evaluation (Gould and Lewis 1985; Nielsen 1993; ISO 2019). This means that the use of illustrative narratives in the design process can achieve the same result as a UCD approach that relies on usability testing (Nielsen 1993; Tanenbaum 2014; Shneiderman et al. 2016; ISO 2019). This insight provides validation for designers to use visualised narratives to address usability issues.

The Birds app is an example of a textural interface that also inspires the design of healthier IT tools and time-saving interactions, UIs and UXs, and apps. Expert reviewer 12 highlighted the juxtaposition of a different texture in the Birds app digital interface, which had a positive effect on the user. They stated that textural interfaces should be incorporated into the design process. This relates to research that has shown that sketching and hand-drawn elements are an accepted approach when designing UXs (Buxton 2007). First, this raised the question of whether textural interfaces minimise noise in digital interfaces. This is an interesting and unexpected insight because I created the textural interface unintentionally. I also did not realise the impact that such a texture could have on a user or other designers. As mentioned previously (see page 165), the use of texture – as well as sound and colour – should be considered by designers interested in undertaking further research on developing less noisy digital interfaces. Second, this raises the question of whether such textural interfaces can inspire industry professionals to design more textural interfaces. Expert reviewer 2 noted that the Birds app provided an opportunity to develop less time-consuming digital products. They explained that consumers need digital devices because they need to perform different activities. However, they questioned whether designers could create digital experiences that require less time. This relates to research on design fiction that has questioned aspects of design as the basis of design practice, rather than simply focusing on innovation (Sterling 2005). This also suggests that mindful interactions stimulate UI and UX designers to create efficient, mindful UIs, UXs, and apps. Both of these comments are good examples of how illustrated narratives can provoke unexpected innovation ideas from expert reviewers that focus on user needs (Tanenbaum 2014; Penney et al. 2024).

The Birds app is also an example of how to create more human-centred and less procedural interfaces. Expert reviewer 5 explained that most UIs and UXs are based on conventional interaction patterns and mental models (Nielsen 1993; Norman 2013; Cooper et al. 2014; Johnson 2014; Shneiderman et al. 2016; ISO 2020). While these are convenient, they prevent innovation and limit how users interact with their devices (Norman 2013; Kolko 2014; Schwab 2017). The reviewer stated that unconventional design is also a more human-centred approach to tackling challenges and developing solutions because it enables designers to explore issues through a different lens. This insight links to whether design fiction and the use of illustrative narratives are more human-centred approaches rather than user-centred because they focus on usability and accessibility rather than emphasising a user's psychological and emotional needs (Norman 2013; Kolko 2014). Expert reviewer 7 noted that this would inspire the development of similar apps that prompt users on their device use more humanely and mindfully. This suggests that mindful interactions are more human-centred than conventional UIs and UXs because they can resonate emotionally with users (Kolko 2014).

Similarly, expert reviewer 13 highlighted the poetry of the Birds app interface and found the exploration of how interfaces could be more poetic and less procedural interesting. They also speculated that tools like the Birds app will be possible in the future because of new generative technologies that are now appearing on the market. Expert reviewer 13 also noted that 'design teams could benefit from exploring poetic interactivity like this'. Kolko (2011) argued that when designers only focus on usability aspects when developing products, the outcomes are conventional, unimaginative, and lack originality. He also argued that focusing on designing poetic interactions rather than usability would provide more meaningful UXs (Kolko 2011). This suggests that poetic interactions can enhance the UX. This reviewer considered that my work is 'out of the list of criteria that are used in the day-to-day operations' and that 'we might have some more creative and fun interactions if designers and decision makers wouldn't dismiss the power of things that feel good'. This corresponds to research that shows that design fiction activities are aimed at encouraging employees to inject greater imagination into their day-to-day activities (Near Future Laboratory 2025b). This confirms that illustrated design fiction narratives can facilitate this. It also provides validation of its use in the design process, where the goal is to develop new and better products rather than 'innovate for innovation's sake' (Sterling 2005). While this is interesting, it is not surprising that this reviewer highlighted the poetry of the Birds app interface and visuals. The method I used to develop this interface was 'The Poetics of Design Fiction' framework (Markussen and Knutz 2013). Its title highlights the notion of developing poetic work. I worked with a writer to develop the narrative for the app, highlighting the influence of poetry not only in the written narrative but also in how the birds and interfaces are portrayed. This prompts the question of whether designers can use literary practice to inform interface design as well as to develop illustrated narratives in the design process of product development, as suggested by Markussen and Knutz (2013). This indicates that poetic interfaces inspire industry professionals to create more human-centred, mindful, and less procedural interfaces and to innovate.

### 2.3 Shapie and touch-rich interactions as inspiration for the design process

The strengths of Shapie's design were its unusual shape and elastic features, which can stimulate designers to imagine new uses for the device. Expert reviewer 1 suggested that this product could potentially revolutionise how devices are perceived. They explained that phones without hardware buttons (e.g. smartphones) were considered inconvenient for consumers when they were first released. Therefore, they speculated that 'maybe a stiff rectangle is not the final shape of the way phones [are] supposed to look like'. Expert reviewer 5 stated that shapeshifting provides more utility for a single piece of technology, as demonstrated by the Shapie diegetic prototype, which ranged from wearable to domestic and environmental uses. They also noted that 'it's inspiring to see thinking beyond the common and fixed shapes of tech'. Expert reviewer 3 provided an example where

travelling consumers would find Shapie useful in small spaces and argued that the device could have more flexible uses because it could replicate a book or a small storage space. They commented that touch-rich interactions could unlock new potentials for app development. Expert reviewer 6 provided three potential scenarios in which Shapie could have different uses for different consumers. The first scenario was where Shapie could be used as a key card for a hotel or cruise ship while having exclusive (hotel or cruise ship) content on it. The second scenario was where chefs could use Shapie to train apprentices by placing it on a desk in half-folded mode to display relevant techniques or recipes. The third scenario was where Shapie could be used by workers to add logs, update information, and check inventories at warehouses and retail outlets. These reviews suggest that this shape-shifting feature could stimulate designers to imagine new ways to design devices and to rethink the impact of the shape of conventional devices. This also correlates with touch-richness research that challenges the norms of designing rectangular and unchanging devices, indicating that touch-rich interactions can stimulate and inspire designers (Barrios-O'Neill and Pakalkaitė 2022).

Shapie is an example of ergonomic design that raises awareness of exploring better ergonomics. Expert reviewer 6 stated that this would inspire the exploration of better ergonomics that cause less chronic pain, particularly due to poor posture. Expert reviewer 9 suggested that touch-rich interactions could also stimulate the creation of hardware and software with care and consideration for users. They argued that designers should consider not only what users use devices for but also how, where, and when they use devices. They also speculated that this approach could potentially create devices that work compatibly rather than awkwardly and inconveniently. Expert reviewer 7 commented that it was stimulating to imagine a more tactile device that is more suitable for the human form. Expert reviewer 2 stated that Shapie would inspire them to imagine how their product could be used in different ways and to better design for those possibilities. Products should also comply with the ergonomic requirements (Nielsen 1993; Shneiderman et al. 2016; ISO 2018, 2019). These insights relate to the ergonomic requirements and recommendations for product designs because they also need to increase accessibility (ISO 2023). This also relates to research that has shown that accessibility enhances usability and therefore enhances the UX (W3C WAI 2016). This suggests that touch-rich interactions can raise awareness of exploring better ergonomics when designing products. This also indicates that illustrated narratives can promote discussion on the ergonomics of design and the usability of hardware (Bleecker 2009; Dunne and Raby 2013).

Shapie also inspired imagining more inclusive and accessible applications of touch-rich interactions. Expert reviewer 12 stated that touch-rich interactions could be useful for users with manual dexterity impairments; for example, older people who experience issues when interacting with screens. Therefore, they suggested that Shapie could be useful for performing certain actions; for example, calling an emergency contact when folded in a certain way. Expert reviewer 8 commented that touch-

rich interactions and Shapie could be developed further; for example, supporting rural areas with poor internet services. They speculated that this could help schools and maternity wards in rural areas because it could improve communication without the internet. Expert reviewer 1 reiterated the other reviewers' comments and recommended seeking tactical solutions that could benefit different types of consumers, such as children and older people. They also stated that Shapie would be an excellent product to inspire user creativity, including in children, because it would enable them to explore new ways of using its physical features. This is interesting because the reviewers were not only thinking about mainstream markets but also about consumer wellbeing and how different types of consumers could benefit, particularly those from disadvantaged backgrounds. This builds on research and policies that has shown that accessibility can enhance usability and the UX for all users – through accessibility assessments – as well as satisfy legal requirements (W3C WAI 2016, 2022, 2024; The Public Sector Bodies (Websites and Mobile Applications) Accessibility Regulations 2018; Government Digital Service and Central Digital and Data Office 2024; UK Government 2024). Therefore, these insights demonstrate that design fiction can engage expert reviewers on the theme of accessibility (Ahmadpour et al. 2019; Sharma et al. 2022). This means that Shapie and touch-rich interactions can stimulate designers to imagine more inclusive and accessible products.

Shapie could potentially be improved to enhance usability by integrating haptic features. Expert reviewer 4 noted that Shapie prompted them to consider haptic touch and how it could be used in the product. However, they did not provide any specific recommendations, and so it is difficult to identify where and why haptic touch could be used. This requires further research and consideration. Also, this prototype focused on elastic properties; haptics were not a focus. However, this is a valid suggestion and something that I explored in a collaborative study on touch-richness, which identified the following four dimensions: texturality, gesturality, elasticity, and interpolation (Barrios-O'Neill and Pakalkaitė 2022). Therefore, this suggests that different combinations of the touch-richness dimensions could be applied when developing prototypes. This also relates to research that has shown that usability is an important aspect because it aims to enhance the UX by facilitating usability assessment (Gould and Lewis 1985; Nielsen 1993; ISO 2019).

There is a need to demonstrate how the Shapie UI could function to facilitate software usability recommendations (Tanenbaum 2014). Expert reviewer 3 suggested that Shapie would need its own way of operating. It would need a visual interface designed for different types of shapes, which the user would operate. Expert reviewer 5 expressed interest in seeing UIs and software illustrated during different uses of Shapie. Expert reviewer 12 questioned whether Shapie could also provide tactile interactions for notifications. They also asked whether the interface could change alongside its shape; for example, when a user wears Shapie on their wrist, it would display a clock. This is a compelling recommendation that should be addressed. The focal point for Shapie was on developing its elastic

properties, and the development of the UI was not a priority. However, this could be explored through further research. This also creates new opportunities to design interfaces and apps for touch-rich devices. Expert reviewer 12 commented that Shapie and touch-rich interactions could be used during the design process to brainstorm ideas on how tactile interfaces could benefit digital products. Expert reviewer 13 echoed other reviewers by stating that it was stimulating to imagine tactile interactions, such as bending features. They reiterated that Shapie could be used as a platform for software development because it would be interesting to explore the possibilities, given the technical constraints and limitations. This suggests that Shapie and touch-rich interactions could stimulate industry professionals to imagine new ways to design software. These unexpected insights suggest that illustrated narratives can help identify usability issues through UI visualisation when developing hardware prototypes and also provide recommendations (Blythe and Wright 2006; Tanenbaum 2014; Penney et al. 2024).

There is also a need to develop higher fidelity in touch-rich prototypes, which could be other computational devices rather than a phone. Expert reviewer 13 complimented the Shapie concept; however, they wanted to see higher fidelity explorations. They recommended redesigning Shapie into a different computational device. They also suggested seeking inspiration from the Massachusetts Institute of Technology (MIT) and the Interactive Telecommunications Program (ITP) at the NYU Tisch School of the Arts. After reviewing these sources, I concluded that some of the MIT projects focused on morphing fabrics, shapeshifting textiles, and developing technologies that make shapeshifting a reality, while the ITP focused on developing high-fidelity functioning prototypes, such as the Descriptive Camera by Matt Richardson and Cat Hunger Timer by Leia S. Chang (Richardson 2012; Chang 2021; Zewe 2023, 2024). According to these sources, high-fidelity prototypes aim to bridge the gap between the design concept and fully functional products (McElroy 2017). As my project was not focused on developing fully functional prototypes for sale, I rejected this suggestion (Dunne 2006; Auger 2013; Dunne and Raby 2013). First, it is important to acknowledge that illustrated narratives and expert reviews may also be undertaken at the beginning of a design process rather than at the end, when it is orientated towards the final working prototype. Second, this insight is encouraging because it suggests that a diegetic prototype can provide the basis towards the development of a fully functional prototype. These two unexpected insights may be helpful to designers who use design fiction during their design process. Furthermore, I would be interested in exploring the previous recommendation further, such as developing a series of creative computing devices that employ elastic properties and other touch-rich dimensions, such as texturality, gesturality, and interpolation (Barrios-O'Neill and Pakalkaitė 2022). However, higher-fidelity prototypes would require hardware engineering knowledge; therefore, this could represent a future collaboration opportunity with experts working in this field. This recommendation is also useful for future research on touch-rich and noise mitigation in interfaces.

### 2.4 Summary of the research results

This section addresses the first sub-question: how do design fictions stimulate designers to create healthier IT tools and generate insights for the design process? I discovered that presenting illustrative narratives – such as the Yoshi Phone user manual and 'Yoshi Phone. Break the Mould' narrative – to expert reviewers, provokes debate and promotes new advances for the design process (Bleecker 2009; Dunne and Raby 2013; Penney et al. 2024). The UCD approach (which is a more traditional design approach for developing interfaces) is focused on enhancing the UX through usability and accessibility assessment (Norman 1983; Gould and Lewis 1985; Nielsen 1993; Shneiderman et al. 2016; W3C WAI 2016). Regarding usability assessment, illustrated narratives can facilitate usability recommendations and identify usability requirements for both design aspects (software and hardware). In addition to facilitating usability evaluation, the previous discussion demonstrates that the Yoshi Phone design and narratives can also enable accessibility evaluation (Ahmadpour et al. 2019; Sharma et al. 2022). This links to research that has shown that design fiction can enhance the UX by facilitating these assessments (Norman 1983; Gould and Lewis 1985; Nielsen 1993; Shneiderman et al. 2016; W3C WAI 2016; Ahmadpour et al. 2019; Sharma et al. 2022; Penney et al. 2024). When responding to the illustrated narratives for the Yoshi Phone, the expert reviewers identified usability and accessibility issues and provided recommendations in the same way as a UCD approach (Ahmadpour et al. 2019; Sharma et al. 2022; Penney et al. 2024). The previous analysis also shows that the Yoshi Phone and hand-drawn interfaces can inspire the imagination of human-centred, gentle, mindful, and organic interfaces and low-fidelity and minimum viable interfaces (Buxton 2007; Case 2016; Case and Day 2019). These insights may be helpful to designers wanting to use illustrated narratives and develop unconventional interfaces, and need validation to do so.

The significance of this project is its use of illustrative narratives, such as the Birds app user manual and 'Birds … Don't get carried away' narrative. By presenting these products to expert reviewers, I have shown that they provoke debate on innovation opportunities and the design process (Bleecker 2009; Dunne and Raby 2013; Penney et al. 2024). As previously mentioned, the UCD approach focuses on enhancing the UX through usability and accessibility evaluations (Norman 1983; Gould and Lewis 1985; Nielsen 1993; Shneiderman et al. 2016; W3C WAI 2016). Illustrated narratives facilitate usability assessment but do not specifically engage with accessibility themes (Tanenbaum 2014; Penney et al. 2024). This is something to consider when presenting software-based designs to expert reviewers; however, my illustrated narratives successfully engaged with accessibility through two other designs: the Yoshi Phone and Shapie (which involved both the software and hardware aspects of design). They also inspire designers to develop other ideas on how to reduce screen time overuse and enhance the UX by developing textural, mindful, and poetic interfaces or interactions

(Buxton 2007; Kolko 2011, 2014; Case 2016; Case and Day 2019). These insights may be beneficial to designers who are considering using illustrated narratives in their design processes or designing UIs.

Similar to the insights from the Birds app and Yoshi Phone, the use of illustrated narratives in the Shapie user manual and the 'Shapie: Feel technology like never before' narrative were fundamental to obtaining feedback from the expert reviewers that offer advances for the design process (Bleecker 2009; Dunne and Raby 2013; Penney et al. 2024). Shapie and touch-rich interactions raise awareness of exploring better ergonomics and provide inspiration to imagine more inclusive and accessible applications of touch-rich interactions and new uses for Shapie (Barrios-O'Neill and Pakalkaitė 2022). As with the Yoshi Phone, illustrated narratives can facilitate the usability requirements for both design aspects (software and hardware). The UCD approach can enhance the UX because it employs usability and accessibility assessment (Norman 1983; Gould and Lewis 1985; Nielsen 1993; Shneiderman et al. 2016; W3C WAI 2016). Design fiction can also enhance the UX because it can facilitate these same assessments (Norman 1983; Gould and Lewis 1985; Nielsen 1993; Shneiderman et al. 2016; W3C WAI 2016; Ahmadpour et al. 2019; Sharma et al. 2022; Penney et al. 2024). Regarding accessibility evaluation, the expert reviewers provided feedback that would be helpful when reimagining Shapie as more inclusive and accessible, as well as engaging with ergonomics (Ahmadpour et al. 2019; Sharma et al. 2022). This links to the role of ergonomics in design because it increases accessibility and can therefore enhance usability (Nielsen 1993; Shneiderman et al. 2016; W3C WAI 2016; ISO 2018, 2019, 2023). This also correlates with research that has shown that design fiction can facilitate usability and accessibility evaluations in a similar way to the UCD approach (Ahmadpour et al. 2019; Sharma et al. 2022; Penney et al. 2024). Shapie aimed to stimulate debate to test methodological advances rather than focusing on a functional prototype for sale (Dunne 2006; Auger 2013; Dunne and Raby 2013). Another unexpected insight was that this method can provide recommendations on developing high-fidelity prototypes if applied to the design process between developing a concept and producing a fully functional product (Sterling 2005; Bleecker 2009; Coulton et al. 2017; Lindley et al. 2018). This insight may be helpful to designers and engineers interested in using illustrated narratives in such a context, and who need validation for this.

## 3. Identification of innovation opportunities

### 3.1 Innovation opportunities with the Yoshi Phone (hand-drawn interfaces)

The Yoshi Phone could be sold as a UI rather than a mobile phone brand. Expert reviewer 10 stated that there is 'a large market demographic for health and wellbeing enthusiasts' for a Yoshi Phone-type interface. According to the reviewer, this could work by developing a 'wellbeing' interface (as an

alternative to a 'classic' interface) using hand-drawn elements, which would then be available to purchase from the App Store and Google Play store. This could also be developed in partnership with a large IT company, with sales generating income for the corporation. It is a common approach for large IT companies to create partnerships with designers to develop new technologies (Nokia Bell Labs 2017).

Furthermore, revenue associated with digital fitness and wellbeing apps is expected to exceed £20 billion in 2023 and to increase by 13.2% between 2023 and 2027, indicating a growing market for such apps (Statista 2022a). Revenue would be generated from first-time users who pay a one-off fee. This suggestion was reiterated by the reviewers. Expert reviewer 10 also explained that 'classic' interfaces would not lose their market value because there are consumers who 'want the full technology accessible immediately and like the on-screen "noise"'. This means that a 'wellbeing' hand-drawn interface would not represent a threat for large IT companies, but would provide an add-on to offer a different type of UX. Expert reviewer 1 stated that the Yoshi Phone could potentially be released as an interface update or plug-in for a conventional design. Expert reviewer 4 commented: 'I think possibly within icon packs and specific/niche types of work. It won't be for everyone, but for some people it would be a "pack" worth downloading and using'. This review suggests that a Yoshi Phone mode could be adapted into an interface pack that could be downloaded, installed, and used when needed. These ideas are very similar to a Yoshi Phone mode being incorporated into an OS (which is described further in a subsequent section (see page 182)). This means that large IT companies could benefit from partnerships with designers and illustrators to develop and sell 'wellbeing' interfaces in addition to 'classic' iPhone and Android interfaces.

The niche market for feature phones, such as the Yoshi Phone, needs to be better defined, as expert reviewer 5 identified. I agree with this because the potential market was not explored through the design fiction for the Yoshi Phone. The same reviewer provided examples of three groups of consumers that the Yoshi Phone could be marketed to: 'parents who want to be connected with their children but not expose them to the wilderness of social media', 'old folks who struggle grasping tech', and 'the woke folks who are deleting their social media accounts and trying to focus more on their (mental) health by reducing noise'. These market insights would be beneficial when pitching the Yoshi Phone to large IT companies. Expert reviewer 4 noted that, as an introduction to IT software, the Yoshi Phone and hand-drawn interfaces would be great for children. This reviewer complimented the Yoshi Phone concept because it was intuitive and immediately usable; however, they also recommended exploring how this type of technology could be developed for certain consumer demographics – for example, children, young adults with learning needs, and mainstream markets by creating a social media platform-type interface. They also suggested that this system would be particularly beneficial for users who are easily distracted. They explained that this would make this

type of design convenient to use in learning environments; for example, for students with attention issues. Expert reviewer 11 also saw the potential for hand-drawn interfaces to make healthier digital learning environments. This partly reiterated the comments of expert reviewer 5. This suggests that there is a potential market among these types of consumers, and this could be explored further by large IT companies. The feature phone market began to decline in 2020 and is projected to further decline slowly to 2028; however, it still generates an annual global revenue of nearly £9 billion (Statista 2023a). This may be the last opportunity to penetrate the feature phone market. This shows that large IT companies can benefit from partnerships to develop and sell feature phones with minimalistic and monochromatic designs. However, big tech companies typically prioritise mainstream markets over niche markets; therefore, this may not be of interest to them (Norman 2004, 2013).

Developing and selling devices that incorporate a new OS would be potentially beneficial to large IT companies. Expert reviewer 7 suggested that hand-drawn interfaces could use a separate OS on a series of Yoshi devices, such as phones, tablets, and computers, among others, or as a predefined option on the OS. The first option would include developing the Yoshi brand in partnership with an IT company and the OS and other products. However, the second option could be pitching the Yoshi Phone to IT companies directly. This idea correlated with comments provided by expert reviewer 13. This reviewer echoed expert reviewer 7 but provided further detail. They referred to the Yoshi Phone (hand-drawn interfaces) 'as a nice provocation in the OS worlds'. Its hand-drawn interface could work as a mode; for example, Android users could switch between regular 'Android OS' and 'Yoshi mode'. According to this reviewer, 'Yoshi mode' would enable a user 'to experience less distraction and taking in the constraint of less functionality'. The benefits of this would be similar to those described in more detail in the following section (see page 183). Operating systems already generate income for big tech companies (Apple 2024a; Microsoft 2024). Other ways to commercialise an OS would require further research. This means that large IT companies could benefit from the development and sale of new products with a new type of minimalistic OS.

Information technology companies could benefit from including a Yoshi Phone interface as an option for their apps. This theme somewhat overlaps with the previous theme because they both explore the potential for the Yoshi Phone to be a mode; however, the previous theme focused on the OS aspect. Expert reviewer 10 proposed developing a 'Yoshi mode'. This would enable a user to switch to a Yoshi mode view for a less noisy interface experience in the same way users are able to switch between light and dark modes in apps. This is an interesting insight because Yoshi mode could be offered for the products of large IT companies; for example, browsers (Google Chrome, Microsoft Edge, Safari, etc.), popular apps (Amazon Kindle, Pinterest, Wikipedia, Outlook, and most Apple and Google apps), and websites (Spotify, Klarna, Apple AirPods, etc.) that have a dark mode. Such companies would benefit by including an option to create a better UX and minimise noise in

interfaces, which would help build an image of a caring brand. This could lead to higher consumer satisfaction and greater engagement, which could produce greater app sales. This same reviewer also suggested that Yoshi Phone-style prototypes could help address usability issues in the design phase of software development (as discussed in detail in previous sections (see pages 170–173 and 179–180)). Expert reviewer 6 suggested that hand-drawn interfaces could be monetised using a one-off fee rather than solely through the hand-drawn interface itself. This would mean that I would need to create further 'Yoshi' hand-drawn products, which could be beneficial for large IT companies. The same reviewer suggested that this could work through the development of side services, which could include developing and pitching hand-drawn versions of popular apps (such as a hand-drawn option for Deliveroo, a podcast, dictation apps, etc.) to their owners or developers. These popular apps would have predefined options, such as 'regular' and 'Yoshi mode' views. Further research is needed to establish how hand-drawn apps can successfully generate income. This reiterates the possibility of monetising 'Yoshi mode' to benefit large IT companies. This means that large IT companies could benefit from the development and sale of hand-drawn, monochromatic, and minimalistic modes of their existing digital products, such as apps.

According to Statista (2024a), the productivity software market generates revenue that is predicted to double in size by 2029. Productivity apps can generate income in many ways; for example, through upfront payments, adverts, in-app payments, or through a free download option with add-in features (Numminen et al. 2022; Statista 2024a). Therefore, another specific example would be to develop a Yoshi Phone UI as a productivity app. Expert reviewer 7 commented that such an interface could have mental health, time, and productivity benefits for users. Expert reviewer 9 expanded on this notion and suggested that the Yoshi Phone or hand-drawn interfaces could enable the digital compartmentalisation of work and life. This would create a healthier 'work force, mentally and physically through reduced stresses'. Expert reviewer 10 echoed these views by suggesting that software or workplace tools could benefit from hand-drawn interfaces and modes. This reviewer thought that such an interface would be more efficient because it would enable users to navigate more quickly and increase productivity because they would not need to focus on locating commands. This shows that large IT companies could benefit from the sale of productivity apps.

Hand-drawn interfaces could be used to develop and sell apps and fonts. Expert reviewer 2 suggested that they could be used to develop a diary app for users to keep track of their memories. This reviewer saw the benefit of adapting hand-drawn interfaces to create something new, highlighting its potential to develop new products. Such a diary app could be produced by a large IT company. The reviewer also highlighted that the use of illustrations would make the UX much more personal and special. This relates to the argument that hand-drawn interfaces provide a warmer UX than generic interfaces. My review indicated that journal apps can have two different definitions: they can function as a digital

journal with a focus on wellbeing, lifestyle, and health goals, or as a digital notebook for productivity (or both) (Evernote 2022a, 2022b; Journal 2024). Both app types can be financially successful (Statista 2022a, 2024a). Expert reviewer 12 proposed that a 'Yoshi font' could also be licensed or monetised. The font I used in the Yoshi Phone was my hand-drawn typeface, which could be developed into 'Yoshi Font'. However, additional research is needed on how typefaces can generate income for corporations. This suggests that large IT companies could benefit from the development and sale of digital products with hand-drawn interfaces, such as apps and fonts.

### 3.2 Innovation opportunities with the Birds app (mindful interactions)

The advantage of the Birds app is that it could be developed as a subscription-based app, as well as be part of a series of apps that expand on the theme of mindful screen time tracking. Expert reviewer 5 noted that it would be difficult to sell the Birds app because its competitors are free to download and use. However, this could be resolved by including additional features that other tools do not offer for free. Expert reviewer 1 suggested adding extra features, such as exclusive plugins and animations, to the Birds app. Expert reviewer 3 noted that other potential features could include 'natural or human reminders about device usage'. Expert reviewer 11 stated that the Birds app could benefit from customisation or microtransactions. Expert reviewer 7 proposed two options for how the Birds app could be financed. The first option would involve selling it as an app and would be optional for the user, but with the Apple or Android name on it. They explained that this would help such a company to 'brand itself as caring for the user, it could be marketed as such' because 'many brands have lost focus on consumer health and wellbeing with respect to information overload'. The second option would be to sell the Birds app and brand it as its own company. According to expert reviewer 10, this could potentially be done through crowdfunding as a Kickstarter app on the App Store. Six reviewers commented that large IT companies could brand the Birds app. Meditation, digital fitness, and wellbeing apps can generate high revenues and can be financially profitable (Statista 2022a). This implies that large IT companies could benefit from partnerships with designers and illustrators to develop and sell apps with mindful interactions.

Alternatively, the Birds app could be adapted or redesigned for children and young people, which then could be marketed to students, parents, and educational companies. According to the expert reviewers, there is a need to develop this concept further by exploring real-world examples. This correlates with research that has shown that children and young people are affected by excessive screen time, which can have a detrimental effect on their wellbeing (Vandewater et al. 2007; Livingstone and Helsper 2008; Nikken and Jansz 2014; Przybylski and Weinstein 2018; Domoff et al. 2019). Expert reviewer 8 questioned whether the Birds app could be redesigned for children because children and their parents need better tools to manage their screen time. My research is based

on Hiniker's (2017) study, which concluded that the use of media could be supported effectively in families (parents and their children) through mindful interactions. The Birds app was not targeted at any specific types of consumers; however, this is a valid point, and it could be redesigned for families in particular. This could financially benefit education companies that use technology in learning environments. Expert reviewer 4 stated that children experience the most significant issues with phone use, and the Birds app could provide a potential solution. Expert reviewer 5 commented that they had seen parents setting similar timers for their children's smartphones and suggested that the Birds app is a better solution visually than the Screen Time feature. Expert reviewer 12 suggested that the Birds app could have 'a feature promoting internet safety and mindful usage of apps' and reiterated its usefulness for children. Expert reviewer 8 echoed the other reviewers and suggested that the Birds app would be useful for students and children who cannot track their time. They also suggested that this could be monetised in schools, colleges, and universities to potentially educate pupils and students on how to better manage their time and screen time. I found it interesting how many reviewers echoed similar ideas about similar consumer groups and identified how this could benefit both consumers and educational institutions. Large IT companies could also adapt these ideas. This implies that large IT companies could benefit from the development and sale of IT tools with mindful interactions for children, young people, and educational institutions. However, as previously mentioned (see page 182), big tech corporations typically focus on mainstream markets rather than niche markets owing to profitability (Norman 2004, 2013). As such, products aimed at niche markets may not align with their business goals.

Some of the reviewers also suggested that there may be a potential lack of commercialisation opportunities for big tech companies. Expert reviewer 2 highlighted a scenario in which the Birds app could stop user traffic to a company's products, leading to reduced revenue of that company's product(s), whether it is a device or an app. Therefore, this app would not be beneficial for such companies. Expert reviewer 9 also claimed that mindful interactions are a positive outcome for users but may have a negative impact on monetisation for large IT companies. They explained that this is because all devices and apps are designed to hook consumers and feed them adverts to sell more apps and devices. Expert reviewer 10 echoed the other reviewers and highlighted that 'there will be a market for users who purposefully want to reduce their screen time due to health and wellbeing'. However, Birds is an app rather than an integrated feature and is 'independent from Apple and Android who may see this as a hindrance and reject it due to commercial impact. The aforementioned companies would seek high profits from mobile phone addiction over the genuine health and wellbeing of the consumer'. This means that the development and sale of mindful interactions do not benefit large IT companies. However, these reviews conflict with the data that shows that meditation apps – such as Calm and Headspace – are among the highest-grossing health-related apps

globally, alongside digital fitness and wellbeing apps in general, which are used by touchscreen users (Statista 2022a, 2023).

### 3.3 Innovation opportunities with Shapie (touch-rich interactions)

Large IT companies could potentially benefit from the further development and sale of touch-rich devices. Expert reviewer 5 highlighted that technology companies have already heavily invested in flexible screens. Furthermore, expert reviewer 10 suggested that large IT companies, such as Nintendo, Sony, Apple, and Samsung, may be interested in such innovative concepts and could generate profit from them. Shapeshifting technology patents filed by large IT companies indicate that they are investing heavily in this area of research and development, which correlates with these reviews (Rothkopf et al. 2013; Lin 2020; Seo et al. 2021). Furthermore, the global market for rollable and foldable smartphones has risen to £4 billion and is estimated to reach over £85 billion by 2025 (Statista 2023b). This means that the market is growing rapidly and needs to be penetrated by large IT companies. Expert reviewer 5 also highlighted that flexible screens have infinite applications. This comment suggests that there could be a series of products developed for different uses rather than a single prototype. The next step could include further investigation of flexible screens for different user groups and environments, and how this could be used to develop a series of commercial products. According to expert reviewer 9, Shapie (touch-rich interactions) could also be beneficial to large IT companies because 'it would come down to find[ing] new ways to accessorise, to serve ads, or to develop more suitable apps'. These unexpected insights indicate that further research and development are needed, and more specific uses and markets need to be defined for it to be successful. As such, I believe that Shapie – or a series of elastic design products with flexible screens – could open a new market, which could then provide a new platform for accessories, apps, and adverts. This could generate revenue for large IT companies interested in such opportunities and with the finances needed to test them. This correlates with research that has shown that design fiction can stimulate imaginative ideas that can be exploited by big tech companies (Michaud 2021). This analysis also shows that large IT companies could benefit from the development and sale of touch-rich devices.

Shapie could be a niche demographic item; for example, for young children or consumers with visual impairments. Expert reviewer 4 commented that they were unsure whether such a product was suitable for mainstream markets. This insight provides further thought for companies that create products for niche consumer markets. First, further research would be needed to identify IT companies that operate in this area. Second, I would need to develop proposals on how Shapie could be used with these consumer groups. Lastly, I would then need to pitch Shapie to these companies for sponsorship or investment in this product. These suggestions consider very specific potential

financial benefits or explore how Shapie or other touch-rich devices could be monetised. This implies that large IT companies could benefit from the development and sale of touch-rich devices for both mainstream and niche demographic markets. As previously mentioned in this chapter (see pages 182 and 185), large IT companies typically focus on developing products for mainstream markets rather than niche markets because they are more profitable (Norman 2004, 2013). This is why insights orientated towards developing products for niche markets may not align with their business aims.

There are technical challenges related to the development of a functional Shapie prototype. Expert reviewer 8 advised researching Shapie's potential manufacture as well as ways to educate consumers on how to use it. Expert reviewer 10 highlighted the cost of the technology needed to develop Shapie as a major consideration and obstacle, and asked whether some of the technology, such as the stick or unstick function, exists. They also questioned whether an LED screen is capable of bending and whether the image quality is as good as on smartphones. In contrast, expert reviewer 4 complimented the Shapie concept and stated that the technology needed to produce the hardware required is in the near future. These reviewers' concerns about available technology relate to the research on foldable smartphone technology and the patents for flexible devices filed by big tech companies. For example, Corning Gorilla Victus glass technology enables users to fold and unfold their smartphone without the touchscreen cracking (Corning 1994–2025). This technology is used in foldable smartphones, including the Samsung Galaxy Z Flip and Z Fold series (Samsung 1995–2025). However, it is unclear whether Corning Gorilla Victus glass technology can facilitate more complex shapeshifting properties, such as a device becoming hard or soft and bending smoothly without ridges, rather than simply folding and flipping. Filed patents provide further evidence for big tech companies, including Apple, Oppo, and Samsung, exploring touch-rich devices, such as flipping and folding smartphones (Rothkopf et al. 2013; Lin 2020; Seo et al. 2021). This demonstrates that large tech companies have already invested heavily in the research and development of touch-rich devices. This analysis also shows that there is technology available that could be used to develop Shapie into a functional prototype.

Alternatively, Shapie could be its own brand. Expert reviewer 4 complimented the Shapie concept but echoed that the development costs needed to prove Shapie's utility could be very expensive. Expert reviewer 8 noted that 'If Shapie wishes to be its own brand, its revenue could come from investors willing to see this as high-risk high-reward investment backed with the technology as part of its sales pitch to achieve this'. They suggested that 'this product would sell itself, but knowledge of the technology required to fulfil its functions will need to be presented to the brands that are present, such as Samsung or Apple'. Expert reviewer 10 mentioned that this could be a 'high risk, high reward investment'; therefore, the sales pitch would need to include precise calculations on the cost of further development. Both of these reviewers also highlighted the importance of the

technologies needed to develop Shapie into a functional prototype. This could be addressed by developing higher fidelity touch-rich prototypes that could be orientated towards a working prototype (this is discussed in more detail in a previous section (page 178)).

### 3.4 Summary of the research results

This section addressed the second research sub-question: how do design fictions generate innovation opportunities that would be valuable and beneficial for large IT companies? The illustrated narratives for the Yoshi Phone provoked discussion by the expert reviewers on innovation opportunities for large IT companies (Bleecker 2009; Dunne and Raby 2013). This discussion focused on how the Yoshi Phone and hand-drawn interfaces can be developed into products, monetised, and marketed. First, the main advantage of this method is that illustrated narratives can be used to produce and test design fictions during the ideation stage of the design process (Near Future Laboratory 2025a, 2025b). Second, it could be applied to producing public-facing design fiction (Kirby 2010; Pasman 2016). Both of these methodological aspects would be beneficial for big tech companies that use design fiction to innovate (Michaud and Appio 2022). However, this provocation generated too many suggestions and unexpected insights. The weakness of this method is that it does not prescribe how to evaluate and select ideas that would be applicable and achievable for big tech companies. To mitigate this issue, the selection process could be developed by a facilitator or the company. The discussion also focused on niche markets, which may not align with the business goals of large IT companies (Norman 2004, 2013). Therefore, when adapting this approach, companies should consider these aspects carefully. This analysis demonstrates that illustrated narratives can provoke discussion on imaginative and innovative opportunities and provide unexpected insights to benefit large IT companies that use design fiction (Bleecker 2009; Dunne and Raby 2013; Michaud 2021; Michaud and Appio 2022).

As mentioned previously, a significant aspect of the Birds app was its use of illustrative narratives because they can provoke discussion by expert reviewers (Bleecker 2009; Dunne and Raby 2013). This discussion focused on whether the Birds app should be developed into a working prototype, with the majority of reviewers recommending that it be developed further, monetised, and marketed. The advantage of this is that it may enable big tech companies to produce and test design fictions using illustrated narratives, particularly at the ideation stage of the design process or public-facing design fiction (Kirby 2010; Pasman 2016; Near Future Laboratory 2025a, 2025b). The first disadvantage of this method is that it does not provide complete validation for a working prototype because there are contradicting recommendations. The second disadvantage is the lack of criteria for selecting ideas for further investigation. Some of the recommendations may be irrelevant or unachievable for big tech companies. This could be mitigated by developing criteria. The third

disadvantage is that it can focus on solutions for niche markets rather than mainstream markets, which may not align with big tech company goals or interests (Norman 2004, 2013). Large IT companies should consider these aspects when using this method. In addition to being thought-provoking and contributing to innovation opportunities in the design process, the use of illustrated narratives can also generate discussions on new opportunities for large IT companies that use design fiction (Bleecker 2009; Dunne and Raby 2013; Michaud 2021; Michaud and Appio 2022).

Shapie's illustrated narratives provoked discussions by the expert reviewers on identifying innovation opportunities for big tech companies (Bleecker 2009; Dunne and Raby 2013). These discussions focused on generating creative ideas for the development and sale of touch-rich devices, which big tech companies could exploit for financial gain (Michaud 2021). They also focused on whether Shapie should be developed as a working prototype, with the majority of expert reviewers highlighting technical obstacles to this. Similar to the Birds app, this did not provide a complete validation for a working prototype because of the opposing expert recommendations. This project was orientated towards provoking debate rather than producing functional prototypes for sale (Dunne 2006; Auger 2013; Dunne and Raby 2013). However, the discussions show that it can provide recommendations for developing one and identify the technical challenges and practical steps associated with funding its production (Sterling 2005; Bleecker 2009; Coulton et al. 2017; Lindley et al. 2018). This also raises the question of how these suggestions would be selected and prioritised. Some of the ideas may not be relevant to or feasible for big tech companies. As mentioned previously, this could be resolved by the development of a selection process. These discussions also focused on niche markets rather than mainstream markets. This aspect may not be aligned with big tech company targets (Norman 2004, 2013). Big tech companies should consider these aspects when adapting this approach. The significant advantage of this method is that the use of illustrated narratives enables the development and testing of public-facing design fictions or can be used internally during the ideation phase of the design process, which would benefit big tech companies (Kirby 2010; Pasman 2016; Near Future Laboratory 2025a, 2025b). The analysis also suggests that illustrated narratives can stimulate discussion on innovation opportunities for large IT companies (Bleecker 2009; Dunne and Raby 2013; Michaud 2021; Michaud and Appio 2022).

# CHAPTER 6

# METHODOLOGICAL ADVANCES

This concluding chapter discusses contributions to new knowledge gained from the study's methodological aspects. The chapter reflects on how my research generated discussion rather than debate. It then considers how the innovation in my research can be best applied to the ideation stage of the design process and the advantages that this provides. The chapter also describes the intended audience for my research and how the project contributes to new knowledge in each field of practice. It also acknowledges the limitations of this research. The chapter concludes with reflection-on-actions (Schön 1984), which focuses on how this research has affected my work as an illustrator and a researcher.

## 1. Debate versus discussion

In this project, I set out to stimulate debate; however, I managed to provoke discussion rather than debate. In a context of design fiction, debate and discussion both involve engagement with diegetic prototypes and speculative artefacts (Bleecker 2009; Dunne and Raby 2013). However, the main distinction between them is in their aims, characteristics, roles, and outcomes, meaning that discussion and debate operate on two different levels, and it is important to distinguish and acknowledge this. Dunne and Raby (2013) argued that the role of speculative design is to create artefacts that open discussion (as well as reflection) about possible futures. This means that discussion is focused on the expansion and exploration of the worlds created by the speculative artefacts (Bleecker 2009; Dunne and Raby 2013). Compared with debate, discussion differs in tone because it fosters collaboration and generative thinking rather than conflicting viewpoints and tensions (Bleecker 2009; Sterling 2009; Auger 2013; Dunne and Raby 2013). The most desirable outcome of a discussion is to generate imagination, new ideas, insights, and interpretations from the engagement with these fictional worlds (Lindley and Coulton 2015).

Bleecker (2009) explained that design fiction aims to create prototypes that generate interpretive conversations. Building on Bleecker's ideas, Sterling (2009) and Auger (2013) explained that design fiction stimulates debate, such as generating ethical tensions and conflicting viewpoints. This means that debate should be critical, adversarial, and ethical and is mainly orientated towards the speculative narrative, which then enables the exploration of contrasting perspectives (Sterling 2009; DiSalvo 2012; Auger 2013). The properties of a debate should include critical and conflicting viewpoints on the matter at hand, and it should focus on ethics, implications, desirability, and risks rather than

having exploratory characteristics (Sterling 2009; Auger 2013). The outcomes of a debate are focused on extracting and interrogating political or ethical insights and tensions (Sterling 2009; Auger 2013). Furthermore, discussion and debate can both occur simultaneously in design fiction because it is used to enable exploration and imagination (characteristics of discussion) and critical evaluation (properties of debate) (Bleecker 2009; Lindley and Coulton 2015).

In this project, illustrated narratives invited discussion through the use of expert review. Discussions emerged from the individual expert reviewer comments gathered through the expert review. The expert reviewers only interacted with the illustrated narratives alone, and they did not interact with each other, which is the first potential limiting factor in this study concerning debate. In design fiction, the most commonly used methods, such as co-design and workshops, are aimed at the participants' ability to not only interact with the speculative artefacts but also with each other. This suggests that a specific environment must be created for debate to occur and that prompts for the expert reviewers must be designed specifically to target aspects of debate rather than discussion. Upon reflection, I believe that my study method was aimed at generating discussion rather than debate, and this is evident in the prompts used in the expert review. In this thesis, I also used the terms 'debate' and 'discussion' as synonyms rather than articulating them as two different and separate concepts.

In this project, different types of discussions emerged from the engagement with the illustrated narratives. First, the expert reviewers provided contrasting views on the prototypes and whether they reduce noise. This could be mistaken for characteristics of debate at first. It is also important to note that while the expert reviewer comments appeared to contrast, multiple interpretations and suggestions emerged from engagement with the Yoshi Phone, Shapie, and Birds app. Second, some comments focused on ethics, implications and risks; however, they were not strongly orientated towards the main outcome of the debate, which can also be incorrectly identified as a characteristic of debate. Overall, the comments were exploratory, and the majority were orientated towards the production of new ideas and interpretations from the interaction with the illustrated narratives. Lastly, the expert reviewer comments may not seem collaborative because they were extracted individually, which can also be mistaken for debate. Therefore, it is evident that discussion occurred rather than debate because there was a lack of emphasis on the production of ethical and political insights. In the context of design fiction, discussion can possess some of the properties of debate; however, the overall distinction is clear in the outcomes it produces. Nonetheless, the value of discussion was significant because it generated useful insights for my research.

I also do not consider the lack of debate as a failure of the aims of this project. While there is a mismatch between my original aim and what this project has achieved, this reveals something

interesting about illustration as a mode of enquiry and raises an important question concerning whether illustrated narratives/illustration can facilitate debate even when the conditions for debate are present. If illustration cannot provoke debate, it is perhaps a *softer* as well as *richer* mode of enquiry (as it facilitates discussions) compared to other approaches in speculative design practice. Therefore, my research establishes a basis for future research to test this hypothesis. My research also shows how failed practice research experiments using illustration can generate new knowledge and provide unexpected insights, which can inform further practice research.

## 2. Innovation in the design process

In this thesis, I aimed to test how illustration and speculative design practice can be employed at the ideation stage to advance the design process itself. Previous research on traditional ideation techniques has shown that illustrated storyboards and sketching can provide a visual communication tool to envision (and communicate) the use of technology, explore and illustrate UXs, and activate design thinking and user-centred design in the design process (Carroll 1995, 2000; Buxton 2007; Rogers et al. 2011). The combination of sketching/drawing and design fiction could be adapted to inform software and hardware design (Lewis and Sturdee 2024). Building on previous research on ideation tools and expanding on the work of Lewis and Sturdee (2024), I reframed innovation as the use of illustrated narratives alongside speculative design practice to enable ideation. The audience for my research innovation includes illustrators and designers, as well as large IT companies, who can employ this approach in their innovation processes.

In the context of UI/UX design and development of communication devices, my innovation concerns the ideation phase of the design process, and is particularly orientated towards the Double Diamond model (Design Council 2026a). This model consists of four steps and is not constrained by specific methods or tools (Design Council 2026a). While the Double Diamond framework does not have an explicit 'ideation' phase, my approach could be applied at the 'develop' step of the second diamond. This step focuses on developing alternative solutions to a precise problem (established at the previous step). The develop step is also aimed at searching for ideas and inspiration, as well as co-design. In addition to the Double Diamond model, my approach could also be adapted in design processes that employ an 'ideation' phase (or equivalent) and are orientated towards developing communication devices and UI/UX design.

Within the boundaries of 'ideation', my innovative approach could be used to generate ideas and inspiration, and particularly in identifying several design directions as well as viable options for prototyping. My framework focuses on five simple steps: (1) developing 'what if' scenarios based on

design challenges and proposals; (2) designing diegetic prototypes informed by the 'what if' scenarios; (3) creating texts for stories regarding how diegetic prototypes work and look; (4) illustrating narratives; and (5) presenting the outputs for expert (relevant stakeholders) review and feedback. While the first steps focus on the development of the illustrated narratives, the final step gathers insights, which is the main aim of the ideation phase. As part of speculative design practice, the illustrated narratives rely on exploring possibilities through fictional prototypes without technical feasibility constraints rather than communicating potential solutions (Bleecker 2009; Blythe 2014). These conditions are critical for the illustrated narratives to generate insights. Traditional UI and UX outputs (such as wireframes and storyboards) cannot function in this way because they depend on technical credibility and are already orientated towards prototyping rather than exploring possibilities (Bleecker 2009; Dunne and Raby 2013).

Compared to creating design fiction videos, an advantage of illustrated narratives is that they provide a quicker and easier way of working (and are less costly). This method has not been tested in an industry environment; however, this project shows how creating and sharing illustrated narratives with expert reviewers can be a straightforward process. This approach could be appropriate for environments where work needs to be shared digitally via links or files, as well as for collaborative purposes where narratives need to be adapted and reiterated before and/or after sharing based on stakeholder feedback. In contrast to filming and editing design fiction videos, creating illustrated narratives should involve fewer staff resources, production time, and costs. Another advantage of illustrated narratives is how they act as a visual communication tool as well as a stakeholder engagement tool (Tanenbaum 2014). Compared to traditional ideation techniques such as illustrated storyboards, sketching, and drawing UXs, illustrated narratives provoke discussion. This has not been tested against other methods or with a diverse range of innovation actors/stakeholders; however, this project shows how illustrated narratives can successfully communicate stories with a diverse range of experts, including UI/UX designers and software engineers. The final advantage of illustrated narratives is their enhanced engagement with an audience (unlike wireframes and storyboards). The amount and quality of discussion generated by this project have not been compared with other methods, but it does show how hand-drawn illustrations alongside expert review can facilitate engagement with relevant stakeholders. If the use of illustrated narratives enables easier and quicker ways to develop design fictions, enhances engagement, and supports visual communication, this suggests that illustrated narratives are a valid approach to ideation in the design process and creating design fictions in speculative design practice.

## 3. Audience and contribution

This section identifies the intended audience for my research, which has been divided into two main groups: (1) practitioners (illustrators, UI and UX designers) and design researchers (both in industry and academia) who would benefit from or should consider *employing speculative design practice*, and (2) large IT companies that *use speculative design practice to innovate*. This section also describes how my project contributes to new knowledge through four fields of practice. Furthermore, I explain what each contribution offers to the intended audience for my research.

First, this thesis demonstrates that illustrated narratives stimulate discussion. This new knowledge primarily contributes to the field of illustration. According to Gannon and Faunchon (2021), illustration practice can generate new knowledge when 'testing the transferability of an illustrative methodology within a new research subject'. Through this practice research, I have shown that illustrated narratives can act as hand-drawn provocations. Speculative narrative framing must be present for this to occur and to enable engagement with reviewers and its audience (Bleecker 2009; Dunne and Raby 2013; Coulton et al. 2016). I consider hand-drawn provocations to be illustrations and illustrated narratives that have hand-drawn elements as well as provocative and/or speculative narrative framing. In this project, I applied speculative design principles to illustration to generate new knowledge. This methodological advance provides a valid framework for practitioners, including illustrators and graphic designers, enabling them to employ speculative design practice by using illustration and speculative design framing to create illustrated narratives (Coulton et al. 2016). This contribution enables illustrators and graphic designers to engage with speculative design practice in a more legitimate way.

Second, this thesis also shows that illustrated narratives are a valid method to develop and test UXs and UIs. Consequently, my research also contributes to the fields of UX and UI design. Both UX and UI design rely on traditional user-centred techniques to develop and enhance interfaces; however, recent research has shown that unconventional strategies such as speculative design practice can also be used (Blythe and Wright 2006; Tanenbaum 2014). In this project, I successfully created and tested less noisy digital interfaces using this approach rather than traditional UI and UX-related approaches. Furthermore, I showed that illustrated narratives can successfully facilitate usability and accessibility evaluations in the same way as the UCD approach (Ahmadpour et al. 2019; Sharma et al. 2022; Penney et al. 2024). This project shows that by adapting this framework, it is possible to produce interfaces that enhance the UX without using UI and UX-related approaches. This thesis offers an unconventional but valid strategy that would benefit UI and UX designers who are considering using speculative design practice to ideate, design, and test the UI and UX. This contribution to new

knowledge provides a verified approach for UI and UX designers to engage with illustrated narratives and speculative design practice.

Third, this thesis establishes that illustrated narratives are a valid way 'to do research' where the aim is to stimulate provocation. Furthermore, my research contributes to the research through design field. Stappers (2007) argued that design solutions can act as provocations. Stappers and Giaccardi (2016) further explained that illustrative narratives can be intentionally provoking through this approach. These researchers also argued that fictional prototypes that are simulated as fully functional can be thought-provoking (Stappers and Giaccardi 2016). Furthermore, Casnati et al. (2024) suggested that the purpose of narratives is to act as a provocation tool in the speculative design process during a project's dissemination phase. Building on this research, I have established that illustrated narratives can be thought-provoking. Therefore, this thesis offers a tested strategy for practice researchers who use illustrated narratives as their research method. This contribution provides a new method for adapting the research through design approach.

Finally, this thesis demonstrates that illustrated narratives are a valid way to innovate; therefore, my research contributes to the field of innovation studies. Big tech companies use design fiction to identify new business opportunities (Michaud 2021; Michaud and Appio 2022). Furthermore, new design fiction frameworks are needed to establish its methodological credibility and value, as it can then be applied to industry contexts (Dunne and Raby 2013; Lindley et al. 2014). Working with experts with different perspectives, I showed that illustrative narratives can prompt discussion as well as generate innovation opportunities for large IT companies (Bleecker 2009; Dunne and Raby 2013). This thesis offers insights into how illustrated narratives can be applied in a design/innovation process by big tech companies (which use or are interested in using speculative design practice to innovate). This contribution to new knowledge shows that illustrated narratives are an unconventional strategy as well as a credible method that is orientated towards real-life applications in industry.

## 4. Research limitations

This section focuses on the research's limitations across four different aspects. I explain the choice of qualitative research over quantitative research, developing diegetic prototypes rather than fully working prototypes, and the use of 'The Poetics of Design Fiction' framework (Markussen and Knutz 2013), expert review, and illustration. I also explain how these choices have enabled and limited my research project, as well as highlight the implications for interpretation. Lastly, I provide directions for future work.

From an epistemological perspective, this thesis generates qualitative knowledge rather than quantitative knowledge. The main constraint with this type of approach is that it did not generate any statistical findings, which would likely be beneficial for large IT companies. In terms of innovation, this thesis contributes to design practice and research, which has a somewhat limited appeal to businesses. Future work could include exploring less noisy digital interfaces from the perspective of businesses. Regarding less noisy digital interfaces, this research project prioritised three design challenges related to digital wellbeing. It also focused on the creation of diegetic prototypes. These designs then informed the design of user manuals and illustrated narratives. However, this constrained the creation of fully working prototypes. While this project does not provide practical solutions, it establishes the basis for future research that could explore other design challenges related to less noisy interfaces, as well as challenges related to digital wellbeing.

This project focused on adapting the steps from the 'The Poetics of Design Fiction' framework (Markussen and Knutz 2013). It developed 'what if' scenarios, diegetic prototypes, narrative texts, and illustrations. This original framework includes a co-design approach, which was rejected in this project and replaced with the expert review process to stimulate discussion. Furthermore, the expert review focused on collecting individual expert reviewer comments online rather than facilitating interviews or a workshop where participants can interact not only with the illustrated narratives but also with each other. This approach restricted collective involvement in the creation of the practice and inhibited debate. Future research could focus on exploring how expert review can facilitate debate or employ co-design/other techniques to provoke debate. Future research could also focus on testing whether illustrated narratives can stimulate debate with different types of conditions needed for debate to occur.

This thesis emphasised the use of minimalistic monochromatic digital interfaces and monochromatic illustrated narratives. This enabled the development of diegetic prototypes and narratives. However, this restricted how the UIs were designed as it rejected the use of colour and focused on hand-drawn and visual elements. The use of monochromatic, stylised drawings with a hand-drawn texture also limited the exploration of other textures, materials, and colours. The illustrations were intentionally stylised, thus rejecting photorealism (as commonly seen in design fiction). Future research could expand the stylistic and aesthetic choices further from an illustration practice perspective. However, this research has established a basis for exploring how less noisy digital interfaces can be designed and how speculative illustrated narratives can be further developed stylistically.

## 5. Impact on my practice as an illustrator and researcher

This section describes how this project has changed the way I approach projects, make decisions, and position myself. Before this project, my practice focused on creating illustrated narratives, artworks, and a wide range of visual communication projects for both print and online publication and exhibition. This project was the first time in my creative practice where I engaged with a completely new area of design: UI/UX and HCI. My motivation for this was to connect my visual storytelling, illustration, and design skills with these domains in a way that made sense to me and explore the design challenges that fascinate me. Lacking any previous experience in or knowledge of these fields, I was both nervous and enthusiastic about this research.

After undertaking this doctoral study, I feel more confident in starting projects that do not directly align with my primary expertise. I have learned that I can adapt my creative practitioner skills and transfer them between and across creative disciplines or find common ground. I have also become more comfortable with uncertainty (as well as the unexpected outcomes of practice research). I have used it as a space that enables iteration, reflection, and discovery. The research skills I have gained during this project have enabled me to frame questions and hypotheses first, rather than immediately leaping to the creative practice phase. I have also learned that research questions can change and that the process of setting research questions requires adaptability, flexibility, and review.

Regarding decision-making, I have used my intuition (both as a researcher and an illustrator/designer) to guide me through the process of engaging with the scholarship as well as developing UI/UX solutions. However, my decision-making has increased beyond intuition during this project, becoming more reflective and documented. This was particularly evident in Phase 1. In terms of creative practice, I have learned how to express my thought process as well as the importance of articulating decisions and realising how they affect subsequent phases as well as the outcomes. Furthermore, my positioning as a creative practitioner has changed over time during this project. Before it began, my primary expertise as a creative practitioner was informed by graphic design, illustration, and communication design. After engaging with this practice research at a doctoral level, this positioning has changed (how I see myself), and I am now an illustrator–researcher and designer–researcher as well as a practitioner–researcher.

This section also reflects on how I use illustration and consider its impact. Therefore, this reflection also focuses on the creation of the illustrated narratives. Before this project, my aim as a practitioner when creating illustrated narratives was primarily to tell a story, capturing its emotion as well as conveying information. The focus was often on creating aesthetically pleasing visuals or using illustration to represent ideas. This then led to the presentation of the work to an audience who would

view it and perceive it, but with no end goal of receiving or prompting a direct response. In terms of impact, I used to focus on the quality of the artefacts rather than outcomes that generate provocation, debate, or discussion. In this project, the placement of the prototypes within the narratives became central and critical to the stories, which revolved around how the prototype works and is perceived by the user. One of the main aims of the illustrated narrative was therefore to provoke a response from the viewer/audience/expert reviewer. It was vital to translate this intention (through my creative practice) by illustrating and designing the user manuals and monochromatic illustrated narratives, and test this hypothesis in Phase 2. I feel that the term 'provocation' can have a negative connotation because it can evoke negative feedback. In an illustration context, this type of practice differs from my previous experience and has taught me the importance and value of provocation, sparking debate/discussion when developing creative outcomes. I feel that this project has enabled me to engage with the creation of illustrated narratives in more depth and in a more precise manner, as well as engage with illustration as a mode of enquiry to generate new knowledge. Consequently, I also feel that this project has changed how I view and use illustration, as well as how I think about the impact of my creative practice.

# APPENDICES

## APPENDIX A: ETHICS APPROVAL FOR PHASE 1

FALMOUTH
UNIVERSITY

**PAKALKAITE, J**

SUBJECT AREA: User Interface Design.
Keywords: noise, digital interfaces, visual attention, mindfulness, tactility, design fiction.

*RESEARCH QUESTION:* How could the noise be mitigated within digital interfaces?

Overuse of smartphones and other digital devices are increasingly linked with negative impact on human cognition (Ward, Duke, Gneezy, Bos 2017), causing sleep disturbances, elevating stress and being linked to various mental health conditions (Thomée, Härenstam, Hagberg 2011). This project aims to develop digital interface solutions that can increase *mindfulness* and help meet increasing consumer demand for digital experiences that mitigate *noise*. In this context *mindfulness* refers to the quality and nature of one's attention, ability to use technology and process digital information mindfully, technology-induced mindfulness and cultivation of it through a sense of touch (Gunatillake 2017; Levy 2016; Kabat-Zinn 2018). In this project, *noise* is defined as information overload and in a form of signals (Gross 1964; Silver 2012).

*AIMS AND OBJECTIVES*

This project is on one hand oriented towards the design problem of improving user wellbeing through better technological design of gadgets. On the other, it is focused on the business problem of providing innovative solutions to a growing consumer demand for tech tools that foster psychological and emotional wellbeing. For example, minimalistic phones, called Light Phone and Light Phone 2, have been successfully funded through Indiegogo campaigns by consumers to produce and distribute them. My project would explore the research questions through three related interaction design and user experience factors of tactility, mindfulness, and visual economy. I propose to generate the solutions by developing and testing design fictions (Bleecker 2009).

Essential to my research is the management of attention as a limited resource (Crawford 2015; Simon 1971). According to Microsoft, the average human attention span dropped from 12 to 8 seconds in

5 years (Microsoft Canada 2015). Recent data from Statista (2017) shows that the average smartphone user spends around 5 hours each day on their device. Informational overload and associated "noisy" digital experiences are a major problem to be addressed by those developing new technological interfaces and tools, where consumers increasingly demand products that decrease noise in virtual informational environments (Harris 2014).

My aims are to create, design, develop new noise-free digital interfaces and test their applications to benefit large IT companies. Objectives include:

- creating new ways of managing digital attention;
- redesigning social and digital media for healthier use;
- developing mindfulness interventions, touch-rich interactions and IT tools that promote digital wellbeing.

A contribution to new knowledge would be the digital interface solutions and their theoretical principles.

In PHASE 1: PRACTICE, I set out to design and perform a set of research experiments by using design fiction as my methodology. Next, I describe the process of performing these design experiments. The process of designing and performing these design experiments consist of 6 stages:

1. Development of Ideas- Identifying and writing about design challenges.
2. Generation of Ideas: 'What if scenarios'.
3. Development of Diegetic Prototypes- software and hardware prototyping.
4. Narrative planning and storyboarding.
5. Development of design fiction in various medias.
6. Distribution of design fictions to the audiences.

PHASE 1: PRACTICE does not involve participants. PHASE 2 involves participants, but I am waiting for data from PHASE 1 in order to be able to proceed. I will apply for Research Ethics Approval again for PHASE 2 separately.

**RESEARCH DEGREES COMMITTEE – EXTRACT (POST AFR ETHICS APPLICATIONS) Section B – Confidential**

**15.5 PAKALKAITE, J** [RDC/19/107]

1. **15.5.1 Noted:** the student makes clear that phase two of the research will involve participants, and so will need to return for further ethics approval.
2. **15.5.2 Agreed:** that the application constituted minimal ethical risk, and was approved.
3. **15.5.3 Action:** RDSO to feedback to Joskaude Pakalkaite the outcome of the ethics application.

## APPENDIX B: YOSHI PHONE USER MANUAL TEXT

**Page 1: Cover**

Yoshi Phone User Manual

**Page 2: About Yoshi Phone**

'Yoshi Phone' is the first feature phone with a minimalistic hand-drawn user interface, which is gentle on users' attention.

**Page 3: How to set Yoshi Phone**

1. Press the power button.
2. Yoshi Phone Set up will appear, press 'Set it up' to continue.
3. It will take you to 'Set-up your phone', where you can select the view from Icons or without.

**Page 4: How to set-up Icon View**

1. Tap on the Icons box to select the view with Icons and tap Okay.
2. The Welcome sign pops up, tap 'Okay' to continue.
3. The menu starts with a Basics mode, to view other modes, tap to your right.
4. Tap 'LOCK' to lock your phone

**Page 5: How to set-up No Icon View**

1. Tap on the Icons box to select view with No Icons and tap Okay.
2. The Welcome sign pops up, tap 'Okay' to continue.
3. The non-Icon view starts with the whole menu.
4. Tap 'LOCK' to lock your phone.

**Page 6: How to select a mode**

1. Tap on the menu to select a mode.
2. Tap Yes to select the mode, tap 'back to return' to return to the menu.
3. Lock the phone by tapping on 'Lock'.
4. Tap on 'Unlock' to use the mode.

**Page 7: How to change mode**

1. Tap on 'Switch Mode'
2. Tap Yes to return to the menu or tap cancel to use the current mode.
3. By tapping yes, it will take you to the original menu, where you use all modes and then select the mode you need, if necessary.

4. Lock/Unlock to keep your device secure.

**Page 8: How to go offline**

1. Swipe to the right until Offline mode appears, then Select Offline mode.
2. Tap Disconnect.
3. Lock the phone by tapping on 'Lock'.
4. Tap Reconnect to go online again.

# APPENDIX C: BIRDS APP USER MANUAL TEXT

**Birds User Manual Text**

Cover: User Manual for Birds Mobile Application

**About the Birds Mobile Application**

'Birds' is a mindful timer digital app, which allows users to set screen timers and be gently alerted to set time limits of their digital sessions by the hand-drawn images of birds.

**How the application works**

This illustrates how the 'Birds' timer works. The images of birds alert the user to remaining time online.

1. 1st timer gently reminds you about remaining time.
2. 2nd timer gently reminds you about remaining time.
3. 3rd timer gently reminds you about remaining time.
4. After the 4th timer, the device shuts down.

**How to set the app on your device**

1. Download the App on the App Store and install it on your device.
2. Tap on the app to launch it.
3. Then tap on the launch app home screen.
4. It will take you to the About the app stage. Press Exit to leave the app or Next to continue.

**How to set timers**

Users can set up to 4 timers for their session to track and set intentional screen time use.

1. After you launch the app and skip the about the app step, you end up at Birds Timer Settings.
2. Set your timers by tapping on the set timer timing areas.
3. Tap Save to save your timer settings.
4. Tap Exit to leave the app, when you are finished with your task.

**How to switch timers off**

1. Enter the app on your device and tap on Bird Timer Settings.
2. Tap on the OFF element. This will switch your timer off.

**How to switch timer back on**

1. Enter the app on your device and tap on Bird Timer Settings.
2. Tap on the ON element. This will switch the timer back on.

# APPENDIX D: SHAPIE USER MANUAL TEXT

**Cover:** User Manual for Shapie, a touch-rich device

**About Shapie**

Shapie is a touch-rich portable communication device that comes with the elastic properties and abilities to change shape.

**Shapie Properties**

Shapie has six properties that makes it stand out from other communication devices.

Cardboard-thin property: Shapie has a thin body.
Stickiness property: Shapie can stick and unstick from surfaces.
Softening and hardening properties: Shapie can become soft and hard again.
Bending property: Shapie can be bent, change shape and return to its original shape.
Folding property: Shapie can be folded and unfolded, when needed.

**Shapie: Cardboard-Thin Property**

Shapie is easy to carry and store when on the go: Shapie, wallet and keys. It is also quite a thin device compared to other phones.

**Shapie: Stickiness Property**

If you tap the device in a wavy motion on the left, Shapie will become sticky and will stick to the surface. If you tap the device in a wavy motion on the right, Shapie will unstick and become its original shape. For example, you can stick and unstick Shapie onto the wall and also use it as a wall clock.

**Shapie: Softening and Hardening Properties**

If you drag your finger in a circular motion on the surface, the device will become soft and roll up. If you double tap on a rolled device, Shapie will roll back into its original shape and become hard. You can roll it when you don't need to use it and for easier storage.

**Shapie: Bending Property**

If you drag your finger in a straight line to the right and stop halfway, the device will bend 90 degrees. If you drag your finger from the fold to the left, the device will return to its original shape. You can use the folded Shapie as a photo frame or for other uses.

**Shapie: Folding Property**

If you swipe in a tick shape on Shapie's surface, the device will bend in that place. If you swipe the tick shape backwards, Shapie will return to its original shape. You can use it as a standing phone and place it on your furniture or use it as a bracelet-phone and wear it on your wrist.

## APPENDIX E: FREELANCE CONTRACT FOR WRITTEN DESIGN FICTION NARRATIVES

CLIENT NAME: JOSKAUDĖ PAKALKAITĖ FREELANCE CONTRACTOR: GEORGE FORSTER

Note: From now on, Joskaudė Pakalkaitė will be referred to as The Client and George Forster as Freelance Contractor in this contract.

Freelance Contractor gives consent to the Client to use the narratives and illustrate them in her PhD project called 'Development of noise- free digital interfaces' that he creates specifically for this project.

Also, Freelance Contractor gives consent to the Client to publish the narratives and the illustrations / any creative content created from his written work in any academic publications, her thesis and online/social media/websites/ presentations, conferences, and lectures.

Freelance Contractor understands that he will be credited as a narrative writer in the Client's final thesis and any publications for his commissioned narratives.

The Client gives consent to Freelance Contractor to use the work/publish the work for his portfolio/for promotional uses that either benefits her project or does not negatively reflect on the project. The Freelance Contractor must credit The Client as the illustrator/creator of the illustrations.

However, Freelance Contractor understands that the illustrations and any creative content created by the Client will become her own Intellectual Property and cannot be used without her consent.

Freelance Contractor understands that he cannot withdrew his consent and written work that he produced for this project from any of the Client's publications such as portfolios, websites, journals thesis and online sources, because this is a commission, and he will be paid for the work that he produces for the Client.

Freelance Contractor will be paid a one-off fee of £200 for all the written work that he produces for this project upon completion.

Freelance Contractor agrees that he will be working according to the brief and deadlines and will make amendments, when requested.

The Client agrees to set reasonable deadlines and requests and pay for the services upon completion. The deadlines, edits and written work will be liaised between the Client and The Freelancer Contractor.

Client Name: Joskaudė Pakalkaitė Client Signature: J. Pakalka Contract date: 1st Feb 2021

Freelance Contractor Name: George Forster Freelance Contractor signature:

Contract date: 15th Feb 2021

# APPENDIX F: BRIEF FOR THE WRITER

## DESIGN FICTION BRIEF FOR YOSHI PHONE, BIRDS AND SHAPIE

The writer needs to create a set of narratives for the speculative products *Yoshi Phone*, *Birds* and *Shapie*. Yoshi Phone is a first feature phone that has a hand drawn interface. It was designed in response to smartphone overuse and to promote digital wellbeing. *Birds* is a mindful timer digital app, which allows users to set screen timers and to be gently alerted to set time limits of their digital sessions by the hand-drawn images of birds. *Shapie* is a touch-rich portable communication device that comes with elastic properties and the ability to change shape.

In this project, design fiction is used to explore and criticise possible futures by creating speculative, provocative scenarios narrated through a designed artefact. In this case, the designed artefacts are Yoshi Phone, *Birds* and *Shapie*. Also, the design fiction narratives will be used to explore and address any possible negative impact of the phone on the consumers.

I need:

• Slogans. This will be used to promote *Yoshi Phone*, *Birds* and *Shapie*. The slogans will be illustrated as fictional promotional postcards/brochures.

• Text for Digital Campaign ad/website, which could be adapted for the printed brochure.

• Text for the storyboard, which could be made into a comic/graphic novel. The storyboard would be used to explore the everyday use of the device.

Examples of work to look at to get a feeling for the style I am looking for:

• Light Phone: https://www.thelightphone.com, https://www.youtube.com/watch?v=o-jamNT9CkY

• Google Digital Well-being: https://www.youtube.com/watch?v=rt5LY5TeTVQ

• Charlie Brooker's Black Mirror at Netflix

• Introducing David 8: https://www.youtube.com/watch?v=qgJs7uluwlU

• Mudita Pure: https://mudita.com/

• PUNKT Phone: https://www.youtube.com/watch?v=fWRBtzGO0VA

• Design Fictions: https://www.postscapes.com/internet-of-things-award/design-fiction/

## APPENDIX G: YOSHI PHONE ORIGINAL SUBMISSION BY GEORGE FORSTER

# NARRATIVES

## NARRATIVE ONE: "*THE SQUARE MAN*"

**Concept:** The routines and aesthetics of conventional smartphones have encroached into our lives and regimented every waking moment into strict formulae. This is exemplified by a cartoon mad, formed of rigid squares and rectangles – he lives a very precise, outwardly unproblematic life, yet it is exceedingly restrictive and dull. The Yoshi Phone is an antidote to this monotony, with its flowing aesthetic and stripped-down, relaxed utility encouraging the square man the live life however he wishes to.

## NARRATIVE ONE, BEAT BY BEAT

1. A cartoon person with **square features** (head, arms, torso etc) wakes to a shrill alarm from their similarly **angular generic smartphone**. The screen reads **'6:00 WAKE UP'.** The bed is neatly made with covers pressed tight into the edges of the bedframe, leaving little room to breathe.
2. **The alarm continues to blare out: '6:05 BRUSH TEETH' as the figure squeezes a precise, rectangular spot of toothpaste onto his brush and scrubs his teeth vigorously, foaming at the mouth but with a blank expression, except for a twitch in his eye.**
3. **'6:20 BREAKFAST.'** They take a bite from a very square piece of toast. The kitchen is filled with other angled appliances. **A picture of a bicycle is stuck to the fridge.** They are becoming more **agitated** in their expression.
4. **'6:45 DRIVE TO WORK.' They drive in a cramped, boxy car. They sit in traffic as a cyclist overtakes them. They are now rather angry.**
5. Now at work, mindlessly typing on a computer, they **look out from their office block window** onto a park where **people picnic and ride bikes.** There is a look of longing.
6. **This is interrupted by his phone blaring another alarm: '13:00 EAT LUNCH.' They grow agitated, their eye twitching and face turning red. They slam their fist into the phone, shattering it into a million pieces. When they raise their fist, something unusual is left behind – the Yoshi Phone – sleek and curved, with natural tones and a comforting tune emanating from its speakers. On the screen reads a message in an almost handwritten font: "take some *you* time". They smile to themselves.**
7. **The next we see them, they are enjoying a pleasant bike ride through the park, listening to something on their Yoshi Phone. TEXT: Yoshi Phone. Break the Mould.**

## NARRATIVE TWO: "*SEE THE WORLD AGAIN*"

**Concept:** We have become buried in our devices due to the plethora of entertainment and social applications available. Whilst there are benefits to this, it has come at a cost: we no

longer see the real world – only that which is displayed on our screens. We follow a character absorbed in their phone, the world around them is barely visible as the only source of light is the screen which illuminates their face, leaving everything else in the shadows.

### NARRATIVE TWO, BEAT BY BEAT

1. **A young girl walks through a pitch-black void; only her face is visible, illuminated by her phone screen. She looks bored.**
2. Other **illuminated faces glide by** in the void, also bored. Nobody notices each other.
3. **Close.** The girl **walks straight into something** in the darkness, sending her falling to the floor. In the residual light of her phone screen the object appears mangled, twisting and monstrous.
4. **Her phone screen is cracked, beginning to flicker. The crack grows until the whole phone shatters.**
5. As the phone shatters and the light dies, the **real world** around her **comes into view.** She is sat **beneath a tree**, once twisted and terrifying; now revealed to be beautiful and natural. The **street** around her is **dotted with friendly cafes, greengrocers etc.**
6. **She looks back to her phone, expecting a handful of shards. Instead she is holding the Yoshi Phone. She smiles, stands up, pockets the phone and walks down the street admiring her surroundings. TEXT: Yoshi Phone. Break the Mould.**

# AD COPY

This Ad copy is designed to be able to be modular. Segments of the main text body (i.e. the website text) can be taken and repurposed for shorter advertisements in other formats. For example, the website text contains paragraphs on the hand drawn design, the offline function and the focus on mindfulness, however this would be a lot to cram into a single ad, so each advert would highlight one specific feature.

### RADIO:

I enjoyed the longer radio ad Kitto wrote. It was funny and engaging and it really covered all the bases. I think it would pair well with a series of shorter adverts, similar in length to YouTube ads: 5-10 seconds. Each ad should be catchy and to the point, preferably with a tagline. Here are some examples:

**Hand Drawn Aesthetic**

- "With a fully customisable hand-drawn interface, break the mould with the all new Yoshi Phone... *Yoshi Phone: A phone, without the fuss*." ~ 7/8 seconds

- "With new hand-drawn designs added monthly, break the mould with the all new Yoshi Phone... *Yoshi Phone: A phone, without the fuss."* ~ 7 seconds

**Offline/Screen Time Functions**

- "Take some you time with the all new Yoshi Phone, with regular wellness tips and custom screen time caps. *Yoshi Phone: A phone, without the fuss."* ~ 8 seconds

- “Rediscover the world with the Yoshi Phone offline mode. Work, play and relax without the distractions. *Yoshi Phone: A phone, without the fuss.”* ~ 8 seconds

## PRINT/WEBSITE:

The Yoshi Phone is an all new smartphone designed to reduce stress and promote wellbeing. It fills the requirements of your typical device whilst eliminating the harmful and expensive distractions, allowing you to be your best self.

From designer Joskaudé Pakalkaité comes an all new smartphone experience. With a curved, flowing design and an all hand-drawn interface the Yoshi phone calms the user, encouraging a more relaxed approach to life. The Yoshi Phone gives users the option to modify their experience, choosing between design layouts, icons and colour schemes, with new interface styles added regularly, hand-drawn by independent artists.

The Yoshi Phone takes a back-to-basics approach to its usage. It is not a £1000 camera, it is not a deep-sea waterproof watch, it is not a games console. It is a phone. It has everything you need, without the distractions and expensive add-ons of your typical smartphone. It is internet capable, you can shop, listen to podcasts, access online banking, email and, of course, make phone calls and texts. Gone however are irritating alarms, harmful social media and unnecessary, costly apps.

Quite simply, it’s a phone, without the fuss.

# APPENDIX H: YOSHI PHONE FINAL NARRATIVES BY GEORGE FORSTER

## YOSHI PHONE NARRATIVE

**Concept:** We have become buried in our devices due to the plethora of entertainment and social applications available. Whilst there are benefits to this, it has come at a cost: we no longer see the real world – only that which is displayed on our screens. We follow a character absorbed in their phone, the world around them is barely visible as the only source of light is the screen which illuminates their face, leaving everything else in the shadows.

## NARRATIVE, BEAT BY BEAT

1. **A young girl walks through a pitch-black void; only her face is visible, illuminated by her phone screen. She looks bored.**
2. Other **illuminated faces glide by** in the void, also bored. Nobody notices each other.
3. **Close.** The girl **walks straight into something** in the darkness, sending her falling to the floor. In the residual light of her phone screen the object appears mangled, twisting, and monstrous.
4. **Her phone screen is cracked, beginning to flicker. The crack grows until the whole phone shatters.**
5. As the phone shatters and the light dies, the **real world** around her **comes into view.** She is sat **beneath a tree**, once twisted and terrifying; now revealed to be beautiful and natural. The **street** around her is **dotted with friendly cafes, greengrocers etc.**
6. **She looks back to her phone, expecting a handful of shards. Instead, she is holding the Yoshi Phone. She smiles, stands up, pockets the phone, and walks down the street admiring her surroundings. TEXT: Yoshi Phone. Break the Mould.**

## AD COPY

This Ad copy is designed to be able to be modular. Segments of the main text body (i.e., the website text) can be taken and repurposed for shorter advertisements in other formats. For example, the website text contains paragraphs on the hand drawn design, the offline function, and the focus on mindfulness, however this would be a lot to cram into a single ad, so each advert would highlight one specific feature.

### Hand Drawn Aesthetic and Offline/Screen Time Functions

1. "With a fully customisable hand-drawn interface, break the mould with the all-new Yoshi Phone... *Yoshi Phone: A phone, without the fuss.*"
2. "With new hand-drawn designs added monthly, break the mould with the all-new Yoshi Phone... *Yoshi Phone: A phone, without the fuss."*
3. "Take some you time with the all-new Yoshi Phone, with regular wellness tips and custom screen time caps. *Yoshi Phone: A phone, without the fuss."*
4. "Rediscover the world with the Yoshi Phone offline mode. Work, play and relax without the distractions. *Yoshi Phone: A phone, without the fuss."*

**Slogan**

*Yoshi Phone: A phone, without the fuss. Yoshi Phone. Break the Mould.*

**PRINT/WEBSITE:**

The Yoshi Phone is an all-new smartphone designed to reduce stress and promote wellbeing. It fills the requirements of your typical device whilst eliminating the harmful and expensive distractions, allowing you to be your best self.

From designer Joskaudė Pakalkaitė comes an all-new smartphone experience. With a curved, flowing design and an all hand-drawn interface the Yoshi phone calms the user, encouraging a more relaxed approach to life. The Yoshi Phone gives users the option to modify their experience, choosing between design layouts, icons, and colour schemes, with new interface styles added regularly, hand-drawn by independent artists.

The Yoshi Phone takes a back-to-basics approach to its usage. It is not a £1000 camera, it is not a deep-sea waterproof watch, it is not a games console. It is a phone. It has everything you need, without the distractions and expensive add-ons of your typical smartphone. It is internet capable, you can shop, listen to podcasts, access online banking, email and, of course, make phone calls and texts. Gone however are irritating alarms, harmful social media, and unnecessary, costly apps.

Quite simply, it's a phone, without the fuss.

# APPENDIX I: BIRDS APP NARRATIVES BY GEORGE FORSTER

**'BIRDS' APP Narratives & Copywriting**

**Outline**

I wanted to focus on the freeing grace of birds contrasted with the absorbing, oppressive nature of mindless digital scrolling. I was inspired by videos of starling murmuration (I'll attach some reference footage) and their hypnotic formation flying. I think playing on this enchanting quality will be an effective visual shorthand to use in the positive for the narrative.

**Narrative**

- A person is sitting on the sofa in their apartment, buried in their phone, scrolling with a mindless expression.
- The room is dark – it is early evening, and the curtains are halfway-closed, the natural light coming through is drowned out by the light from the television which is going unwatched.
- The person's eyes are locked to the phone screen when there is a flutter of wings outside the window and the glimpse of a starling passing by. The person notices but does not get up.
- Again, another bird flies past. This time, the person gets up with a huff and goes to close the curtain fully, still looking at the phone.
- When their hand grasps the curtain, a third starling passes the window, this time really catching the person's attention.
- Curiously, they open the curtain fully and they see hundreds of starlings flying in beautiful formation.
- They smile, opening the window and taking a deep breath of the fresh air. They switch off their phone and admire the birds.
- The slogan appears: *"Birds...Don't get carried away."*

**Slogan**

***"Don't get carried away"***

This slogan is a reference to the functionality of the app (I.e., Not letting you get carried away with screen-time). The tone is friendly, conversational, and memorable. By being so closely linked to Birds' functionality, I believe the slogan will be easily attributable to the project and thus the app itself will be better received.

**Web Copy**

*Birds* is a brand-new mindfulness app from Joskaudė Pakalkaitė, designed to help users reduce mindless interactions.

We all know how easy it is to get carried away on our devices. What we intend to be a quick 10-minute break to browse social media soon becomes an hour of mindless scrolling. It's difficult to keep track of time when we are preoccupied.

Setting timers manually whenever you use your phone is unrealistic, and besides, when your screen-time is rudely interrupted by a blaring alarm, it's easy enough to simply hit snooze and carry on.

With *Birds*, users can program their own screen-time limits both for individual websites such as Twitter and YouTube, and for general phone usage, which remain in place for all future sessions without having to set anything up after the initial install.

*Birds* works by gently reminding users of their screen-time limits with a series of calming and natural animations of birds flying across the screen. This happens in up to four stages, starting with one bird and finishing with a whole flock flying across the screen.

When the timer has elapsed, either the specific app or website is locked for a pre-determined length of time, or the device itself is locked (phone calls and EMS features remain unaffected) to physically restrict users from ignoring their time limits.

# APPENDIX J: SHAPIE NARRATIVES BY GEORGE FORSTER

## 'SHAPIE' TACTILE DEVICE Narratives & Copywriting

### Outline

I focused on the themes of flexibility, plasticity, and adaptability to promote Shapie's tactile benefits. I wanted to treat the device as a kind of Swiss-army-knife: able to adapt and change to best fit each scenario. The narrative is set over several very short scenes rather than being one condensed story like the other narratives I have written as I felt this method would best display the device's adaptability.

### Narrative

- A person is texting in the rain, getting water on their screen. Part of the Shapie folds over the screen to create a little umbrella.
- A person drops the Shapie, and it looks like it will fall down a drain. Suddenly, the Shapie extends its shape outward, making it too big to fit through the drain cover.
- A person is sending a message. Someone next to them is being nosy and trying to read what they are writing. The Shapie puts up a flap to stop them seeing what is being written. The Shapie user gives the nosy person a disapproving glare.
- A person goes to put the Shapie in their pocket, but their trousers don't have any. They mould the Shapie over their wrist and wear it like a watch.
- A person puts the Shapie on top of their car roof as they put shopping bags away. They forget to remove it and they drive away. The Shapie's tactile, grippy coating makes sure the device sticks to the car roof until they are home.
- A person is trying to watch something on the Shapie, but it falls over. They mould its base into a stand, and it remains sturdy.
- The slogan appears: *"Shapie: feel technology like never before."*

### Slogans

***"Shapie: feel technology like never before"***

This slogan highlights the *Shapie's* tactile qualities and emphasises the fact that such a device is a new development.

### Web Copy

*Shapie* is an all-new handheld device from Joskaudė Pakalkaitė, designed to be fully flexible and adaptable for the challenges of everyday life.

Its touch-rich design and mouldable construction make *Shapie* the most ergonomic device on the market, with numerous benefits in both usability and functionality.

*Shapie* has a sleek design and is pleasing to the touch. It is designed to be part device, part sensory experience, and so users will enjoy its tactile nature and calming feel.

*Shapie* has two modes: hard, and soft.

In hard mode, *Shapie* acts as any other handheld device. It has a strong, rigid structure and is extremely thin so pocket space will not be an issue. It also has a tacky coating which can adhere to any dry surface, even on a steep incline.

In soft mode *Shapie* becomes mouldable, able to be rolled up like a newspaper, folded like a box, formed into its own stand, and even worn like a watch! It is in soft mode where *Shapie* shines, as it is unlike any other device on the market.

**APPENDIX K: ETHICS APPROVAL FORM FOR PHASE 2**

# Post-Registration Research Ethics Approval Form

## Guidance:

- **Please ensure that you have read the '*UAL Guidance for Research Ethics Approval*' and '*UAL Code of Practice on Research Ethics*' before completing this form**. All supporting documentation on research ethics can be found in the forms section of the Learning Space.
- Please complete this form electronically
- **Section A and Appendix 1** (if applicable) are to be completed by the student and supervisors
- **Section B** is for UAL Committee use only
- Once Section A (and Appendix 1 if necessary) has been completed, including all necessary signatures, the form should be submitted to research@falmouth.ac.uk by the student
- Incomplete forms, including any that are missing signatures, will be returned to the student for completion

## SECTION A — TO BE COMPLETED BY THE STUDENT

| | |
|---|---|
| **Name:** | **Joskaudė Pakalkaitė** |
| **College:** | **School of Communication/ School of Entrepreneurship** |

**1. Please provide a 100-word summary of your proposed research.** Explain in terms appropriate to a layperson.

In PHASE 1: PRACTICE, I have generated ideas using 'What if scenario', developed diegetic prototypes, planned narratives and storyboarding. Currently, I am developing design fictions in various medias, which will be distributed to the audiences.

In PHASE 2, I plan to design a questionnaire, which then will be distributed to industry professionals to gain feedback about my work. I will then collect the data to analyse.

**2. Does your research involve participants**

| | |
|---|---|
| | No* |
| **X** | Yes * Please note that PHASE 1: PRACTICE does not involve participants and it was approved by the Research Ethics Committee. PHASE 2 involves participants. |

***If you answer 'No', you do not need to complete Questions 3 to 12, instead please go to Question 13 and continue from there.**

| **3. Who will the participants be? Please tick as appropriate.** | |
|---|---|
| | Students at the University |
| | Staff at the University |
| **X** | Other* |

***If you answered 'Other' please specify below**

Participants will be software engineers, UI and UX designers, software developers and consumers, who are interested in alternative tech tools. The demographic of potential participants is over 18s and not in vulnerable groups. Participants will be asked to declare on the consent form that they are over 18 and not a vulnerable adult. Section 59 from the Safeguarding Vulnerable Groups Act 2006 will be attached to the consent form in order for participants to check whether they are vulnerable adults or not.

**4. How will participants be recruited and how many will be involved?**

I have been networking face to face at conferences and online using social media platforms. I will try to recruit as many participants as possible, but I hope that at least 20 participants will take part. The age and vulnerable status of participants will be confirmed at the consent form stage, and any under 18s or vulnerable adults will not further take part in the study.

**5. What will participants be asked to do?** Explain in terms appropriate to a layperson.

Participants will:

- read the participant information sheet and sign the consent forms.
- complete an online survey, where they will be asked to provide answers and feedback on my work.

They will need to participate once, and it should take 15-20 minutes.

**6. What potential risks to the interests of participants do you foresee and what steps will you take to minimise those risks?** A participant's interests include their physical and psychological well-being, their commercial interests; and their rights of privacy and reputation.

No discomforts, disadvantages and risks to participants are foreseen, because personal information will be anonymised and kept confidential.

To ensure this is the case, the following measures will be taken:

1. Paper documents with personal information provided will be stored securely in a locked file cabinet when not in use.

2. All data will be digitised by the researcher and transferred onto the University Microsoft OneDrive storage. University Microsoft OneDrive storage will be password protected.
3. The data will be accessed by the researcher only.
4. Data will be conscientiously destroyed one year after the completion of the project, following the necessary period of use. This includes the shredding of all paper documents and permanent deletion of digital files.

The results of this study will be used in the final draft of my PhD thesis. Also, the results might be published. If so, I will contact the research participants with the details of where they can obtain a copy of the published results. The research participants will not be identified in any report or publication.

**7. What potential risks do you foresee to yourself as the researcher and what steps will you take to minimise those risks?** E.g. does your research raise issues of personal safety for you or others involved in the project, especially if taking place outside working hours or off University premises.

There are no foreseen risks to myself, as I will not have direct contact with the participants, because the survey will be online.

**8. Please attach a copy of proposed written consent form and information sheet to be given to participants. If you are not obtaining written consent or supplying an information sheet, please explain the reasons for this.**

See attached copies of proposed written consent form and information sheet.

| | |
|---|---|
| **X** | Please tick here if the written consent form and information sheet are attached |

**9. Does your project involve children or vulnerable adults?** E.g. a person with a learning disability.

| | |
|---|---|
| **X** | No. Go to Question 10 |
| | Yes***** |

***If you answer 'Yes', you must refer to Section 4 in the '*Guidance for Research Ethics Approval*' <u>AND</u> obtain a Disclosure and Barring Service (DBS) check (formerly known as a CRB check).**

| | |
|---|---|
| | I confirm that I have obtained a DBS check |

| **10. Does your research concern groups which may be construed as terrorist or extremist?** | |
|---|---|
| **X** | No. Go to Question 11 |
| | Yes* |
| ***If you answer 'Yes', you must refer to Section 5.5 in the '*Guidance for Research Ethics Approval*' AND complete the questionnaire at Appendix 1 of this form.** | |

## Please Note:

It is a presumption of academic research that, wherever possible and feasible, the information on which the research is based should be preserved, so that it can be made available to future researchers. However, the privacy of participants must be respected. Please refer to the guidance note on data protection before answering Question 11.

| **11. Will you be obtaining personal information from any of the participants?** E.g. name, personal opinions, address, recorded images or audio, date of birth, notes and observations. | |
|---|---|
| | No. Go to Question 12 |
| **X** | Yes* |
| ***If you answer 'Yes', please give details. In your response, please consider:** How will you store and use this information during the course of your research? What parts of this information will need to be confidential and how? Will you exhibit or publish the information? Will you retain information after the research is concluded? If information is to be destroyed, explain why this is appropriate. | |
| Personal information will be anonymised and kept confidential. Firstly, paper documents with personal information provided will be stored securely in a locked file cabinet when not in use. Secondly, data will be digitised by the researcher and transferred onto The University Microsoft OneDrive storage. The University Microsoft OneDrive storage will be password protected by the researcher. The data will be accessed by the researcher only. I intend to keep personal information for one year only after completion of the study. The paper copies will be shredded, and the electronic files will be permanently deleted. | |

| **12. Will payments to participants be made?** | |
|---|---|
| **X** | No. Go to Question 13 |
| | Yes* |
| ***If you answer 'Yes', please state amount and whether payment is for out-of-pocket expenses or a fee.** | |
| | |

| **13. If the project is to receive financial support from outside the University, please give details. Include any restrictions that have been imposed upon the conduct of the research. Please discuss this with your Director of Studies. Both financial propriety and the protection of commercial rights are important for you, the University and other third parties (e.g. sponsors, participants etc.)** |
|---|
| **The project is not to receive any financial support from outside the University, so not applicable.** |

| **14. Will any restrictions be placed on the publication of results?** | |
|---|---|
| **X** | No. Go to Question 15 |
| | Yes***** |
| ***If you answer 'Yes', please state the nature of the restrictions, e.g. details of any confidentiality agreement.** | |
| | |

| **15. Have you attached a detailed outline of the research project to this form?** | |
|---|---|
| **X** | Yes, the detailed outline is attached |
| | No |

## Student Declaration:

**16. I confirm my responsibility to deliver the project in accordance with the Code of Practice on Research Ethics of the University of the Arts London (the University). In signing this form I am also confirming that:**

**a)** The form is accurate to the best of my knowledge and belief.

**b)** There is no potential material interest that may, or may appear to, impair the independence and objectivity of researchers conducting this project.

**c)** I undertake to conduct the project as set out in the application unless deviation is agreed by the University and to comply with any conditions set out in the letter sent by the relevant College Research body and/or the University's Research Ethics Sub-Committee.

**d)** I understand and accept that the ethical propriety of this project may be monitored by the relevant College Research body and/or the University's Research Ethics Sub-Committee.

| | |
|---|---|
| **Signature of Student:** |  |
| **Date** *(dd/mm/yyyy):* | 19/04/2021 |

## Director of Studies Declaration:

**17. I support this project and have reviewed it with the applicant.**

| | |
|---|---|
| **Name:** | Danielle Barrios-O'Neill |
| **Signature of Director of Studies:** |  |
| **Date** *(dd/mm/yyyy):* | 19/04/2021 |

## APPENDIX L: ETHICAL APPROVAL FOR PHASE 2

FALMOUTH
UNIVERSITY

**PRIVATE AND CONFIDENTIAL**

Extract from the minutes of Falmouth Research Degrees Committee on 5 May 2021 for the POST-REGISTRATION ETHICS APPLICATION for JOSKAUDE PAKALKAITE

**16 Post-registration Research Ethics Applications** (DP) ☒

16.2 PAKALKAITE, J (v2) [RDC/21/41]

**Development of noise-free digital interfaces to benefit large information technology companies.**

16.2.1 Received**:** Joskaude Pakalkaite's revised post-registration ethics application, responding to feedback given at the last RDC meeting.

16.2.2 Noted**:** This is a very well-constructed and intelligently articulated research investigation taking shape and the revisions represent a considered and relevant set of adjustments in response to the ethics reviewers. The candidate has responded thoughtfully to the observations and recommendations notably adding further detail to methodology as requested; providing indicative questions for the online survey, clarifying platforms and tools used to collect data, unpacking references to data collection/feedback and discarded the 'observation'. In the outline of the project the candidate has provided more detail on recruitment methods and reassurance of the demographic, including the declaration of being over 18 and not a vulnerable adult. The candidate has reconsidered the USB storage for data and decided to use University OneDrive storage as advised. Moreover, any future queries will now be firstly channelled through the Falmouth Research Office and finally a re-evaluation of data destruction timing has also been factored into the research activities. With these adjustments in mind, the review should be approved as minimal risk in terms of ethics criteria that need to be fulfilled.

16.2.3 Agreed: that the application constituted minimal risk and was approved.

16.2.4 Action**:** RDSO to feedback to Joskaude Pakalkaite the outcome of the ethics application.

# APPENDIX M: PARTICIPATION INFORMATION SHEET

Participant Information Sheet: Participant's COPY

**Development of noise-free digital interfaces to benefit large information technology companies**

*You are being invited to take part in a research project.*

*Before you decide to participate it is important for you to understand why the research is being done and what participation will involve. Please take time to read the following information carefully and discuss it with others if you wish.*

*Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part.*

*Thank you for reading this.*

**The background, aims and objectives and duration of the project**

This research aims to:

- Better understand the effects and challenges associated with noisy digital experiences, where a high volume of information is always arriving via devices.
- How this affects or drives behaviours such as screen time overuse, misuse of colours and shapes, touch-poor and mindless interactions.
- Propose solutions enabling healthier relationships with hardware and software interfaces.

This doctoral project is a part of my PhD studies, which I enrolled on in September 2018. My funding is until 31st December 2021, so I plan to complete the project for this date. However, my maximum submission date is 1st January 2023.

**Why have you been chosen?**

There is only one inclusion criteria for this study: software engineers, UI and UX designers and software developers. You were chosen because you fall into this category. Data is unavailable of how many other participants will be recruited to this study.

**Do you have to take part?**

It is up to you to decide whether to take part. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. You can withdraw at any time without giving a reason.

**What will happen if you take part?**

My project will last 3 years in total, and you will be involved in the third year of my research. You will need to participate once, and this should take 15-20 minutes.

**What do you have to do?**

Firstly, you will need to read the participant information sheet and sign the consent forms. Secondly, you will have to complete an online survey, where you will be asked to provide answers and feedback on my work.

**Possible disadvantages and risks of taking part**

No discomforts, disadvantages and risks to participants are foreseen, because your personal information will be anonymised and kept confidential. Firstly, the paper documents with personal information that you provide will be stored securely in a locked file cabinet when not in use. Secondly, the data will be digitised by the researcher and transferred onto University Microsoft OneDrive storage. The University Microsoft OneDrive storage will be password protected. The data will be accessed by the researcher only. I intend to keep your personal information for one year after completion of the study. The paper copies will be shredded, and the electronic files will be permanently deleted after this time.

**Possible benefits of taking part**

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will provide alternative solutions to the current issues and challenges related to UI and UX design. This project aims to raise awareness and spark debate between industry professionals and provide healthier choices of IT products and tools for the consumers.

**What if something goes wrong?**

If you have any complaints, please let the Doctoral Researcher and Falmouth Research Office know ASAP (please see the 'contact for further information' section for contact details). We will listen to your concerns. If there are any problems, we are sure that we can find a solution. However, if you

should feel that your complaint has not been handled to your satisfaction, you can contact the Chairs of the Falmouth Research Ethics Committee and/or UCL Research Ethics Committee.

**Will your taking part in this project be kept confidential?**

All the information that we collect about you during the research will be kept strictly confidential. You will not be able to be identified in any ensuing reports or publications.

**Results of the research project.**

The results will be used in the final draft of my PhD thesis. Also, the results might be published. If so, I will contact you with the details of where you can obtain a copy of the published results. You will not be identified in any report or publication.

**Organising and funding the research**

This research was enabled by the Falmouth Doctoral Studentship from Falmouth University.

**Contact for further information**

If there are any problems or questions, you can contact Doctoral Researcher Joskaudė Pakalkaitė by email, phone, or post.

Falmouth University, The Academy of Innovation & Research (AIR), Penryn Campus, Treliever Road, Penryn, Cornwall TR10 9FE.
07539287525, jp223694@falmouth.ac.uk joskaude@gmail.com

If there any queries or complaints, you can contact Falmouth Research Office by email, phone or post.

Research & Development Office

Falmouth University, AIR Building, Penryn Campus, Penryn, Cornwall, TR10 9FE

01326 259247, research@falmouth.ac.uk

You will be given a copy of the information sheet and a signed consent form to keep. Thank you so much for taking part in the project.

## APPENDIX N: CONSENT FORM – PARTICIPANT'S COPY

**CONSENT FORM: Participant's Copy**

I understand I have been invited to participate in the study *Development of noise-free digital interfaces to benefit large information technology companies* and I have a copy of the participation information sheet to keep.

I have had the chance to talk to Joskaudė Pakalkaitė and ask her questions about the study.

I know that the research is questionnaire based and I know how long it will take.

I understand that any personal information I give is strictly anonymised and confidential.

I understand that my personal information will not be stored on a computer, but on the researcher's institutional OneDrive account, with all paper copies stored in a locked safe.

I freely consent to complete the questionnaire.

I freely consent to the questionnaire being used for academic research. I understand that any extract used in academic publication will be anonymised.

I declare that I am over 18 and not a vulnerable adult according to the Safeguarding Vulnerable Groups Act 2006, Section 59 (https://www.legislation.gov.uk/ukpga/2006/47/section/59/enacted).

I know that if there are any problems or questions, I can contact Joskaudė Pakalkaitė (email: jp223694@falmouth.ac.uk and/or joskaude@gmail.com).

Research & Development Office

Falmouth University, AIR Building, Penryn Campus, Penryn, Cornwall, TR10 9FE

01326 259247, research@falmouth.ac.uk

**Please complete this consent form.**

1. Date:
2. Name of the participant:
3. Please select the inappropriate if you want my personal feedback after the research: YES NO
4. Signature:

## APPENDIX O: CONSENT FORM – REVIEWER'S COPY

**CONSENT FORM: Reviewer's Copy**

The following should be signed by the questionnaire reviewer. I confirm that I have explained to the participant named above the nature and purpose of *Development of noise-free digital interfaces to benefit large information technology companies* research to be undertaken. Reviewer's name: Joskaudė Pakalkaitė

1. Name of the participant:
2. Participant's signature
3. Please select the inappropriate if you want my personal feedback after the research: YES NO
4. Date of Consent form signed:
5. Reviewer's name:
6. Reviewer's signature:
7. Review date:

# APPENDIX P: EXPERT REVIEW

**Development of noise free digital interfaces to benefit large information technology companies: expert review online survey.**

You have received the participation sheet and signed the consent forms to participate in the study *Development of noise free digital interfaces to benefit large information technology companies*. It will take you 15-20 minutes to complete this survey.

**ELIGIBILITY**

Please confirm your eligibility to participate in this research. Please note that this part of the survey will be anonymised in any final reports/PhD thesis/publications.

Are you over 18?: Yes No

Are you a vulnerable adult according to the Safeguarding Vulnerable Groups Act 2006, Section 59? (https://www.legislation.gov.uk/ukpga/2006/47/section/59/enacted ): Yes No

Your full name:
Your email:

**FEEDBACK**

Please provide your feedback for the Development of noise free digital interfaces to benefit large information technology companies. Please interact with each prototype and illustrated narratives for each prototype and provide your feedback on each one and their narratives in the boxes below.

**Prototype 1: Yoshi Phone**

*Yoshi Phone* is the first feature phone with a minimalistic hand-drawn user interface, which is gentle on users' attention. You can view the user manual of how Yoshi Phone works and is advertised here: https://www.joskaude.com/my-phd-project-yoshi-phone.

**Feedback**

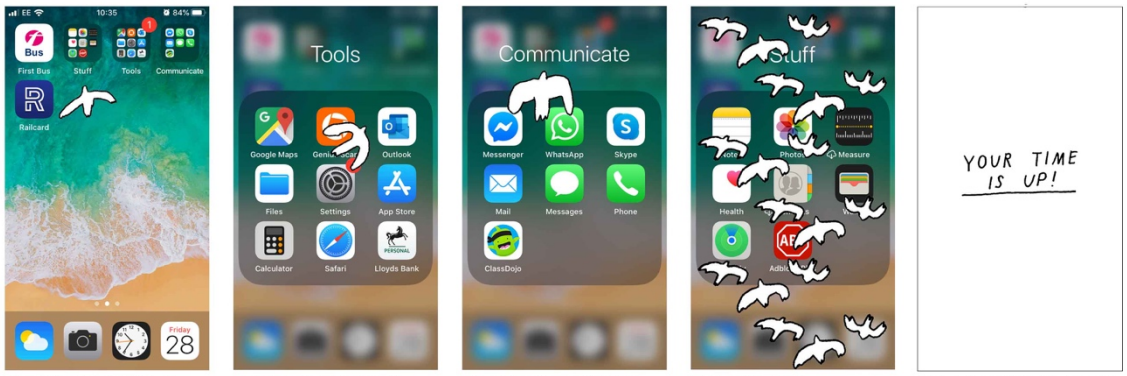
Please comment on the application of hand-drawn interfaces within this prototype, what is successful about this design and address any issues. Please also provide comments on how the use of hand-drawn interfaces could be applied and developed further.

How could Yoshi Phone/hand-drawn interfaces stimulate you and other UI/UX designers, software, and hardware developers to design healthier IT tools?

How could large IT companies/your company potentially monetize and benefit from Yoshi Phone/hand-drawn interfaces?

Any other relevant comments/suggestions/insights:

**Prototype 2: Birds**




First bird timer flies by. Second bird timer appears. Third bird timer flies by. Final timer alert. When session is over, it shut downs.

*Birds* is a mindful timer digital app, which allows users to set screen timers and to be gently alerted to set time limits of their digital sessions by the hand-drawn images of birds. You can view the user manual of how the Birds app works and is advertised here: https://www.joskaude.com/my-phd-project-birds.

**Feedback**

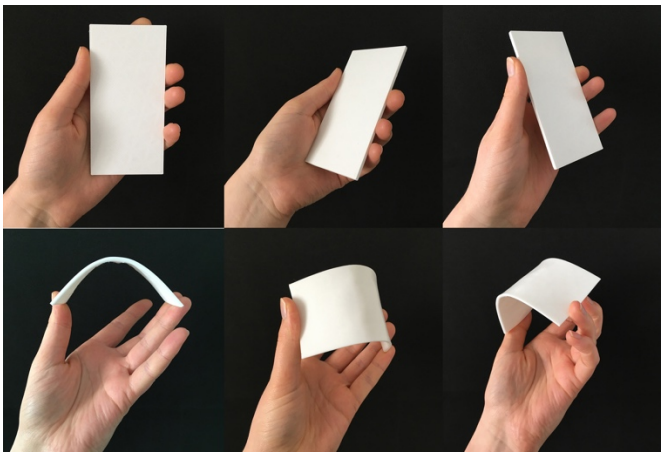
Please comment on the application of mindful interaction within this prototype, what is successful about this design and address any issues. Please also provide comments on how the use of mindful interactions could be applied and developed further.

How could Birds/mindful interactions stimulate you and other UI/UX designers, software, and hardware developers to design healthier IT tools?

How could large IT companies/your company potentially monetize and benefit from Birds/mindful interactions?

Any other relevant comments/suggestions/insights:

**Prototype 3: Shapie**



*Shapie* is a touch-rich portable communication device that comes with elastic properties and the ability to change shape. You can view the user manual of how Shapie works and is advertised here: https://www.joskaude.com/my-phd-project-shapie.

**Feedback**

Please comment on the application of tactile interaction within this prototype, what is successful about this design and address any issues. Please also provide comments on how the use of tactile interactions could be applied and developed further.

How Shapie/tactile interactions could stimulate you and other UI/UX designers, software, and hardware developers to design healthier IT tools?

How could large IT companies/your company potentially monetize and benefit from Shapie/tactile interactions?

Any other relevant comments/suggestions/insights:

**DEMOGRAPHICS: ABOUT YOU**

**Instructions**

Please complete the section about you. Please note that this part of the survey will be anonymised in any final reports/ PhD thesis/publications.

**Where do you work?**

•Work for a large IT company (+250 employees)

•Work for a small/medium IT company (less than +250 employees)

•Freelance

•Other

**Which field do you work in?**

• Applications development

• Web design/development

• Software engineering

• Hardware engineering

• Other

**What is your occupation?**

• UX Designer

• UI Designer

• Software Developer

• Hardware Developer

•Other

**How long have you worked in your current position?**

• less than 1 year

• 1-2 years

• 3-5 years

• 6-10 years

• more than 10 years

**How long have you worked in your field of expertise in total?**

• less than 1 year

• 1-2 years

• 3-5 years

• 6-10 years

• more than 10 years

**What are your academic qualifications?**

• A-levels/High school diploma

• Bachelor's degree

• Master's degree

- PhD degree
- Other

## APPENDIX Q: YOSHI PHONE FEEDBACK TABLE 1

| **Yoshi Phone Feedback Code #1: Prototype** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Unconventional approach** | • I think using handwritten elements in UI/UX could influence the way we interfere with technologies. People are so used to how app and phone design supposed to look like which in a way influences how people use their phones (in an addictive way) so maybe an experimental hand drawn design could shift the mindset of the users and build new habits which are healthier as well.<br>• I find the idea of using hand-drawn interfaces charming and eye-catching as it's very different to any other interfaces I use on my day to day. My preference would be the view with icons, they make the interface more engaging and helps me understand the different modes and the navigation between screens.<br>• This design significantly reduces visual 'noise', preventing information overload. As a result, it shows clear modes depending on the preference. These simplify the phone's functions down to the main categories very useful for home use and away. As a regular user of smart phones, when I am on the go I usually only use maps and ticket, be it at airports or buses. Often times, I am scrambling my folders, downloads, and emails to get my tickets and other important documentation. If this interface simplifies actions such as these (and the equivalent actions for home use, work etc.), and can be developed as such, I would see this as the next evolutionary step in regular smart phone use. |
| **Benefits of a minimal, monochromatic, user-friendly, and customisable UI** | • I love the minimalist approach and removal of distractions that come with modern day smartphones. The monochromatic UI means it can use E ink display, which is easier on the eyes and saves energy. I also like the minimal set-up.<br>• This is a great idea. It makes the user interface much less anxiety inducing and more mindful. The hand drawn aspect makes it more friendly. It removes some of the negative or detrimental aspects of social media and other apps which use anxiety to encourage increased usage.<br>• The hand drawn design features of the UI make the phone feel more friendly. I feel that the design style achieves its goal well however may be polarising; the current phone market allows for heavy customization. I would like to own a devise of this nature, and I particularly like to native 'disconnect' features. |

| **Yoshi Phone Feedback Code #1: Prototype** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| | • The idea is nice. The logic reminds me a bit an android launcher called 'Ratio'. The imperfect lines are a nice humane touch. It would be nice to have to sideload/customise it with your own writing or your own sketched icons<br>• I think the intention of the interface to be gentle on user's attention is successful. Especially in icon free view, the user is compelled to slow down a little and read each menu item. The interface feels like it would be intuitive, with swiping motions that are familiar to smart phone users. The paper-like, hand drawn design is certainly gentle, and although noise (also know as information) is removed/minimal, it doesn't appear to be to the detriment of usability as far as I can tell from the images. The comic narrative provides a nice context for the user need for a less distracting interface.<br>• I liked this interface very much. It felt intuitive to the user although it felt like it skewed more towards business/work use more than leisure. Nothing wrong with that but that was my first impression. |

## APPENDIX R: YOSHI PHONE FEEDBACK TABLE 2

| **Yoshi Phone Feedback Code #2: Potential risks and further considerations** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **More inclusive and human considerations needed** | • The hand drawn element brings an organic feel to the user, one benefit I could imagine this system having is an impact on easily distracted individuals so this particular system could be useful for easy learning, say for those who struggle to stay focused.<br>• I really liked the work; I thought it was intuitive and immediately useable. I would love to see this type of thing being used for certain demographics of people (children, young adults with learning needs and something a bit more mainstream (social media platform type interface?).<br>• I would further explore different personas using the phone in different ways. There's a lot of things people are used to have on their phone (cameras, music, money, sport). Can those things appear in a new way that's useful, graceful, and never distracting?<br>• The way the phone operates, personally, would help those with slow motor skills due to its pared-back approach.<br>• I love the idea of calm and less intrusive technology. One that might be a bit more human (I guess that's the hand drawn part; can there be more? conversational UI?). I think there's quite a bit to research and learn to make it useful and not just simple or basic. Can the phone know you better? |
| **Not a great solution** | • My question is why you are using hand drawn elements for a user interface if your end goal is having a less distracting interactions. For me the most promising strategies to address the issues of distractions, attention, and wellbeing probably would be some sort of spatial computing or any kind of ubiquitous computing when you don't really need to interact with GUI too much.<br>• I suggest seeing other options of how to use fonts, designs etc that already exist but to make UX itself noise-free. |
| **Risks to user cognition** | • The use of hand drawn interface whilst reducing distraction or no one item gaining more attention, could perhaps slow down cognition as I feel perhaps an icon can more quickly be associated with a task |

| Yoshi Phone Feedback Code #2: Potential risks and further considerations | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| | than reading a word. Of course, in practice, this could be completely false!<br>• I would argue that hand-drawn interfaces might be harder to use (legibility mostly) for masses and therefore more cognitively demanding. In a standard GUIs we have defined interface elements that are commonly known for people and given that hand-drawn interfaces are far lower fidelity it would be hard to communicate more advanced functionalities like selecting a thing or navigating between areas, etc. |
| **Hardware, customisation of UI, haptic feedback, sound, font type, and dark mode considerations** | • I feel like certain features could be handled by hardware buttons or gestures (like offline more or 'go back'). I also feel it could do with some customisation for UI (like shortcuts on your home screen). Light phone is a good example for basic UI and good use of hardware buttons – https://www.thelightphone.com/.<br>• Due to the sheer volume of apps on the market and the google play store, I would say that additional tabs/pages may be necessary to further customise/personalise a user's mobile phone, especially in the 'home use' mode. Google install options may need to be updated to fit in with the Yoshi concept. Alternatively, there may need to be another page giving a prompt to add additional apps to each mode. The overall concept should not be compromised by this as it is to significantly reduce noise. I think this should be easily achievable, however.<br>• What interests me with this is that the comic starts with white line on black, then flips. Unless the Yoshi phone is more like a kindle screen, it might be interesting to see a prototype that is white lines on black, to reduce user eye strain? Or at least the option to switch modes.<br>• Dark mode or thicker text could be a good option to have.<br>• Would the phone provide haptic feedback as a way of signifying to the user an interaction has occurred? I'm a fan of the clean minimal noise free approach, would a dark mode be a consideration? Or sound? |

| Yoshi Phone Feedback Code #2: Potential risks and further considerations | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Practical issues of developing hand-drawn interfaces** | • I really like the idea and concept of noise-free digital interfaces but after working in this field nearly 8 years I see some issues with hand drawn interfaces. In the bigger scale, if app would not be a very small project handwritten interfaces don't have common coding language around the world and can face issues with accessibility. That said I don't want to say it can't work, but my suggestion would be to find the concept that uses font's and symbols that work around the world in design and coding language and play on the concept itself how to make it noise-free digital. There is for sure big potential in many ways. Nowadays we all consume too much of data and we really need this, but as I mentioned before for bigger applications handwritten design will be way too hard to implement and manage, especially in the long run. Hard to say, as I mentioned apps have to have similar design and code language to be able to manage them, handwritten design would need a lot of work which will be hard to manage in the future. But not impossible.<br>• Getting back to the hand-drawn interfaces, I'd say that it would be really hard to work with this kind of system on scale since there are no standardized coding frameworks that could support it and there are no defined patterns that we already know in the world of the common GUI world. This is of course a practical problem that is not necessarily important for a speculative project like this. As an interaction designer I can say that it's interesting but it's hard to understand what we are trying to achieve with this. As a product designer, I would be hesitant to consider this kind of framework for the GUI of any application since it's so uncommon and will result in a lot of work and not necessarily better outcomes. |
| **Other considerations** | • I agree with reducing the visual noise by using a black and white interface, but how would this phone solve the problem of the constant notifications and stimulus that come with using a phone?<br>• How could a hand-drawn interface be used in a complex and heavy information- or data-based digital product? Would the lack of colour and other UI elements have an impact on the usability? |

| **Yoshi Phone Feedback Code #2: Potential risks and further considerations** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| | • Could the use of hand-drawn typography have an impact on the legibility and therefore the accessibility of this phone? |

## APPENDIX S: YOSHI PHONE FEEDBACK TABLE 3

| **Yoshi Phone Feedback Code #3: Inspiration to design healthier IT tools** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Question the status quo and raise awareness to make UI and UX more mindful** | • To question status quo.<br>• As a design practitioner, this project is a good reminder to keep the user in mind and at the core of the design decisions we make. Sometimes we can get carried away designing digital products that might solve a specific problem at the expense of creating new and unexpected issues.<br>• To make UI and UX more mindful. To ensure devices are used with intent rather than in a mindless or compulsive way. |
| **Prototype used in a design process to inspire designers and developers to create 'minimum viable interfaces'** | • How much information do we really need to be able to use a new product or service effectively? What information/noise can be stripped out? How can we encourage gentleness in all aspects of human-computer interaction? These are all questions that we currently don't address in our design process, but I believe they are pertinent, and Yoshi Phone could help bring that line of enquiry to the fore.<br>• The hand drawn nature of these designs show that we don't need to invest too much into prototyping new designs and interfaces to help us test possible solutions. Perhaps in line with Arduino and Raspberry Pi this could inspire a physical device that allows designers to easily test UI's without having to attain high technical and software skills.<br>• I think there is mileage in a less distracting and perhaps healthier set of tools, with perhaps less time spent on fluffy visuals and functionality, and core functions being strengthened.<br>• I think normalising lo-fidelity interfaces is extremely beneficial in terms of finding Lean workflows and getting to solutions quicker. In the spirit of Lean/Agile I can see that this approach would be great for building consensus amongst teams and stakeholders for future development choices. |

## APPENDIX T: YOSHI PHONE FEEDBACK TABLE 4

| **Yoshi Phone Feedback Code #4: Potential benefits for large IT companies** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Yoshi phone could be sold as a user interface rather than a mobile phone brand** | • I can see a large market demographic for health and wellbeing enthusiasts that may have a spiritual mind-set which is becoming ever prevalent with hobbies such as Yoga. A potential partnership with Apple and/or Android geared towards this market may be part of the first-time user set up to go for either the 'Classic' interface or the 'Wellbeing' interface. I do not believe this would make the 'classic' interface lose its market value as there are undoubtedly people who want the full technology accessible immediately and like the on-screen 'noise'.<br>• Maybe releasing it as an interface update or a plug-in for a regular design.<br>• I think possibly within icon packs and specific/niche types of work. It won't be for everyone, but for some people it would be a 'pack' worth downloading and using. |
| **There is a market for simple phones but it's not for everyone** | • I think the market fit needs to be better defined It could be for parents who want to be connected with their children but not expose them to the wilderness of social media. For old folks who struggle grasping tech. And of course, for the woke folks who are deleting their social media accounts and trying to focus more on their (mental) health by reducing noise.<br>• I think it could also be great for introducing children to certain types of IT software at quite a young age. |
| **Benefits in the workplace to increase productivity** | • Expanding on the mental health benefits as well as time and productivity benefits.<br>• Being able to have a true disconnect between the work life balance would mean a healthier work force, mentally and physically through reduced stresses.<br>• I am not a designer, though I am an engineer, and my mindset is to focus on efficiency. I define efficiency as performance/output versus the work put into something. If the interface allows me to quickly navigate, my time is better spent, I can get more work done at a faster rate, and my concentration is not being taxed trying to |

| **Yoshi Phone Feedback Code #4: Potential benefits for large IT companies** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| | find things that should be easily found. I believe a lot of software/workplace tools can benefit from this.<br>• As I work in an education institution, I see potential for these interfaces to be used to make our digital learning environments healthier. |
| **Developing devices that incorporate the OS** | • Developing devices which incorporate the OS.<br>• I can see this as a nice provocation in the OS worlds. Say you're using an android phone but during the day you switch the OS from android to this to experience less distraction and taking in the constraint of less functionality. |
| **IT companies/software developers could benefit from having a Yoshi Phone interface as an option for their products** | • In the same way you can commonly switch to dark mode in apps, you could switch to 'Yoshi mode' for a noise-free interface experience. Also, like I mentioned above, Yoshi phone style prototypes could be very useful to address usability issues in the design phase of software development.<br>• It's difficult to monetize solely on a hand-drawn interface, other than a one-off charge. Possibly side services could help, such as offering hand-drawn versions of popular apps, such as a hand-drawn deliveroo app with predefined options, hand-drawn podcast app, hand-drawn dictation app etc. |
| **Use hand-drawn interfaces to develop and sell apps and fonts** | • I could see hand-drawn interfaces being use in a diary app, where you could keep track of your memories. I think the use of illustrations would make it a lot more personal and special for individuals.<br>• Yoshi font could also be licenced/monetised. |

## APPENDIX U: BIRDS APP FEEDBACK TABLE 1

| **Birds Feedback Code #5: Prototype** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Unconventional approach that reduces noise in digital interfaces** | • This app also has the same unexpected element as Yoshi's phone interface, it breaks the norms, of what we are used to see as traditional interface in the phones. And also, an interesting aspect of this times that it uses visual cues, and not sound elements to mark that the time is up. That also breaks the habit cycle - people are so used to snoozing their alarms or timers, that they already have a bad habit built in when it comes to time and self-discipline. So, using visual elements could really break the pattern of thinking of how users relate to timers and time apps.<br>• I really like the idea of setting time off and we need more creative ways to interact with users nowadays to 'push' to set time off.<br>• A good way to be reminded about the amount of time you are spending on a device or application.<br>• The low impact visual reminder that time is passing prevents your attention from being completely broken yet subtly informs you of the limits in place.<br>• Any app that makes you aware of how much you use your phone, is always good. It doesn't matter whether you look at birds or plant trees, as long as it boosts. |
| **Use of birds** | • I like the symbolism of using birds, as a representation of the freedom and relaxation you'd get after switching off an app or device.<br>• Juxtaposition of the hand drawn birds with the phone screen works particularly well with this prototype. Not only is it gentle, but the different texture softly alerts the user to a world beyond their device screen.<br>• I like the idea, but I'm not sure if this wouldn't annoy me over time when seeing lots of birds on my screen. Essentially, I wouldn't like to be forced by the app to stop looking at whatever I was looking at. |

## APPENDIX V: BIRDS APP FEEDBACK TABLE 2

| **Birds Feedback Code #6: Potential risks and further considerations** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Design suggestions** | • Perhaps to warn users of content they might not want to see on apps, or it could detect if users have been scrolling a single app for a long time and ask them if they want to continue or take a break.<br>• Could these timers be app specific? Or be tailored to how an individual uses a device. Potential leveraging machine learning to help teach the user about their own usage habits?<br>• I think one timer setting would be enough (with 3 warnings at a set time before time up). I wonder if it would be more useful to set timers for different usage (games, social media, etc.). Also, the ON/OFF switch seems to be the other way around (see standard toggle UI).<br>• This juxtaposition is something that could be developed further.<br>• Suggestion to drive this concept further with real cases and see how it can be developed. Concept can also touch only kids as there is apps for kids and their parents to manage their use of phone.<br>• My only criticism is longevity of this app on people's phones. Will the visual 'noise' that is being churned out by companies and websites be too much for this app to overcome? Will users eventually get irritated by it and switch off the app? I think the timer is a great addition for this and maybe the app could set a goal/game to gradually reduce the timings of the alarms as people like numbers e.g. losing weight, increasing lifting weights, miles ran, metres swam etc. I wonder if it could offer something as way of encouragement for putting your phone down, an incentive so that you continue to learn to spend less time with the device? I would suggest even providing advertisement incentive to tech 'Youtubers' who would be passionate to advertise this app. An awareness campaign could be useful as many people believe knowledge is power and do not understand there being an addiction to visual 'noise' and information overload.<br>• How would the device work in the case of an emergency? |
| **Other ways** | • I think there are other more discreet ways to do this successfully to 'prompt' the user to think about wasting time. The problem with this is |

| Birds Feedback Code #6: Potential risks and further considerations | |
|---|---|
| | that the interface is forcing you to look at the screen to understand the progression of the timer.<br>• Any kind of sound interface in this scenario would be far less attention demanding.<br>• To search for the ways not only visual design but sound design could break bad habitual cycles.<br>• Perhaps a pulsing effect of colour (fade out/warning colours) which remained unobtrusive to the screen.<br>• Being less obtrusive in reminders - A sound or discreet screen colour change would remind me that time was ticking. |

## APPENDIX W: BIRDS APP FEEDBACK TABLE 3

| **Birds Feedback Code #7: Inspiration to design healthier IT tools** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Design mindful interactions, UI and UX, and apps** | • To design more mindful and humbler UI/UX to make people really to disconnect in the healthy way.<br>• To develop other apps which gently remind the user in a mindful and human way about device usage.<br>• An opportunity to design more time efficient digital products. Being realistic, we all need our digital devices on our daily lives to carry out different activities, but what we could do as designers is reduce the amount of time our products require from the user. |
| **Design tools that protect employee wellbeing and prompt users to take a break from the screen/phone** | • Low impact reminders may pave the way for shorter stints of work tasks, to help break things down and to encourage people to step away from their device.<br>• Rest breaks on networks and large corporations so screen fatigue and over working is prevented to increase wellbeing within the workplace?<br>• It used to be common practice in videogames to remind players to take a break. This seems to have disappeared over time and addiction has seemed more prevalent than ever before. As a user, I would like companies to utilize this again and show an appreciation of the user's health; whether an acknowledgement or a tool to interrupt the user, it would show developers are considerate and hold accountability over the user's health and wellbeing. |
| **Unconventional design approach as inspiration to innovate** | • Non-conventional, more humanistic execution to an existing problem inspires to think of solutions through a different lens. A lot of UI/UX is only based on existing mental models and interaction patterns. Those are useful but can be very limiting and preventing innovation in the way we interact with our devices. |
| **Textural interfaces** | • I think the juxtaposition of different textures in a digital interface, the effect that has on a user, is something that would be interesting to bring into a design process. |

| Birds Feedback Code #7: Inspiration to design healthier IT tools | |
|---|---|
| **Poetic interfaces** | • The only thing I can think of is the poetry of this interface. Raising question how the interfaces could be less procedural, and more poetic is pretty interesting. A lot of those things are going to be possible in the future with all new generative technologies popping in the market now. |

## APPENDIX X: BIRDS APP FEEDBACK TABLE 4

| **Birds Feedback Code #8: Potential benefits for large IT companies** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **No benefits for large IT companies** | • If I had a company, I'd struggle to see the benefit of this app as it could be stopping the users' traffic to my product and therefore reduce the revenue of my product.<br>• Playing devil's advocate, mindful interactions whilst a big positive for the end user, could end up a negative for monetisation. In my cynical mind, all devices, apps etc are designed to keep the client hooked, to feed adverts or sell more apps and devices.<br>• I like that this is an app as opposed to an integrated feature. There will be a market for users who purposefully want to reduce their screen time due to health and wellbeing. It is independent from Apple and Android which may see this as a hinderance and reject it for commercial impact. The aforementioned companies would seek high profits from mobile phone addiction over the genuine health and wellbeing of the consumer. |
| **Children-focused technology and benefits for education companies** | • Especially I think this can work with kids who needs the most attention and have the biggest issues with phone use.<br>• I've seen parents set similar timers for their children's iPhones. Birds is a much nicer visual way to handle the same issue.<br>• A feature promoting internet safety and mindful usage of apps. It would be useful for children who use devices for example.<br>• Perhaps for students and children who cannot track their own time, this could be monetised within schools, colleges, or universities whereby these kinds of training tools could be useful to help younger people manage their time. folding mode and show relevant info. People who constantly use phone at work, to check inventory, add logs or update info (warehouses, retail etc). |
| **Subscription based app and/or sell apps that expand on this theme** | • It might be a hard sell given that there are free tools that do this. Perhaps if it became more/had more features.<br>• Developing other ways to incorporate natural or human reminders about device usage.<br>• For example: Use this idea with special design plugins/animations related to their product.<br>• Something like this could benefit customization or microtransactions. |

| Birds Feedback Code #8: Potential benefits for large IT companies | |
|---|---|
| | • If a company wants to brand itself as caring for the user, it could be marketed as such. Many brands have lost focus on consumer health and wellbeing with respect to information overload. It could best be sold as an app and optional for the user, but with Apple or Android's name on it, it would brand them as a company considerate to health and wellbeing. The idea could also be done by crowd funding as a kick-starter app on the app store.<br>• Companies could brand the birds!<br>• Birds is a digital tool that (I think) lots of people would find valuable. |
| **Help reduce friction in day-to-day operations** | • If a company is more productive on a larger screen, they can use this app to help people focus. |
| **Design teams could benefit from exploring such poetic interactivity** | • Usually, these kinds of things are out of the list of criteria that are used in the day-to-day operations. At the end of the day, we might have some more creative and fun interactions if designers and decision makers wouldn't dismiss the power of things that feel good. |

## APPENDIX Y: SHAPIE FEEDBACK TABLE 1

| **Shapie Feedback Code #9: Prototype** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Touch-rich experience** | • Taking focus off of just the visual element and focusing more on the 'touch-rich' experience, allows more of the body's senses to be distributed. Taking sole attention away from visual stimulation will surely lower addiction to the visual interface and on-screen visual 'noise'. This would help reduce addiction. As someone who likes gadgets, I would personally like to see phones return to having some more 'gimmicky' appeal, but gimmicks that are useful and have purpose such as the concept of 'Shapie'. I think it is a very practical and fun concept. It does not seem 'gimmicky' in a negative way as the manual shows there are many uses. As a 'gadget enthusiast', this is something that would attract me very much. |
| **Elastic design benefits** | • The design of this prototype feels like it is adapting to the life of user's and not vice versa. Which make them feel more in control and again, less habitual thinking (for example keeping the phone only in the back pocket of the jeans).<br>• It's a much more human or less artificial device.<br>• Love the concept!<br>• Effectively this is a phone with a different form factor.<br>• This would be wonderful thing to own. The nature of this device feels like it would make device use accessible in almost any environment.<br>• I love the idea of increasing utility through shapeshifting.<br>• I think the tactile interaction with this prototype works very well. It appears that the shapie is fluid and multifunctional.<br>• I really like the freedom of use of this product and the multiple ways in which you could interact with it.<br>• The benefits though, of some morphing technology would be convenient in many applications as per the user manual. Folding like a book, to have it stand up itself, to wrap around a wrist etc, all interesting ideas.<br>• I can think of various uses this can have, like using this as a key card for a hotel/cruise ship/etc, while having a exclusive hotel content in it. Chefs could use this to train apprentices by placing it in the cooking desk in half folding mode and show relevant info. People who constantly use phone at work, to check inventory, add logs or update info (warehouses, retail etc). |

## APPENDIX Z: SHAPIE FEEDBACK TABLE 2

| **Shapie Feedback Code #10: Potential risks and further considerations** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Haptic touch** | • I immediately thought of haptic touch as soon as I read the introduction to this and how this perhaps could be used within this product. |
| **Technical challenges** | • I would just make sure to look into manufacture of this and also how to teach the world to use it.<br>• My main question is whether technology for this exists right now, such as the stick/unstick function. No doubt it could be developed in time, and I am very curious how. Also, the screen - can an LED screen be capable of bending? Will the image quality be as good as on the smart phones we have today, or will there be a sacrifice in screen quality?<br>• I really like the idea of something that interacts using touch but the development costs for this and proving the concept of its utility could be very expensive I suspect!<br>• The cost of this technology would be a major consideration and obstacle.<br>• Really interesting idea - I can see that the technology to produce this kind of hardware is quite close to us, but whether this would be adopted by the mainstream is moot.<br>• Quite different than oppo x 2021. |
| **Impact of Shapie/touch-rich interactions on user wellbeing** | • Strangely this might have the effect of users being more connected rather than disconnecting.<br>• I imagine the issues might be that it encourages more use of the device rather than mindful usage.<br>• A flexible device of this nature would likely open many doors for many different uses. I'm not quite sure that they would all be healthy.<br>• Think LG have something similar to this! However, you would possibly need it to have its own way of operating.<br>• The tactile interaction in the first instance would be a novelty, rather like a fidget spinner or something. |

| Shapie Feedback Code #10: Potential risks and further considerations | |
|---|---|
| **UI/software showcase needed** | • It would be great to see actual UI/software being showcased in different use cases. Is there potential for the Shapie to also provide tactile interaction for notifications etc as well? And does the interface change when it is in a certain shape? For example, if it's being worn on the wrist, does it display a clock? |
| **Further higher fidelity explorations needed** | • I really like the idea of shapie but also would want to see some higher fidelity explorations. I'm pretty sure you can get a lot of inspiration from the MIT lab or ITP projects. Especially thinking about this computational device not necessarily being a phone. |

## APPENDIX AA: SHAPIE FEEDBACK TABLE 3

| **Shapie Feedback Code #11: Inspiration to design healthier IT tools** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Design inclusive and accessible touch-rich interactions with care and consideration** | • I think the tactile interaction could also be useful for people who don't have much manual dexterity. Older people for example have trouble using touch screens. It could be useful for Shapie to perform actions such as calling an emergency contact when folded a certain way.<br>• But idea is great, I would really develop this further to help rural areas where internet is not the thing. It can help rural areas to have better communication without internet. Those can be kids schools, maternity wards and what not.<br>• To search for tactical solutions which could benefit different group of people – from seniors to kid's first phones. It would be a great product to sparkle users' creativity (mainly thinking about kids) to find new ways to use Shapie's physical features.<br>• By exploring better ergonomics that cause less chronic issues, especially in posture.<br>• To build hardware and software with a conscious consideration for not just what someone uses it for, but how, where, and when, could lead to devices that work in harmony rather than an awkward extra or inconvenience. |
| **Shapeshifting as inspiration** | • The shapeshifting unlocks more utility for a single piece of tech (from wearable to environmental/domestic use).<br>• It's inspiring to see thinking beyond the common and fixed shapes of tech.<br>• To think of more tactile devices which can fit more closely to the human form.<br>• It would be interesting to use Shapie as a design prompt.<br>• Shapie would inspire me to think about my product being used in multiple ways and how to better design for all of those options. |
| **New ways of app development and software** | • For those traveling I see this being useful, small spaces or for giving the device more flexible usage - replicating that of a book or small space storage. It would open a world of new ways of app development. |

| **Shapie Feedback Code #11: Inspiration to design healthier IT tools** | |
|---|---|
| | • In a design process it could be used to generate ideas around what tactile interfaces could benefit a product.<br>• It's pretty stimulating to think about the tactile interactions like bending (pressure sensors) and stuff like that. I'd think about this as a platform for software meaning that I have no idea what it's for at the moment, but it would be cool to play with it if I'd know the technical limitations and constraints. |

## APPENDIX BB: SHAPIE FEEDBACK TABLE 4

| **Shapie Feedback Code #12: Potential benefits for large IT companies** | |
|---|---|
| **THEMES** | *Expert Reviewers' comments* |
| **Revolutionise how devices are perceived** | • Not that long ago buttonless phone seemed so unconvenient, and now buttons are nowhere to be found on most of the devices. So maybe a stiff rectangle is not the final shape of the way phones supposed to look like. |
| **Niche demographic item** | • Thinking about people with visual impairments or young children. I'm not sure whether this is something for mainstream markets as yet. |
| **Further development and sale of touch-rich devices** | • Flexible screens have infinite applications, it's something tech companies are already heavily investing in.<br>• I think Shapie could be used to develop interfaces that are tactile for certain needs where a screen by itself is not very useful.<br>• Japanese companies such as Nintendo enjoy innovative concepts such as the Nintendo Switch. I believe this market sector alone would benefit greatly from having a launch campaign, such as 'Sony' perhaps having a market comeback. Apple enjoys quality-of-life touches and Samsung the technological implications. I think the complete package would sell itself and make companies a lot of money.<br>• I guess they can build this to something very meaningful depending on manufacture prices and technology.<br>• It would come down to find new ways to accessorise, to serve ads, or to develop more suitable apps.<br>• Go ahead with this concept and find the place where it fits the best. |
| **Shapie as its own brand** | • I believe this product would sell itself, but knowledge of the technology required to fulfil its functions will need to be presented to the brands that are present such as Samsung or Apple.<br>• If 'Shapie' wishes to be its own brand, its revenue could come from investors willing to see this as high-risk high-reward investment backed with the technology as part of its sales pitch to achieve this. |

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