

Pervasive artefacts as scaffolds for mindful living: reframing calm technology

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Abstract

Keywords: mindfulness intervention, calm technology, slow technology, design frictions, Stoicism, ludic data sculpture

Ubiquitous computing, the term coined by computer scientist Mark Weiser at Xerox PARC in 1988, refers to the vision that information technology will one day be so ingrained in our lives that it will be found and seamlessly embedded in our everyday environments. Embedding new contexts of communication in everyday objects means that our lives will be more strongly shaped and guided by digital information. To express an ideal future, Weiser ignited a dialogue around the concept of *calm technology*, technology which shifts from periphery to centre of our attention seamlessly, empowering us without increasing information overload. Despite this narrative, there is a trend in HCI to design technology for efficiency, such that we do not have to ‘think’ while using it. At the same time, science has shown that mindfulness has many benefits in health and well-being. Given that technology will become more pervasive in the future, how can we design technological artefacts in a way which does not contribute to the trend of mindlessness but instead brings mindfulness into the equation? In this research project, we explore how a pervasive technology artefact can improve well-being by supporting more moments of mindfulness. We dissect the mindfulness construct and review several mindful interaction and design leitmotifs – starting with calm technology – before arriving at our research agenda. As a case study, we developed a mindfulness intervention called Bloom·e – a combination of an ambient artefact and smartphone app – which facilitates Stoic reflection exercises. We designed Bloom·e with calm technology and slow technology principles in mind. Bloom·e was deployed in three home studies inspired by context mapping techniques to gain insight into Bloom·e’s potential as a well-being intervention. We share our results and discuss the impact of the intervention on participants. We also consider several emergent themes, including varied conceptions of virtuous living, the self-attribution of meaning in the physical artefact, and discrepancies surrounding attention demand. This is followed by a critical analysis of calm technology and the development of a calm technology framework for HCI designers and researchers to consider. We conclude by highlighting several opportunities for future work, including refining Bloom·e as a ludic data sculpture, using Bloom·e in pure and guided self-help formats, conducting longer-term or controlled studies, and validating our calm technology framework in other domains.

Table of Contents

1	INTRODUCTION	1
2	MINDFULNESS AS A CONSTRUCT	4
2.1	Japanese Zen	5
2.2	The psychology definition	6
2.3	Stoic mindfulness	7
2.4	The colloquial definition	9
2.5	The terms used in this study.....	9
3	MINDFUL INTERACTION AND DESIGN LEITMOTIFS	10
3.1	Technology genres.....	11
3.2	Design approaches	13
3.3	Design principles	16
4	MINDFULNESS AS A STRATEGY TO IMPROVE WELL-BEING.....	18
4.1	Design for well-being.....	19
4.2	Research agenda.....	19
5	METHODOLOGY.....	21
5.1	Research through design	22
5.2	User research.....	23
5.3	Design practice.....	24
5.4	Data collection and analysis.....	25
6	STOIC PRACTICE: A CASE STUDY FOR MINDFULNESS	27
6.1	Mindfulness interventions	28
6.2	Stoicism as a mindfulness practice	29
6.3	Stoicism in more detail.....	30
6.4	Stoicism and well-being	32
6.5	The pervasive technology artefact	34
7	INTERVENTION DESIGN	40
7.1	Concept of the Bloom·e artefact	41
7.2	Concept of the smartphone app	43
7.3	User scenarios	45
7.4	Requirements	48
7.5	Smartphone app design and development.....	48
7.6	Bloom·e’s behaviour	68
8	HOME STUDIES	71
8.1	Experiment setup.....	72

8.2	Research dimensions	72
8.3	Questionnaires	73
8.4	Semi-structured interviews	74
8.5	Data processing	76
8.6	Experiment procedure	76
8.7	Participants	78
9	RESULTS.....	81
9.1	Bloom-e in daily life	82
9.2	Stoic mindfulness	83
9.3	The Bloom-e artefact	88
9.4	The Bloom-e app	92
10	DISCUSSION	95
10.1	Bloom-e as a mindfulness intervention	96
10.2	Design implications	103
10.3	Limitations.....	108
10.4	A critical analysis of calm technology	111
10.5	Constructing a calm technology framework.....	113
10.6	Future work.....	117
11	CONCLUSION	121
	REFERENCES	124
	APPENDIX A. STORYBOARD OF BLOOM-E'S ORIGINAL CONCEPT	130
	APPENDIX B. BLOOM-E TECHNICAL BREAKDOWN	131
	APPENDIX C. DISCARDED USER SCENARIO.....	134
	APPENDIX D. UNIMPLEMENTED REFLECTIONS	135
	APPENDIX E. SMARTPHONE APP – TECHNICAL SPECIFICATIONS	137
	APPENDIX F. PRE-EXPERIMENT QUESTIONNAIRE	138
	APPENDIX G. MID-WAY QUESTIONNAIRE	144
	APPENDIX H. POST-EXPERIMENT QUESTIONNAIRE	147
	APPENDIX I. SEMI-STRUCTURED INTERVIEW – ALL QUESTIONS	150
	APPENDIX J. CONSENT FORM FOR HOME STUDIES	152
	APPENDIX K. PARTICIPANT CHECKLIST FOR REFERENCE DURING HOME STUDIES.....	153
	APPENDIX L. INFORMATION BROCHURE FOR HOME STUDIES.....	154
	APPENDIX M. PRE-EXPERIMENT QUESTIONNAIRE: RESPONSES.....	155
	APPENDIX N. MID-WAY QUESTIONNAIRE: RESPONSES	160

APPENDIX O. POST-EXPERIMENT QUESTIONNAIRE: RESPONSES	164
APPENDIX P. INTERVIEW TRANSCRIPTS	167

1 Introduction

Ubiquitous computing, the term coined by computer scientist Mark Weiser at Xerox PARC in 1988, refers to the vision that information technology will one day be so ingrained in our lives that it will be found and seamlessly embedded in our everyday environments. A pragmatic approach to this future-oriented vision is pervasive technology, a technology category which explores the embedding of microprocessors in everyday objects such that they provide new contexts of information communication and where people are unaware of the underlying technology. To what extent do we command technology, or does technology command us?

Embedding new contexts of communication in everyday objects means that our lives will more strongly be shaped and guided by digital information, a pattern already seen with existing products such as digital billboards, smartphones and personalized advertisements while browsing the internet. The manner in which this information guides us can also manifest in undesirable ways. If we take the smartphone as an example, studies have shown that mobile notification systems are considered a distraction [74] c.f. [59], [64]. Although the content of notifications can be useful, their untimely arrival could mean that an ongoing conversation with someone in front of you is interrupted, work e-mail finds a way to bring stress into your evening, social media shifts your focus from the world you live into the digital world and instant text messaging places new and frantic expectations on social interaction with friends. Regularly responding to such cues automatically and without awareness means that we live more often in a state of ‘mindlessness’ rather than ‘mindfulness’. These effects come as a result of a design trend to make technology work seamlessly, automatically and efficiently, requiring little effort on the part of the user, catapulted perhaps by the vision that technology will one day disappear into the fabric of our lives such that we will use it “without thinking” [101]. While this approach can make us more productive at times as an individual or as a society, we argue that there is both room for and a necessity in technology design to consider mindfulness in the interaction and in the user, a design philosophy that is currently heavily outweighed by its antithesis.

While *mindlessness* has been shown to be undesirable and even predicted subsequent unhappiness in one study [24] c.f. [55], science has shown that *mindfulness* has many benefits in health and well-being. Mindfulness has become its own scientific category, used in clinical interventions to improve outcomes in multiple domains such as chronic pain and depression [24]. Mindfulness and self-control appear to be positively correlated with well-being [9] and improvements in some aspects of mindfulness and self-compassion were significantly correlated with decreases in depression and anxiety [92]. Mindfulness can also lead to other improvements such as self-insight, which has been shown to lead to a reduction in depressive symptoms among Japanese undergraduate students [65]. Given that technology will become more pervasive in the future, how can we design technological artefacts in a way which does not contribute to the trend of mindlessness but instead brings mindfulness into the equation?

In this study, we explore how a pervasive technological artefact can be used as a scaffold for mindful living i.e. enabling the user to be more present in their day-to-day life and support moments of mindful behaviour. First, we explore mindfulness as a construct in **Chapter 2** with roots in Zen Buddhism and identify the different ways the term is used in psychology, Stoic philosophy, and colloquially in design and human-computer interaction (HCI) literature. Through this we establish the definitions we use in our study. This is followed by a presentation of a number of related design and interaction leitmotifs in **Chapter 3**, placing them in three categories: (1) technology genres; (2) design approaches; and (3) design. In **Chapter 4**, we propose, under the ‘capabilities’ approach of design for well-being [14], that the capability to live mindfully is a relevant strategy for improving well-being in the 21st century and in the long run, especially as modern society continues to near the ubiquitous technology vision. This forms the basis of our research agenda.

In **Chapter 5**, we describe the methodology of our work, including our research approach, design practice, and methods of data collection and analysis. **Chapter 6** introduces our case study: designing and developing a mindfulness intervention. We turn to the philosophy of Stoicism for the more pragmatic approach of Stoic mindfulness, which subsequently forms the basis for our intervention.

Introduction

We dive into Stoicism in more detail, before framing the philosophy under well-being constructs. We then introduce Bloom·e, an ambient sculpture originally designed as home décor.

In **Chapter 7**, we detail the design and development of a well-being intervention, starting first with concept descriptions before moving onto details of the design and implementation. We contextualize the intervention in a set of home studies in **Chapter 8**, where we describe the experiment setup, our research dimensions, as well as the steps taken to collect data and perform an analysis. We close the chapter with the experiment procedure and a description of participants.

Chapter 9 presents the results of our home studies, synthesizing participant responses under the four research dimensions of (1) Bloom·e in daily life; (2) Stoic mindfulness; (3) The Bloom·e artefact; and (4) The Bloom·e app. The emergent themes are discussed in **Chapter 10**, where we discuss Bloom·e as a mindfulness intervention, highlight several design implications, and consider the limitations of our research. We close the chapter with a critical analysis of calm technology and construct a framework for designers, and we describe several avenues for future work. **Chapter 11** concludes this research.

2 Mindfulness as a construct

In this chapter, we break down the concept of mindfulness by considering several perspectives. First, we turn to Japanese culture where mindfulness values are widespread and explore the concept of 'enlightenment' as found in Zen Buddhism, before turning to the Western operationalized definition in Psychology. We then describe a recent account of Roman Stoic mindfulness, followed by the colloquial definition as used by designers and HCI researchers in past work.

2.1 Japanese Zen

In Japan, mindfulness values are widespread. The Japanese way of thinking is captured in a concept called *the spirit of dō*, which is said to have been influenced by Taoism, both a philosophy and a religion, originating in Ancient China. In their 2002 book *The Japanese Mind: Understanding Contemporary Japanese Culture*, Davies and Ikeno [28] write:

The notion of Tao expresses the essential unity of man and nature, and Taoism has long been concerned with techniques aimed at bringing heaven and earth together, **blending the sacred powers of the heavens with ritual practice in the mundane world** so that human beings can harmonize their life energies with the Tao, or universal spirit.

It is said that the Tao cannot be grasped, but it can be received. Under a master “teaching without words,” the adept goes through a cathartic process of **emptying the mind of all passions and distinctions until it becomes a “mirror of heaven and earth reflecting the multiplicity of things.”** The person then becomes inhabited by the Tao and finally reaches enlightenment in the “eternal now” through **an experience outside of time and space.**

...“so thoroughly integrated into the Japanese psyche have the assumptions and values of Buddhism become that their influence is apparent in every aspect of the lives of the people of Modern Japan”.

Taoism greatly informed the development of Zen Buddhism in Japan. The writers further explain that Zen had a great influence on Japanese culture. Zen monks would engage in religious activities such as meditation but also the arts, such as tea ceremony (Figure 1) and gardening (Figure 2). Eventually, Zen beliefs became strongly associated with Japanese arts and literature.



Figure 1. Depiction of a tea ceremony which requires concentration and proper technique. Source: commons.wikimedia.org



Figure 2. A Zen gardener draws patterns in the ground with a rake.
Source: www.pinterest.cl

Zen places strong emphasis on meditation, self-insight and the essential truth. The essential truth, however, is considered incommunicable. To perceive the essential truth is to reach enlightenment, a state seen as “...a liberation from [wo]man’s intellectual nature, from the burden of fixed ideas and feelings about reality...”. David and Ikeno [28] further write:

Those who are enlightened cannot explain this ultimate truth, which is both radically simple and self-evident but beyond the ordinary duality of subject and object. It cannot be conveyed by books, words, concepts, or teachers but must be realized by immediate and direct personal experience.

Although the spiritual component of enlightenment may be a complex and inaccessible concept for many, Western science found inspiration in the practices surrounding meditation.

2.2 The psychology definition

Daisetsu Teitarō Suzuki (1870 - 1966), a famous Japanese author, helped spread ideas about Japanese Zen through his many books and essays. After the Second World War, his writings became influential in the Western world and encouraged American psychotherapists to take inspiration from Zen and apply the techniques in clinical projects [82]. This coincided with interest from neuroscientists who, through brain computer interfacing technology, could begin to study the effects of meditation on the brain more closely. Mindfulness is now its own scientific category, applied in clinical psychology research as well as branching off into more specific practices such as Mindfulness-Based Stress Reduction (MBSR) research.

MBSR is a meditation program designed to alleviate chronic stress and pain. Its founder, John Kabat-Zinn, refined the Western definition of mindfulness as “the awareness that emerges through paying

attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” [75]. Here, nonjudgmentally means suspending judgement i.e. not judging how judgmental one is, as opposed to having no judgements or forcing oneself to be non-judgmental. This is an operational definition, as Western takes on mindfulness are largely about its clinical application. This is in contrast to what we have seen in Japanese literature, where the definition of mindfulness, or its spiritual counterpart ‘enlightenment’, is an incommunicable concept. Mindfulness research has more to do with how the practice can improve the mental health of individuals and less to do about how to turn everyone into Buddhists. In the 2013 discussion ‘Becoming Conscious: The Science of Mindfulness’, Kabat-Zinn, while acknowledging the influence of Buddhism on mindfulness science and his own motivations, describes mindfulness as an inherent human capacity with nothing particularly Buddhist about it, as well as unlocking what is already within us [75]. One door into mindfulness is to use objects to pay attention to; attending to your breath and only your breath, as it comes in and out, is one such object commonly used in meditation sessions.

To gain further understanding of this concept, we can look at the methods used to assess mindfulness in an individual. The well-known *Five-Facet Mindfulness Questionnaire* (FFMQ) has been previously validated in research [4] as a reliable self-report method, albeit not perfect. The FFMQ comprises five facets suggested to be key component skills in mindfulness: (1) Observing; (2) Describing; (3) Acting with awareness; (4) Nonjudging of inner experience; and (5) Nonreactivity to inner experience. The test traditionally uses 39 items that measure the five facets. Scoring involves summing the ratings of a five-point Likert-Type scale for each item, where the total is compared before and after mindfulness-based clinical therapy.

Observing refers to the way we use our sensory awareness, involving our perception of both the internal and external world around us, as well how we shift our focus and attention between stimuli. The ‘*describing*’ facet studies the way we use words to label our experiences and express them to ourselves and others. *Acting with awareness* is closely related to self-awareness and studies how we respond to situations in the present moment, outside of an autopilot mode and without making quick judgements. *Nonjudging of inner experience* refers to our ability to view ourselves without criticism, accepting ourselves and others unconditionally. The final facet ‘*nonreactivity to inner experience*’ is similar to the nonjudging facet except it looks specifically at how we can accept negative thoughts and emotions and choose not to react to them.

The FFMQ is considered reliable but not perfect, largely due to its self-report format. Many factors might influence its use and reduce its accuracy. For example, in one study, meditators with years of experience interpreted the *observe* items differently than those without years of meditation experience [3]. It is for this reason that clinical psychologists recommend multiple methods to be combined in order to effectively assess mindfulness in an individual.

2.3 Stoic mindfulness

Countless variations of mindfulness can be found in ancient philosophies and religions, even if they are not referred to as ‘mindfulness’ explicitly. Recent discussions have noted a perceived affinity between the philosophy of *Stoicism* and modern mindfulness techniques as adapted from Buddhism [85] c.f. [48]. In his paper, Sellars describes Stoic attitude as a variation of mindfulness, where a similar kind of attention is paid to oneself, while both the object of attention and the goal of the process differ

from that of modern mindfulness [85]. Sellars highlights that the goal of Stoic mindfulness, as he calls it, was virtuous action based upon one's philosophical principles.

A common Roman Stoic claim was that one ought to keep one's attention not on the past or the future but rather around the actions in the present moment. Sellars quotes the following from Marcus Aurelius' *Meditations* [2, *Med.* 12.3]:

If, as I say, you separate from this directing mind of yours the baggage of passion, time future and time past, and make yourself like Empedocles' 'perfect round rejoicing in the solitude it enjoys', and seek only to perfect this life you are living in the present, you will be able at least to live out the time remaining before your death calmly, kindly, and at peace with the god inside you.

This can be likened to Buddhist meditation practices which also focus on paying attention to the present moment. There are also parallels between Stoic *ataraxia*, meaning tranquillity of mind, and the Buddhist concept of *nirvana*, which refers to a state of being in which toxic mental and emotional dispositions have been extinguished.

The Stoic principle of reserving judgement is also comparable to the modern mindfulness principle of non-judgmental observation. Epictetus, one of the more well-known Stoics, wrote the following [77]:

We suffer not from the events in our lives, but from our judgement about them!

Still, Sellars distinguishes Roman Stoic mindfulness from modern mindfulness by explaining that, where modern mindfulness proposes a shift in focus from negative thoughts to experiences, Roman Stoic mindfulness attempts to replace unthinking actions shaped by habits (i.e. mindlessness) with conscious actions shaped by philosophical principles that are always kept 'ready to hand' [85] (i.e. mindfulness about virtue and action). Epictetus outlines in his writings that this is done by paying constant attention, during all our activities, to a set of philosophical principles. The key notion here is that attention is paid to the principles themselves which supersede and inform any activity of ours as opposed to the activity itself being the object of focus. Epictetus believes that if someone is able to live a life informed by the principles outlined in his writings, then no external agent or event will have the power to upset their equanimity [85].

If the forces of ubiquitous technology drive us to conduct our activities mindlessly, then what principles do we need to pay attention to in order to act mindfully? This version of mindfulness, in which we are to pay attention to our virtues at all times, may be seen as a more tangible and accessible concept when compared to the clinical psychology approaches targeted towards awareness of awareness. We might even speculate that we can draw parallels between Stoicism and identity-based motivation, in which people are motivated to act and make sense of the world using the identities on their minds – identities have value and people regulate themselves in light of their identities [73]. As an example, Hooglugt and Ludden [44] used an identity-based approach as a strategy to behaviour change in order to promote physical activity. Can an identity-based approach be used to transform our mindless behaviour around technology? And in what ways can this merge with or be influenced by Stoic practices? We leave this opportunity for synthesis to later stages of our work.

2.4 The colloquial definition

In casual language and understanding, mindfulness refers to the state of awareness of something or the act of being deliberate and intentional. Several designers and HCI researchers use this basic definition when discussing mindful design, interaction, or behaviour (e.g. [22], [57], [62] and [81]). This is a stripped-down account of the notion of mindfulness as found in clinical psychology approaches which have to do with the awareness of awareness, as inspired by Zen Buddhism practices in pursuit of enlightenment or the ‘ultimate truth’. It is difficult to discern whether this colloquial definition is an abstraction of Eastern conceptions of mindfulness or simply the borrowing of the word, in order to describe a concept which is much simpler and more understandable to the general audience.

2.5 The terms used in this study

Because of potential discrepancies surrounding the concept of (Buddhist) mindfulness and the ways in which it varies semantically in HCI literature, clinical psychology, and Stoicism, we clarify below the terms used in this study:

Mindful (descriptor): a conscious awareness of (the effect of) one’s own actions or the context surrounding one’s actions. Any further use of the term ‘mindful’ as an adjective or descriptor will refer to this simple definition.

Mindfulness (outcome or practice): the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment. We reference here the meditative quality described in clinical psychology.

Stoic mindfulness (outcome or practice): a deliberate awareness of, reflection on and enactment of one’s own virtues. We use here our own definition of the phenomenon described by Sellars [85] which describes a Stoic counterpart to modern mindfulness principles.

3 Mindful interaction and design leitmotifs

The idea that pervasive technology – and the more future-oriented notion of ubiquitous technology – seemingly integrates with our everyday lives has by no surprise sparked discussion amongst designers, technologists and philosophers. The questioning of the role of computing devices led to the emergence of a number of interaction and design leitmotifs which aim and continue to question user authorship and control of the devices we use, the content we consume and the types of interaction we can have with digital technology. In this chapter, we describe a number of these themes as either a genre of technology, an approach to design, or a design principle.

3.1 Technology genres

In this section, we explore a number of key technology categories which emerged as a result of the discourse around ubiquitous technology.

Calm technology

Shortly after coining the term ubiquitous computing in 1988, Weiser and his colleague John Seely Brown at Xerox PARC started a dialogue in 1995 around a key challenge they saw for the next decade of technology design: *calm technology* [102]. This was a dialogue in response to the understanding that, although information technology was very useful in quickly informing us of many things (e.g. pagers, cell phones, new services, the internet) it did so frenetically. At the same time, technology could create encalming experiences (e.g. a comfortable pair of shoes, a fine writing pen). Weiser and Brown believed that the difference between something enraging and something encalming was the way in which our attention was engaged. Calm technology is able to engage both at the *centre* and *periphery* of our attention, as well as move back and forth between the two at the appropriate time.

Weiser and Brown explained that calm technology is fundamentally encalming for two reasons: (1) Our periphery informs without overburdening our brains, while allowing us to attune to many more things than if everything was at the centre of our attention; and (2) By recentring what was previously in our periphery, we are taking control of it and enabling our calm through increased awareness and power. They note that not all technology needs to be calm – the point for some may need to be exciting – but in some cases we must learn to design for the periphery so that we can command technology without being dominated by it. According to Weiser and Brown, a technology is calm when it meets three signs: (1) It moves easily from centre to periphery and back; (2) Our peripheral reach is enhanced by bringing in more details to the interaction without increasing information overload; and (3) As a result, we are put at home and in a familiar place, connected effortlessly to a myriad of familiar details.

The concept of calm technology began as a dialogue, perhaps as a way to describe the light at the end of a tunnel that technology designers could aim to reach in the 21st century. In 2015, anthropologist and technology hobbyist Amber Case expanded upon this genre with her own book detailing a number of design principles to smoothly capture user attention only when necessary and which do not get in the way of a user's life [15]. Although it appears calm technology remains only a general way to describe attention-respecting products and technology (there are no concrete frameworks or examples belonging solely to this genre), we can nevertheless appreciate the discussions around information technology and user attention the term enables to this day.

Ambient displays

The dialogue around calm technology inspired the technology category known as *ambient displays*. As technologists began to see the potential around embedding digital information seamlessly in our environment, opportunities to use architectural spaces as an interface between people and online digital technology emerged.

In 1998, Craig Wisneski and his colleagues at MIT Media Laboratory introduced the concept of ambient displays as taking a broader view of display than the conventional graphical user interface (GUI), making use of the entire physical environment as an interface to digital information. Rather

than have multiple sources of information compete against each other on a small amount of screen real estate, information is moved off the screen and manifests itself in the environment as subtle changes in form, movement, sound, colour, smell, temperature, or light [103]. More recently, Mader et al. [61] propose the concept of *single value devices* which seems to fall under the category of ambient displays except with the specific focus on filtering out a single item from a cloud of information and displaying it in isolation to the user.

An ambient display should be accessible in the periphery and can present information through any of the five senses. The choice of modality for the background media should consider the person's foreground task and complement it appropriately. Wisneski et al. give the example of an office worker engaged in the foreground in a visually intensive task – in this case a visual ambient display in the background might not be as effective as an auditory display. They go on to say that ambient designers must map information into new forms successfully, and also suggest that abstract display mappings may be more suitable than literal mappings if privacy of information is a concern for the people who are involved or represented in the ambient media itself.

Other aspects to consider when designing ambient displays are the threshold at which something switches from background to foreground attention and the learning effect for a person in an ambient environment to learn how and where to look for information. A great deal of ambient display examples exist in past work such as [6], [8], [17], [49], [50], [78], [80], [98], and [99]. The range of applications are diverse and include behaviour change, social interaction, healthcare, information art, entertainment, as well as storytelling, among others.

Slow technology

Shortly after their respective introductions, the potential application of calm and ambient media in other areas were explored. In 2001, Hallnäs and Redström [38] conceived the unconventional category of *slow technology*.

Slow technology is a design philosophy towards designing artefacts which, through their expression and slow appearance, puts reflective 'use' in focus for a prolonged period of time. For a technology to be slow, reflection must be inherent in its design and in this way time will appear as opposed to disappear, which is in the case we use technology as a tool to get things done efficiently (and as we also experience when acting mindlessly). Slow technology is not meant to reduce cognitive load (e.g. calm technology) or make digital information and computational resources more readily available (e.g. ambient media). Rather, it is about exposing technology in a way which encourages people to reflect and think about it. Important to explain is that the function of reflection is inherent in the design expression i.e. the total expression of the thing should embody the meaning of reflection itself. This is to distinguish it from a sign which simply says 'Please reflect on X', the design of which does not give any precise meaning to the intended act of reflecting. For slow technology, the meaning of reflection is inherent in the design, and thus the form itself brings forth the function.

Hallnäs and Redström highlight three themes under which the design philosophy of slow technology can be applied: (1) Reflective technology, in reflection about the technology itself being a piece of technology is invoked; (2) Time technology, in which the presence of time is amplified; and (3) Amplified environments, in which elements of the physical environment are amplified back to the observer. As a conclusion to their paper, two basic guidelines for slow technology are proposed. First,

there should be a focus on slowness of appearance (materialisation, manifestation) and presence. Secondly, there should be a focus on aesthetics of material and use of simple basic tools of modern technology.

Since its introduction in 2001, slow technology has seen little mention in design and HCI research. In one study, artists and researchers used the slow technology approach to design the art installation *Seeker* [23], which comprises a large screen that visualizes data lines on top of landscape imagery and allows participants to explore the data while absorbing and reflecting on the information in their own way. The slow technology approach allowed the participants to come to their own understandings of agency within complex social and historical issues. In another study, the principles of slow technology were used to design a wooden chest which occasionally prints a randomly selected photo from the user's Flickr account [69]. The study highlighted the technical challenges of designing for a long period of interaction, including long testing phases and questions surrounding the user's perception of the product after years of product use when the technology was only deployed for a short period of that time. The researchers suggested that more work can be done to bring light to the challenges encountered by design teams as the community moves forward in making slow technologies. Another study [68] examined the slow technology aspects of FutureMe (www.futureme.org), where users can send emails and photos to their own or other users' e-mail addresses, potentially delayed by long periods of time (from one day to sixty years). The researcher interviewed a number of users in order to shed light on their experience with the technology after years of use, revealing unexpected intimate interactions over a wide temporal framing including reminiscence and self-reflection. Design considerations are given for designing technology for long-term interaction.

Some other studies may be related to the concept of slow technology if perhaps not explicitly. Gaver et al. [36] designed the *History Tablecloth*, a multimedia table which highlights the flow of objects on it over time through the use of pressure sensors and light projections. The Tablecloth served as a ground for interpretative reflection about technology, an asset for social interaction, an aesthetic object and illustrated alternatives to traditional views of technology's domestic role. In [37] an electronic coffee table was designed to display slowly moving aerial photography controlled by the distribution of weight on its surface. The study gave insight into how to design for engagement i.e. exploration, reflection and curiosity.

3.2 Design approaches

Where the aforementioned technology genres attempt to categorize the types of products we can design or interact with, the following section highlights some approaches to design which may be universally deployed for any one product category.

Critical design

Dunne and Raby [30][31] formulated the *critical design* approach, a type of research which seeks to uncover how designs bring with them assumptions, values, ideologies and behavioural norms, as a way to make the user more aware and critical of their everyday life. The approach originated out of a critique against consumer culture and conformism, which is only reinforced by popular media and capitalism. Example design cases which fall under this category are normally provocative and embody alternative views or values which challenge the status quo. The goal is to generate knowledge of these alternative views and critiques through design itself.

Although the approach received a lot of attention since its incarnation, Bardzell and Bardzell [7] argue that it has seen limited adoption in HCI practice. They explain that there is a general confusion about what critical design actually is and when something can be classified as such, as well as attributing this confusion to the limited explanations and examples given by Dunne and Raby. To expand on their work, Bardzell and Bardzell draw parallels to critical theory and metacriticism schools of thought, proposing critical design methodologies inspired by these bodies of work.

Reflective design

As designers and HCI researchers, we have an influence, and therefore responsibility, in being aware of the way technology propagates our culture. This is a critical response to values and assumptions underlying our technical practices, motivating Sengers et al. [85] to introduce the *reflective design* approach. The question is asked: what values, attitudes, and ways of looking at the world are we unconsciously building into our technology, and what are their effects? Where critical design tackles this question by embodying (provocative) alternative values into a design as a way to raise awareness and encourage critique, reflective design prompts reflection without necessarily narrowing down on any one alternative viewpoint and without the explicit goal of challenging the status quo, giving perhaps room for broader interpretations and self-directed lines of thought.

Reflective design pulls from critical theory which argues that we are strongly shaped by forces and agendas of which we are normally unaware; critical reflection provides a means to gain awareness of such forces and provides us with a step towards possible change [85]. Sengers et al. continue to explain that the value of reflection for HCI is that it does not only open options for designers, but supports new awareness and freedom for *users*, as well. In this sense, we can say that the practice supports designers and users in being more *mindful* towards the role of technology in their lives. Where ubiquitous computing tries to hide technology from the user such that it becomes embedded in our day-to-day environments, the reflective design approach argues that reflection of the technology should be a part of both the design process and potentially even during the ‘in-the-moment’ engagement of the technology. Sengers et al. draw from a number of HCI trends to inform reflective design, including participatory design, value-sensitive design, critical design and ludic design. Using these fields as inspiration case studies, they then outline a wide array of principles and strategies for reflective design, including supporting scepticism, supporting users to reflect on their lives, using technology as a probe, and providing for interpretive flexibility.

In the context of ubiquitous computing, an interesting dilemma is faced: ubiquitous technology should work invisibly as in its inherent definition, but also be visible in the pursuit of critical reflection and engagement. It starts perhaps by considering *when* and *how* reflection can be part of the design process and use cases.

Implicit interactions

Ju and Leifer [52] introduced the notion of *implicit vs explicit* interactions, a way to reason about interactions with technology which occur with or without the awareness or command of the user. They argue that traditional HCI has focused on explicit interactions, where the use of computers and interactive products relies on explicit input and output. In the meantime, the example of a smartphone ringing loudly during a movie is an implicit interaction done poorly.

Ju and Leifer clarify that ‘implicit’ here does not strictly mean something which does not grab attention, rather implicit refers to an *implied*, as opposed to explicit, demand for information. To characterize such implicit interactions, Ju and Leifer provide the domain-independent *implicit interaction framework*, which divides the space of possible interactions along the axes of *attentional demand* (background to foreground) and *initiative* (reactive or user-initiated to proactive or machine-initiated). This framework is meant to provide a way for designers to reason their decisions.

An *implicit interaction design methodology* is also given by Ju and Leifer. The methodology uses interaction patterns in one domain (normally some kind of observation in the real world) as a template for a solution in another domain. The idea is to observe these patterns with a lens of identifying implicit communications between actors, potentially shedding light on effective implicit interactions that can be applied in interactive object behaviours. They give the example of observing how a doorman considers a passer-by as a potential interactant, from which a designer can find ways to map this pattern to the design of an automatic door such that it does not display crude opening and closing behaviour.

Mindful design

As an addition to existing approaches to design for behaviour change, Niedderer [67] introduced *mindful design*. This is an approach which uses awareness of social norms, emotions and moral values to enable someone to change their thinking and perception as a basis for lasting behaviour change. Mindful design considers the three contexts of environment, human object interaction and social interaction, these categories of which are seen as socially driven because of the relationship with social conventions and beliefs as a starting point for emotional or moral judgement. In what way does ubiquitous technology – such as the smartphone example discussed earlier – shape or form social conventions and beliefs?

Mindfulness can aid behaviour change because it encourages looking at our actions and their causes in order to adjust them to new situations and challenges [67] c.f. [58]. Niedderer builds on this notion with a twofold methodology: (1) A mindful design object creates awareness through a physical or symbolic disruption of its function; and (2) Mediation of this disruption through the user directs their awareness to the issue to be mindful of. Several benefits to using the mindful design approach are further mentioned, including shifting responsibility to the user, conscious changes in attitude through internal motivation, enabling critical reflection of continuously changing individual aims versus societal aims, and inducing reflection on an individual’s inner state/emotions and inter/actions which may reflect their beliefs (the last two of which we can see links to reflective design).

Where Niedderer introduced mindful design as an approach to enable attitude change in the *user* through increased self-awareness, Riley [81] uses the term to describe a set of design principles where the *approach* itself is more mindful of the user. Riley’s book looks at a number of ways design is used to engage with people, covering areas in attention and distraction, vision, perception and aesthetics, learning and memory, reward and motivation, and responsible implementation. In all of these areas, Riley discusses how the design process can be more mindful of the user’s needs, goals, emotions and cognitive capacity. Although the book can prove useful to designers in many different projects, the theories in this book consider a very broad range of topics. Because of this we will not dive deeper into Riley’s book.

3.3 Design principles

In this section we discuss two design principles which, unlike the design approaches, does not allude to methodologies or bodies of work but rather refers to specific design elements.

Design frictions for mindful interactions

Design frictions refers to moments of difficulty when interacting with technology, the term of which is used across various design fields including user experience design and usability studies. While the standard argument is that design frictions is a negative point of experience, others see it as an opportunity. Cox et al. [22] suggest that design frictions can be used to facilitate mindful interactions.

Psychology theory tells us that there are two modes of thought: System1 (fast and automatic) and System2 (slow and more deliberate) [22] c.f. [53]. System1 is usually engaged during automatic, mindless behaviour, while System2 is engaged when we are more mindful of what we are doing. Cox et al. argue that technology could and should invoke System2 in a way that advantages the user. They explain that *microboundaries* can be included as small, single moments of friction, giving the opportunity to: (1) Avoid speed accuracy trade-offs in memory processes and therefore increase accuracy; (2) Avoid being induced into performing behaviours that might not align with personal values; and (3) Guide the user towards a particular course of action without having to rely on willpower alone.

Cox et al. further explain that microboundaries can help to prevent us unconsciously rushing from one context to another, by prompting us to briefly reflect on what we are doing; in this moment System2 takes over the behaviour. In their example, workers used microboundaries in the form of separate computer applications, one for work and the other for personal e-mail, to slow down interaction and maintain work/life balance. Cox et al. suggest that the level of autonomy a user has over the introduction of the microboundary may affect its effectiveness, engagement, and retention. Unfortunately, no further work was done in this area.

Peripheral interaction

Ambient media considers how information can be displayed to the user through their peripheral attention. Bakker et al. [5] explored the notion of *peripheral interaction*, which expands on peripheral attention by also considering how users can interact with digital information in the periphery with the aim of broadening the scope of calm technology. They conducted several case studies which involved the design and development of peripheral interactive systems, deploying them in real contexts for a number of weeks to gain insights into characteristics and considerations for peripheral interaction design and evaluation.

Bakker et al. discuss two characteristics of peripheral interaction, the first of which is the way the interaction can shift between centre and periphery of attention during the interaction itself, the dynamic of which largely depends on inter-related factors including difficulty, habituation, and context. The second characteristic of peripheral interaction is that it is highly personal, requiring both learning and unlearning in the individual users' personal mind-set. Considerations for peripheral interaction are also discussed, including considering when to use it, supporting shifts between centre and periphery by taking account context and routine, supporting personal differences by involving multiple levels of detail, and keeping the design open-ended.

In this chapter, we have explored a number of interaction and design leitmotifs in relation to ubiquitous technology and inspired by the calm technology dialogue. To summarize, we list them in Table 1 below.

Table 1. List of reviewed leitmotifs

Technology genres	Design approaches	Design principles
Calm technology Ambient technology Slow technology	Critical design Reflective design Implicit interactions Mindful design	Design frictions Peripheral interaction

4 Mindfulness as a strategy to improve well-being

To synthesize the theories mentioned in the previous chapter and as a starting point for our research, we turn to design for well-being and frame mindfulness under the capabilities approach. This is followed by our research agenda, where we introduce our leading research questions.

4.1 Design for well-being

Design for well-being is a set of approaches which aims to improve an individual's quality of life. Brey [14] has broken down these approaches by first considering different conceptions of well-being based on a number of philosophical perspectives, including *hedonist*, *desire-fulfilment* and *object list* theories. Furthermore, four approaches to design for well-being are mentioned: (1) Emotional Design; (2) Capability approaches to design; (3) Positive psychology approaches; and (4) Life-Based Design. For our study, we are particularly inspired by the *capability approaches to design* [14] c.f. [51], [71] and [72]. Originating in economics theory and further developed in philosophy, this approach assumes that people's ability to attain well-being is dependent on their development and possession of a number of basic capabilities, which enable them to engage in activities that promote their well-being. These capabilities are opportunities to do things or be things that are of value to the person, which may vary from person to person due to different conceptions of value.

We have previously listed a number of design leitmotifs that emerged from ubiquitous technology discourse, among which there is a recurrent theme of 'mindfulness' over 'mindlessness'. While mindlessness is not necessarily a purely negative construct and can support automatic habitual activities considered positive [100], the rising prevalence of mindfulness as a concept in design and HCI theory has shown the significance of cultivating mindfulness in any one individual. It is an important concept in winning back our autonomy as we continue to be surrounded and influenced by pervasive products and continuous information flow. We therefore posit that the capability to live mindfully is a relevant strategy for improving well-being in the 21st century, especially as society continues to near the ubiquitous technology vision.

4.2 Research agenda

Given the trend of technology design which leads to moments of mindlessness rather than mindfulness, we ask designers and HCI researchers the following: how might we design technological artefacts such that we avoid contributing to this trend? This is not intended to be 'instead of', rather it is about exploring the design space on the other end of the spectrum. As a first step in tackling this research direction, we are interested in how we can design a technological artefact which encourages more moments of mindfulness rather than mindlessness.

The study we will conduct is two-fold. First, we will attempt to facilitate mindfulness activities inspired by the slow technology genre, with links to calm technology and ambient displays. This brings us to our first research question:

RQ1: How can a pervasive technological artefact improve well-being by supporting more moments of mindfulness?

The artefact should strengthen the capability to live mindfully by facilitating mindfulness practice in daily life. Our study will use the home environment as a context for investigation, since we expect it to provide more opportunities for participants to interact with the artefact than at work where other obligations could be a priority. We also speculate that participants will interact with the artefact on a more personal level if they are at home than at work or elsewhere. With this context in mind, the artefact should be integrated into the user's home without disrupting other life practices – the calm

technology vision – while interactions with the artefact should be of mindful, rather than mindless, intent. Additionally, we are interested in whether the artefact can improve well-being. This brings us to the following sub-questions:

SQ1: Which practice can enhance the capability to live mindfully?

SQ2: How can an artefact facilitate the practice?

SQ3: How to situate the artefact in the user's home?

SQ4: How to evaluate the effect of the artefact on well-being?

Secondly, we will attempt to apply the design approaches and principles discussed previously, to design the artefact such that it is mindful of the user's attention and cognitive capacity. There is the opportunity to explore design implications by applying some of these approaches and principles and reflecting on the design process. This brings us to our second research question:

RQ2: How can the design approaches and principles be used to design the artefact such that it is mindful of the user's attention and cognitive capacity?

5 Methodology

In this chapter, we describe our research through design approach, the use of a mindfulness intervention case study, and list the user research methods used to bring forth the insights. We also describe our design practice in developing the intervention. This is followed by a description of the qualitative methods used to collect and analyse the data.

5.1 Research through design

Our general approach was framed under research through design, in which a design artefact embodies some understanding of a problematic situation and describes a proposed, preferred state [108]. The goal is then to study the user's experience when interacting with such an artefact. Bloom'e and its companion app were intended to embody the theories around calm technology and slow technology mentioned earlier, which came as a *philosophical* starting point to the research. This is opposed to a *grounded* starting point in which the aim is to solve an empirically observed or concrete problem. From our philosophical approach, our work tackled two research questions (Table 2) and used design artefacts to bring about the insights.

Table 2. Our research questions

Research questions	
RQ1: How can a pervasive technological artefact improve well-being by supporting more moments of mindfulness?	SQ1: Which practice can enhance the capability to live mindfully?
	SQ2: How can an artefact facilitate the practice?
	SQ3: How to situate the artefact in the user's home?
	SQ4: How to evaluate the effect of the artefact on well-being?
RQ2: How can the design approaches and principles be used to design the artefact such that it is mindful of the user's attention and cognitive capacity?	

In this study, our preferred situation does two things. Firstly, it improves the well-being of the user by supporting moments of Stoic mindfulness (RQ1); with this outcome we sought to improve a 'use situation' around the pervasive technological artefact. Secondly, the design of the intervention considers the cognitive load and attention demand of the user so as to not feel invasive (RQ2); with this outcome we sought to contribute to design literature, by uncovering implications through our own application of the mindful interaction and design leitmotifs previously reviewed.

Case study

Because we began our work from a philosophical starting point, the boundaries of the phenomenon of 'mindful' use of technology and its context were not clearly defined. In order to set bounds within which to conduct an empirical inquiry, we carried out a case study involving the design and deployment of a mindfulness intervention (Chapter 6). A case study approach observes data at a micro level and is a unique way to examine phenomenon within a small number of subjects, such that it can be investigated in detail [105]. One advantage of a case study is that the data is examined within the context of use, in this case within the practice of designing a mindfulness intervention and how participants experience the intervention. Another advantage of the case study approach is that the detailed qualitative accounts often produced help to explore data in real-life environments, describing the complexities of real-life situations which are not captured in experimental or survey research.

Within the definition of this case study, we visited literature on mindfulness interventions and introduced a Stoicism as reflective practice to base our intervention on. We also introduced our design artefacts – Bloom·e and a smartphone app – which became the two components of our intervention. To round off the case definition, we defined design goals and guidelines for our intervention, which guided its design and development at later stages.

5.2 User research

Our mindfulness intervention should work in service of the user. To collect rich insights, we took a user-centric approach, therefore focusing on studying the user's needs and pain points by conducting user research [46].

User experience

To gather our findings we placed focus on the user experience, in which we investigated the perceived lived experience surrounding the use of our intervention as opposed to task performance [97]. The data we collected intended to capture, for the most part, the subjective qualities of the user's experience with our intervention. This meant shedding light on the motivation behind interactions, their thoughts and emotions before, during, and after using our intervention, and how they felt about the intervention overall.

Home studies

To contextualise our intervention and drive forward insights, we conducted home studies of seven days each. The home studies, i.e. field studies, provided an environment for Bloom·e to position itself as an ambient artefact, while enabling the participant to more freely interact with it, at their own will and in a personal setting; Bloom·e was to become part of the participant's lifeworld. Observing how individuals use a product in their own environment captures information that affects the use of the product which otherwise cannot be replicated in a lab environment [10]. By conducting home studies, we sought to gain insights about how our intervention was used in daily life. In the context of Stoic mindfulness, this is about how our intervention supports the user in living virtuously.

In our home studies, we did not control for specific variables since our intervention was still in its early stages. As a starting point, the aim was to collect a wide range of insights to provide suggestions for which variables to control in follow-up work.

Context mapping

Stoic reflection is a highly subjective and personal form of self-assessment. To deepen our understanding of the user we turned to context mapping, where the goal is to gain insights into a person's dreams and aspirations [45]. In context mapping, an activity is introduced into a person's daily life as a probe for a personal response e.g. asking the end user to take photos of the area in which they normally relax or to write a journal entry about how they feel after dinner. These probes are in service of better understanding the daily life of the user and the context for which an intervention is developed, so as to design a more impactful solution. Here, we used context mapping differently, as an intervention was already developed and subsequently served as the probe to generate the insights. The aim was still to gain an understanding of the intervention in daily life and, quite suitably, how it supported the participant's dreams and aspirations with regards to virtuous living.

5.3 Design practice

In developing our intervention (Chapter 7), we conducted several design activities, including concept development, user scenarios and requirements definition, wireframing and visual mock-ups, and usability testing.

Concept development

After having defined our design goals, we created an overarching concept for the Bloom·e artefact which tackled these goals. We also created a concept for the smartphone app, describing its purpose and functionality.

User scenarios and requirements definition

Based on our concepts, we generated user scenarios in which intended experiences with our intervention were described. From these scenarios, we defined user and functional requirements for developing the smartphone application used to interface with the Bloom·e artefact. The user requirements highlight the desired aspects of the user experience, while the functional requirements highlight the tasks the user should be able to carry out.

Wireframing and visual mock-ups

To flesh out the user interface of the smartphone application before developing the final software package, we created wireframes and an extensive visual mock-up. During this iterative process, we finetuned the design to best meet our user and functional requirements. The visual mock-up was also made to appear as a convincing prototype of a real smartphone application for later use in usability testing.

Usability testing

To prepare the intervention for our home studies, we run usability tests with the visual mock-ups of the smartphone application. In these tests, we observed the user as they carried out tasks, so that we could assess whether the smartphone application fulfilled our functional requirements. As they carried out tasks, the user thought out loud, making explicit their thoughts and emotions. We asked questions in between these responses to probe for the *why* behind them. Observing their responses allowed us to evaluate whether the application fulfilled our user requirements. The usability tests conducted were not exhaustive – we focused only on qualitative assessments of how users perceived the application, their satisfaction using it, and whether they found it easy to use or encountered any difficulties. We did not use any quantitative metrics, such as recording the time it took to complete a task or counting how many times the user appeared confused. This is because our interest at this stage was in ensuring that the user was able to at least use our intervention during the home studies, instead of more elaborately analysing their task efficiency.

5.4 Data collection and analysis

In this section, we describe the qualitative nature of our research and introduce our research dimensions, which framed the data and structured the results. We then describe the questionnaires we used during the home studies as well as the semi-structured interviews, followed by our method of analysis.

Qualitative data

Measuring well-being is a complex pursuit, with considerable disagreement in literature regarding how to properly understand and measure it [21]. If we positioned Bloom·e as an intervention to support eudaimonic well-being, we could have turned to the many associated measures used in Psychology [79]. However, we did not use any of these measures in our home studies for a number of reasons. First, to our knowledge, eudaimonic well-being measures have not yet been strongly linked to Stoic practice, so we cautioned against their direct use in evaluating the effect of our intervention at such an early stage. Second, it was difficult to decide which specific measure(s) to use. And third, we did not want to lead participants to think about our intervention and its purpose in any specific way, while self-report measures are sometimes indicative as to what they are trying to measure. For example, The Daily Behaviours scale asks participants how often they engage in each of seven eudaimonic behaviours, such as giving money, volunteering, writing out goals, persevering, and building relationships [79] c.f. [89]. This indication of what the experiment is trying to measure could otherwise have prevented unexpected insights from emerging. Finally, because our home studies took place over a duration of seven days, we did not expect to see any measurable changes in well-being. For these reasons, we decided not to use any eudaimonic measures. Rather, through context mapping and qualitative analysis of the data, we hoped to gain an understanding of Bloom·e's potential as a well-being intervention. Our research therefore produced qualitative data for the most part.

Questionnaires

Our first method of data collection involved the use of questionnaires. For our home studies (Chapter 8), we used three questionnaires: (1) Pre-experiment questionnaire; (2) Mid-way questionnaire; and (3) Post-experiment questionnaire. Each questionnaire served a specific purpose.

The *pre-experiment questionnaire* established a baseline of each participant because our intervention sought to improve well-being. In addition to collecting basic demographic information, the baseline measured their affinity for technology interaction since our intervention is highly technological in nature. We also measured the participant's predisposition towards mindfulness and Stoicism. We used these pre-treatment measures in an attempt to contribute to stronger validity and reliability of analyses of mindfulness intervention effects on outcomes, which is currently a methodological limitation in literature [24]. If not for any follow-up work we will conduct, we hope these measures are at least useful for readers to know more about the type of participants we recruited.

The *mid-way questionnaire*, used half-way throughout the home study, aimed to capture contextual insights surrounding the use of our intervention. This was to mimic the use of a diary study in which a participant describes their experience in their own eyes and in situ [9].

The *post-experiment questionnaire* preceded a semi-structured interview and acted largely as a primer for participants to recall their time using our intervention, such that they would be more attuned to describing details of their experience in the final interview.

Semi-structured interviews

Our second method of data collection involved the use of semi-structured interviews, which were held at the end of each home study. Semi-structured interviews were used because they allowed us to shape the interview based on the content of responses and also let us probe for the *why* behind them, while still providing a consistent structure to organize responses. This is unlike structured interviews which do not allow for tangent answers, and unstructured interviews which may lead to too many inconsistencies in responses [10]. Since we wanted to tap into subjective experiences with our intervention, the insights may not always come forth immediately and may also emerge at unexpected moments during the interview.

Although the interviews shared the same structure, we added or adapted specific questions based on responses in the pre-experiment and mid-way questionnaires. In this way, the questionnaires *enriched* the interviews and drew a more complete picture together.

Thematic analysis

The final data collected comprises responses from the questionnaires and transcripts of the interviews. To uncover insights, we coded the data and conducted a thematic analysis. Our thematic analysis was largely inductive in approach, meaning we let the data drive forward insights, instead of grouping them under pre-determined themes as in a deductive approach. Our coding and theme generation were of a semantic approach – we based our insights on the things participants said or their responses in the surveys, instead of using a latent approach to read into the mechanisms or assumptions underlying the data. Our analysis led to a discussion of Bloom's as a mindfulness intervention (answering RQ1) and design implications in relation to the leitmotifs reviewed at the start of this research (answering RQ2).

6 Stoic practice: a case study for mindfulness

To gain insights and tackle our research questions, we carried out a case study to design and develop a mindfulness intervention. In this chapter, we first describe mindfulness interventions as understood in literature. We then turn to a pragmatic form of mindfulness found in Stoicism and examine the philosophy in more detail, justifying the use of Stoic practice in our intervention. We frame Stoicism under a number of well-being concepts and close the chapter by introducing Bloom-e – an ambient artefact designed as interior décor – and explain its use in this study.

6.1 Mindfulness interventions

We begin our work by tackling **SQ1: Which practice can enhance the capability to live mindfully?** It turns out that a large body of work already exists to tackle this question: mindfulness interventions [24]. To provide bounds under which we can conduct an empirical study and tackle our research questions, we conduct a case study involving the design and development of our own mindfulness intervention.

We previously spoke about mindfulness as found in clinical practice and renowned programs such as Mindfulness-Based Stress Reduction (MBSR) (section 2.2). MBSR is just one example of a group-based mindfulness intervention and exists amongst countless others inspired by it. In a review of mindfulness interventions, Creswell [24] lists other types such as meditation retreat programs ranging from 3 days to 3 months, internet and smartphone applications such as the Headspace mindfulness app, and mindfulness-related interventions where mindfulness is just one component of a broader treatment program. Mindfulness interventions typically share the goal of cultivating mindfulness in the individual, that is to *openly attend, with awareness, to one's present moment experience*. This is the definition we highlighted in section 2.2. Creswell further elaborates on this definition of mindfulness by describing two key features found in literature: (1) the grounding of attention and awareness in one's present moment experience, which can take many forms such as body sensations, emotional reactions, or mental images; and (2) the cultivating of an openness or acceptance toward one's experience with a curious, detached, and nonreactive orientation, even if the experience is uninviting.

Creswell reviews an abundance of work investigating the effects of mindfulness interventions on participants and the psychological mechanisms driving these effects. Some of these effects are improvements in chronic pain and health behaviours regarding physical health, or a reduction in depression and anxiety regarding mental health. There are also cognitive and affective outcomes such as developing the skill to maintain an open and accepting attitude towards experiences, which is considered to help with the regulation of emotion. The mechanisms which drive these effects might include the ability to observe one's experiences more objectively, which is essentially the meta-awareness and non-judgemental aspect of mindfulness. Other mechanisms studied in Psychology are neurobiological, that is that certain parts of the brain which are responsible for dealing with, for example, stress reduction, see changes during or after mindfulness interventions.

For the many improvements to well-being that mindfulness interventions seem to show, most of the well-documented studies which give evidence for these improvements involve a trained teacher. In our work, we note the absence of such a teacher, and must therefore look in the direction of creating a pure self-help intervention. These types of mindfulness interventions, such as internet and smartphone applications, have yet to see robust research on their efficacy over in-person group-based approaches as in MBSR. However, initial studies show evidence that they may have benefits [24] c.f. [12], [60].

We could create yet another mindfulness intervention along the lines of the Headspace application. It would be redundant, however, considering the app sees two-million active users around the globe. Additionally, although pure self-help, these interventions are supposedly informed by clinical experts and a deep understanding of mindfulness concepts, an expertise which we unfortunately do not possess. Furthermore, Creswell [24] makes note of some of the risks of participating in mindfulness interventions as currently designed, including those who have a life history of trauma experiencing the resurfacing of these memories, or at-risk individuals of psychosis or seizures exacerbating these

symptoms. Although there is little empirically published work on these experiences, we caution diving into mindfulness practices as grounded in clinical psychology without possessing expertise on the subject. For the reasons stated above, we turn to the more pragmatic concept of Stoic mindfulness as found in the philosophy of Stoicism, which we previously described in section 2.3.

6.2 Stoicism as a mindfulness practice

In his paper, Sellars [85] describes Stoic attitude as a variation of modern mindfulness, where the object of attention is not the present moment as it unfolds, but rather one's philosophical principles and the actions informed by these principles. Although the object of attention and goal may be different, Stoicism and modern mindfulness have commonalities such as the focus on the present moment context and non-judgemental observation of one's experiences.

Today, outside of science-based practices, Stoicism has gained a large following from individuals interested in self-development, a popularity which continues to spread due to the many online videos (e.g. [32], [77] and [94]) and websites (e.g. [42], [43] and [63]) available which describe the philosophy to the general audience, and which sometimes offer explanations of how one can put the philosophy in practice. It is also worth mentioning reputable books such as Marcus Aurelius' *Meditations* [39] and Donald Robertson's *How To Think Like A Roman Emperor* [83], which have seen widespread appraisal by general audiences around the world. We can attribute the popularity of Stoicism perhaps to the fact that it appears to provide a more tangible concept towards mindfulness practice and is a philosophy where followers appear to grasp the source material more easily. This contrasts with Buddhist conceptions of 'enlightenment', its meditation practices of which have informed modern mindfulness science [82] but which remain a challenging practice to grasp, especially given that it is originally non-secular in nature.

Stoicism has also informed clinical science: Robertson [83] explains that cognitive-behavioural therapy (CBT) – a psycho-social intervention which aims to improve mental health – has some primary psychological assumptions in common with Stoicism. This is the “cognitive theory of emotion”, which says that our beliefs mainly determine our emotions e.g. anxiety largely consists of the belief that “something bad is going to happen”. We learn here that, just as meditation concepts in Buddhism inspired MBSR therapy, Stoicism inspired the pioneers of CBT, and both clinical practices aim to support individuals in their well-being. But although Stoicism and Buddhism have both informed science-based practices, their source material differs in accessibility. Stoicism, in its ancient writings about virtue and what it means to be a good person, appear to be more accessible to the general audience than the source material found in the philosophy and religion of Buddhism.

Given that we do not possess the expertise of a clinical psychologist, nor that a mindfulness expert is contributing to this work, we consider the philosophy of Stoicism an approachable body of work to inform the design of our well-being intervention. We also consider this an area worth exploring as, to our knowledge, Stoicism has not yet been studied as part of a well-documented mindfulness intervention.

6.3 Stoicism in more detail

To deepen our understanding of Stoicism, we take reference from cognitive psychotherapist Donald Robertson's book *How to Think Like A Roman Emperor: The Stoic Philosophy of Marcus Aurelius* [83]. The remainder of this section is largely based on the content of his book, specifically from the chapters Introduction, The Dead Emperor (Ch. 1), Contemplating The Sage (Ch. 3) and The Choice Of Hercules (Ch. 4).

The Stoic goal of life

The Stoics believed that the goal of life was to “live in agreement with Nature”. Our ability to think rationally is what makes us human, so the argument therefore is that we have a duty to use and protect our ability to reason. The goal is to live wisely and virtuously. In this way, we can flourish as human beings. Of course, being emotional and experiencing desires and fears is also part of being human. Robertson explains that what matters, however, is rising above this and asserting our capacity for reason where we can. We take this step by keeping with us our values, or rather virtues, at all times. By practicing our virtues, we can learn to make rational value judgements in everything we do.

Robertson uses the terms ‘values’ and ‘virtues’ interchangeably and does not provide a clear formula for defining a virtue – we suspect this is due to the highly subjective nature of virtues as a concept itself – however he later suggests that the reader think about a person whom they admire and subsequently write down that person's traits. This is followed by an exercise in thinking about our ideal virtues with reference to these admired traits. We note here an overlap between this process of virtue identification and identity-based behaviour change. Oyserman et al. describe identities as having value and that people regulate themselves in light of their identities [73]. Oyserman explains that identities can be personal i.e. personal traits or characteristics such as “smart”, or social i.e. social relationships such as “friendly”. We do not fully understand here why “friendly” is not considered a personal trait, even though to many this might be a reasonable semantic. In any case, Oyserman further explains that identities embody values and a sense of what those identities look like, sound like, move like and so forth. This can be likened to the Stoic practice of living through your virtues, which also requires having some awareness of what it means to hold a particular virtue.

Oyserman describes identity-based motivation theory as a theory of human motivation and goal-pursuit. It explains how and when a person's identities or self-concepts motivate them to take action towards their goals. This is not only shaped by how someone regards themselves, but also by the shifting contexts around them. This means that the identity-to-action link is bidirectional: the external world influences what people do and this influences how they see themselves, a notion we can map to the idea that the digital information around us can shape our behaviours and identities, as well. In his book *Atomic Habits*, habit expert and writer James Clear describes in a similar fashion how identities can shape habits:

Many people begin the process of changing their habits by focusing on what they want to achieve. This leads us to outcome-based habits. The alternative is to build identity-based habits. With this approach we start by focusing on who we wish to become. [19]

The Stoic goal of life is to reflect on our virtues by thinking about the kind of person we want to be and to act accordingly. The presence of this mindset in other theories such as habit-forming and identity-based motivation, although in varied conceptions, shows its broad appeal and potential to be applied in different areas of life.

stoicism vs Stoicism

When people talk about being stoic (lowercase s), they often refer to being emotionless or suppressing feelings, which is actually unhealthy and not the intent of the Stoics. This is a misconception of what it truly means to be Stoic (uppercase S) and is an important distinction to make. Stoic philosophy teaches us to transform unhealthy emotions into healthy ones.

Lowercase stoicism is just a personality trait (mental toughness). It also neglects the social dimension of Stoicism, which has to do with being just, fair, and kind to others. The Stoics believed that increasingly identifying our capacity for reason also extends to others - we are all “citizens of the universe”. Stoic ethics involves cultivating this natural affection towards other people.

The four cardinal virtues

Philosophy means “love of wisdom”. The Stoics took this to heart and loved wisdom above everything else. The Greek philosopher Socrates saw philosophy not only as a moral guide but also as a kind of *psychological therapy*. Doing philosophy, he said, can help us overcome our fear of death, improve our character, and even find a genuine sense of fulfilment.

Socrates and his followers defined a number of *cardinal* virtues to live by. The Stoics adopted these virtues into *wisdom, morality, courage, and moderation*. Whereas wisdom refers directly to the pursuit of knowledge and virtue overall, the other three virtues of morality, courage and moderation can be seen as wisdom applied to our actions in different areas of life. We present simplified definitions of each category below:

Wisdom: our pursuit of *knowledge*, especially in understanding what is good, bad, or indifferent. Strengthening our ability to reason in any situation.

Morality: wisdom applied to our *social* sphere – to our relationships and how we treat others.

Courage: mastering our *fears*. Allowing reason, rather than our fears themselves, to inform our actions.

Moderation: mastering our *desires*. Allowing reason, rather than our desires themselves, to inform our actions.

A daily reflection routine

The Stoics incorporated reflection into their daily routine as a way to think about how well they lived in accordance with their virtues. A simple framework provided by Robertson to beginners of Stoicism consists of a morning and evening reflection, with the intention to live in accordance with their values during the day.

In the morning, the student would consider their day ahead and any challenges they might need to overcome. With their day ahead pictured in their minds, they would mentally rehearse the virtues they would want to exhibit, imagining what their role model might do in those situations. During the day, they would try to be continually self-aware, almost as if their role model was observing them. This is what Robertson calls “Stoic mindfulness”. The idea is to keep their eye on the value judgements they make in different situations, and to try to notice any feelings of anger, fear, sadness or unhealthy desires and habits. In the evening or at the end of the day, the student will take a moment to think about the virtues they practised and how things actually went. They consider what they did well, what they did badly and what they could do differently. The next day, they try to use what they have learned to improve their Stoic practice.

Given the well-structured routine outlined by Robertson for practicing Stoicism, we use it to inform the reflective practice facilitated by our intervention. By doing so, we also hope to ground our intervention in a reputable body of work.

6.4 Stoicism and well-being

As Stoicism has not yet been studied extensively as part of a mindfulness intervention, we need to consider its relations to, and the ways in which it enhances, well-being. To do this, we frame Stoicism under objective list theory and the capabilities-based approach to well-being.

Objective-list theory

Well-being is a complex and multi-faceted construct that is largely dependent on the perspective taken. Well-being as a construct has been studied by philosophers for decades and has yielded three major types of theories: hedonist, desire-fulfilment and objective-list theories [14]. *Hedonist* theories hold that well-being consists of the presence of pleasure and the absence of pain. *Desire-fulfilment* holds that people’s well-being lies in the fulfilment of their desires which avoids the ‘authenticity’ issue of hedonist theories. *Objective-list theories* consider a list of objective conditions which improve well-being, regardless of the person’s own desires or preferences. When most or all of the goods on the list are attained, well-being is subsequently attained, as well. Different accounts of an objective list of goods exist, but some goods include liberty, friendship, autonomy, wisdom, morality, the development of one’s abilities, and aesthetic experience [14].

Stoicism promotes rationalising and virtue as the highest value one can have. Pleasure and pain have no particular value in Stoicism, only except that it provides a basis to exercise our ability to think and act rationally as motivators of our actions rather than the pleasure and pain itself. For these reasons, Stoicism opposes the hedonist theory of well-being. We also know that the Stoics sought to gain control over their desires and fears, which means that the desire-fulfilment theories are also not applicable.

Stoicism appears to connect more strongly to objective-list theory. The *perfectionist* account of objective list holds that what is good for us is given by our intrinsic nature as human beings, and that we should strive to excel so as to realize these goods. For the Stoics, what makes us human is our ability to think rationally and it is this rationality which is sought after. We can therefore see it here as a good to be attained under a perfectionist account. Indeed, there are parallels to Aristotle’s famous perfectionist theory of *eudaimonia* or flourishing, in which we are meant to exercise some ultimate function of the

human being. In some of his writings, Aristotle conveys that eudaimonia is achieved through the pursuit and exercising of virtue or excellence [79]. We can see here a clear connection to the Stoics, who also use the term eudaimonia to describe authentic happiness and fulfilment [83] and who place virtue above all else. This comparison is not meant to be exhaustive, however. We mention it here because measuring eudaimonic well-being is a known concept in positive psychology with many associated measures [79], and this may be useful in evaluating an intervention which seeks to support eudaimonic behaviour, something that could be said about our case study. With the perfectionist account of objective list in mind, Stoicism enhances well-being through the pursuit of virtue.

The capabilities-based approach

The capabilities-based approach to well-being assumes that people's ability to attain well-being is dependent on their development and possession of a number of basic capabilities, which enable them to engage in activities that promote their well-being [14]. Capabilities can be described as “what people are effectively able to do or be” or the (positive) freedom that people have “to enjoy ‘valuable beings and doings’” [71]. Beings and doings are *functionings* which are realized, versus *capabilities* which are options effectively possible or from which one can choose. Here, we assume that Stoicism, and the practice of living virtuously, is a mechanism for developing some of these capabilities. In a way, Stoic reflection encourages us to be more conscious about how we can act in light of the characteristics we wish to possess; it is a self-prescribed awareness of the choices we can make that lead to functionings we consider valuable. It is perhaps for this reason that the Stoics believed that we do not need any external thing in order to be happy, for we possess the ability to decide for ourselves how we approach any given situation. Although some would argue, including Aristotle himself, that external goods still do and can enable us to live virtuously [84]. Those external goods are not *the* reason to live – rather it is virtue we must exercise – but from Aristotle's view it is undeniable that the possession or lack of external goods can enable or constrain us from living ‘happily’. The capabilities-based approach to well-being, with its roots in economics, would seem to agree with this outlook, since capabilities enable functionings *in the external world*; the point of having a capability in this sense is for some valuable being or doing in the world around us. Stoicism, on the other hand, says that the ultimate goal to attain is not found in the external world but rather within the rationality that exists inside of us.

If we are to posit Stoic reflection as a mechanism for bringing about capabilities to attain well-being, then we must also adapt the philosophy by allowing users of our intervention to consider external goods within their conceptions of what it means to live virtuously. It turns out that even the Stoics themselves did not all agree on every matter of doctrine [39], which can be seen in the way that they accept a gradation of values as to what one considers a *preferred* or *dispreferred indifferent* e.g. health is preferable to illness, wealth is preferable to poverty. Ultimately, this means that our intervention should not embody Stoicism in any particularly devout way, but rather allow for more flexible conceptions of virtuous living.

The role of our intervention

In framing Stoicism under well-being theory, we have defined two ways in which the practice can enhance well-being: (1) supporting the user in their pursuit of virtue; and (2) allowing for flexible conceptions of virtuous living. At the same time, Robertson's reflection routine is focused on assessing one's performance and findings ways to improve. Our intervention should therefore enhance well-

being within such an assessment: to pursue virtue is to assess how one is performing, and to consider one's own conception of virtuous living is to openly reflect upon the assessment.

Virtues and values are highly subjective to the individual. Virtuous living is a specific account of well-being and a desirable state judged from a particular value framework, in this case one proposed by the Stoics and similarly by Aristotle. Even within this framework we can think of different accounts as to what it means to live 'well'. For example, somebody who neglects virtue during a difficult period might not necessarily consider themselves at fault – as they have other things to attend to – and might return to attending to their virtues at a later point in time with no remorse. In the same situation, somebody else might feel more strongly about keeping to their virtues at all times and if unable to, may wish to receive motivation whether constructive or critical, to improve upon their behaviour. A third person could take the situation as a sign that their attitude towards their virtues must change or come to the conclusion that particular virtues may not be relevant during certain periods of their life. There are a multitude of ways in which an individual might manage and process their virtues. The risk here is that, as designers, our own value framework of what it means to live virtuously, to assess ourselves and even the type of 'coaching style' we gravitate towards, becomes unintentionally embodied in the intervention and the way users interact with it. This can be said about any intervention for well-being that has a prescribed understanding of what well-being is and how one *should* regulate themselves. While not necessarily a bad thing, the embedding of our own value framework in the intervention could prevent users in considering their own during assessment.

While it is true our intervention by default proposes Stoic reflection as something to work towards, we can at the very least assume that there is no single *correct* way to practise the philosophy. This is especially true when we consider Stoic reflection, as outlined by Robertson, a type of self-assessment akin to what is known in psychology as *subjective well-being*, which looks at how people evaluate their own happiness and life satisfaction. It is therefore crucial that our intervention supports the user's assessment of virtuous living in a way which aligns with their own values through open reflection. We hope to achieve this by taking advantage of the slow technology genre and supporting in the self-attribution of meaning.

6.5 The pervasive technology artefact

Now that we have established Stoicism as the reflective practice to be facilitated by our intervention (RQ1), we consider how a pervasive technology artefact can facilitate the practice (RQ2). With the home context in mind (RQ3), the artefact we use should also be well integrated into the environment. This is to strengthen the idea that it is pervasive. In this section, we introduce Bloom·e, a decorative object designed to be placed in the home. We describe its aesthetics, its components, and how we embed Bloom·e in the slow technology genre. We also explain how Bloom·e will play a role in facilitating Stoic reflection and the need for a smartphone application to act as an interface.

Introducing Bloom·e

Bloom·e is an ambient product originally developed to support goal-setting and time awareness (see Appendix A for the original concept storyboard). It was designed to fit inside any home interior as a decorative object. Bloom·e resembles a robotic plant and has two distinct sections: the bottom ‘vase’ and the top area comprising five stems and eight flowers (Figure 3). The size of the product is comparable to a medium-sized house plant.



Figure 3. The Bloom·e artefact

Triangular acrylic sheets cover the surface of the vase and give it an abstract appearance, which contrasts the rounded edges of each flower’s petals. The glossy, white finish gives it a modern feel. The petals are coloured to draw the eye upwards; a soft mint-green is used to complement its rounded edges, giving Bloom·e a calm and gentle appearance. The stems are matte black to give the rest of the components more significance in the visual hierarchy.

Bloom·e’s main program runs on two open-source microprocessors. Each flower contains a digital servo which enables it to bloom (i.e. open and close) independently and at small increments. RGB LED strips placed inside the vase allow it to glow in any colour. The microprocessors are Wi-Fi- and Bluetooth-enabled, allowing Bloom·e to connect to external devices and the internet. For a more detailed technical breakdown of Bloom·e, see Appendix B.

We can summarize Bloom·e's functionality in three key affordances:

- (1) the opening and closing of its flowers;
- (2) animated lighting in its vase; and
- (3) wireless data transfer over Wi-Fi or Bluetooth.

The overall look and feel of Bloom·e as a sculpture is intended to be organic – in the way that the flowers appear 'alive' through their movement and its loose resemblance of a house plant – yet embrace a technological and innovative appearance in its presentation and modern design. For this reason, we speculate that as a decorative object it may appeal more to individuals with an interest in technology or a technical background. We nevertheless consider this aesthetic appropriate for our case study as the design and appearance are clearly technological in nature, with digital and mechanical properties visible up close (Figure 4). Since we aim to explore the experience around technology 'in the background', we find this middle-ground aesthetic of part sculpture-part technology a suitable probe for insights once deployed in the home.



Figure 4. Bloom·e up close

Although Bloom·e does not offer a large array of affordances, a great deal can be expressed through minimal movement in (non-)anthropomorphic robots (e.g. [41][104]) and animated light [87]. To motivate the way we will use these features, we turn to the slow technology genre.

Embedding Bloom·e in the slow technology genre

We consider slow technology an appropriate genre to work with because of its emphasis on reflection as well as its placement of the artefact in some physical environment. In our case, the physical

environment is somewhere in the home. Our focus on facilitating Stoic reflection activities can be framed under a number of slow technology principles.

Hallnäs and Redström [38] highlight three themes under which the design philosophy of slow technology can be applied: (1) Reflective technology; (2) Time technology; and (3) Amplified environments. *Reflective technology* concerns the design of technology that both invites reflection and at the same time is reflective in its expression, asking questions about its being as a piece of technology and in this context through its slow presence. *Time technology* speaks about technology which amplifies the presence – as opposed to the absence – of time, revealing in this context a slow expression of present time. *Amplified environments* concern designing technological settings which amplify existing environmental artefacts (e.g. sound) through, in this context, time.

In our case study, we consider how Bloom·e can be used as an artefact in Stoic reflection i.e. the thing(s) to reflect about are the virtue(s) people hold close to them and how well they live through them. For this reason, we can embed Bloom·e within the theme of amplified environments. The environment to amplify here is not physical or external, however; it is introspective, looking inward towards one's own virtues across time. We take the liberty of expanding on Hallnäs' and Redström's themes by introducing the *introspective environment* as something which can be amplified.

Two primary design goals thus emerge:

- (1) Embody the user's personal virtues within the design expression of Bloom·e, as the intended act of reflecting should be inherent in the design expression
- (2) Enable reflection about virtue enactment through time

In relation to our framing of Stoicism under well-being concepts, we discussed the subjectivity surrounding how the user might want to assess their own enactment of virtues. With this in mind, we add a third primary goal:

- (3) Allow the user to bring forth their own value framework against which to judge their virtues and their enactment of those virtues

Hallnäs and Redström provide two basic guidelines for designing slow technology. First, there should be a focus on slowness of appearance and presence. This means the flowers should open and close at a slow pace. The same quality should hold for any light animations we might use. Secondly, there should be a focus on aesthetics of material and using simple basic tools of modern technology. After careful reading of Hallnäs' and Redström's text, we can understand this as with regards to the presentation of the technology and the materials used, rather than the technology itself. The way the technology works and the components used can be complex, however their presentation should be modest and not get in the way of reflecting about other things. Bloom·e has already been conceptualized which means we cannot make drastic changes to its fundamental blueprint, however it uses basic components: open-source microprocessors, digital servos and RGB LEDs. These components and the materials housing them are not presented – and do not function – in any remarkably complex fashion. We are aware, however, that what constitutes something as 'complex' vs. 'modest' may be open to subjectivity.

We nevertheless set two primary design guidelines for ourselves:

- (1) The behaviour of the flowers and light should manifest slowly
- (2) Bloom·e’s presentation should be modest and uncomplicated – in our point of view already the case

And in supporting the user’s own attribution of meaning to the virtues represented in the artefact, we add a third primary guideline:

- (3) Bloom·e itself should not impose any judgement on the user’s virtues, but instead allow the user to form an assessment of their own

These goals and guidelines (Table 3) will be used when integrating Bloom·e within our well-being intervention.

Table 3. Bloom·e’s design goals & guidelines

Design goals	Design guidelines
#1: Embody the user’s personal virtues within the design expression of Bloom·e	#1: The behaviour of the flowers and light should manifest slowly
#2: Enable reflection about virtue enactment through time	#2: Bloom·e’s presentation should be modest and uncomplicated
#3: Allow the user to bring forth their own value framework against which to judge their virtues and their enactment of those virtues	#3: Bloom·e itself should not impose any judgement on the user’s virtues, but instead allow them to form an assessment of their own

Stretching the slow technology landscape

Hallnäs and Redström say slow technology is not “used” at all, but rather part of an environment, adding to its ambience and supporting various activities which take place in it [38]. For our intervention, this is a problematic constraint: how will we facilitate a structured reflection activity, as detailed by Robertson in his book about Stoicism, if the user cannot directly interact with the slow technology artefact except merely look at it? We presume that the point here is that such ambiguous, slowly manifesting objects do not exactly have a prescribed interaction use case, at least in the first conception of slow technology in 2001. But as interaction designers, we cannot find an argument for why somebody should not be able to interact with slow technology beyond just observing it.

If we examine Hallnäs and Redström’s paper in more detail, they position slow technology against information technology primarily aimed at making people more efficient when carrying out tasks. It is

in juxtaposition to the ‘productivity’ perspective, and the idea that slow technology can just ‘exist’ in the environment without being used, but still serve a meaningful purpose, is perhaps to combat the narrative that technology exists solely as tools to make us more productive. Although, since its conception in 2001, we have seen other forms of engagement which do not have to do with being productive. For example, the Drift Table [37] in 2004 and the History Tablecloth [36] in 2006 were ambient artefacts developed purely for ludic exploration and entertainment. We can also find an abundance of non-productivity experiences centred around technology in fields like that of interactive art [29]. One such art installation is Cmielewski’s *Seeker* [23] in 2009, which incorporates the meditative aspects of slow technology to facilitate in the absorption and reflection of information. Users interact with *Seeker* through a touch screen interface, and explore didactic political content mapped on top of grand vistas which slowly pan across the screen. Their tactile interaction with *Seeker* did not appear to remove the meditative and reflective qualities from the experience, although the paper did not mention this discrepancy.

In embedding Bloom·e in the slow technology genre twenty years after its introduction we also feel the need to modernize its theory: we can find more involved ways to interact with slow technology while still promoting reflection in the activity. Because the Stoic reflection routine outlined by Robertson is an involved process with clear steps, and because Bloom·e cannot walk the user through this process explicitly by mere observation of it, we choose to develop a smartphone app to guide the activity itself. When the app is not guiding the user through the activity, Bloom·e can still form a part of daily life as an ambient artefact, and we wish to see what role Bloom·e plays in the periphery. Our intervention therefore has two roles to play: (1) the active role in which the Stoic reflection activity has the user engage with both the smartphone app and with the Bloom·e artefact in a guided session; and (2) the passive role in which Bloom·e will simply exist in the background as an ambient artefact.

A smartphone provides us with several advantages in design and development, namely that it is a device everyone knows how to use and almost anything can be displayed on the screen interface, granting us flexibility in how we might guide the user through Stoic reflection. It also removes the complication of developing any additional hardware next to Bloom·e, which could otherwise blur the conceptual boundaries of Bloom·e as its own artefact and risk making the embedding of the artefact in the home more challenging. Our smartphone app will wirelessly interface with Bloom·e, allowing it to respond to user input without having to leave the slow technology genre altogether.

In our case study, we have defined our goals and guidelines (Table 3) and established the two components which make up our mindfulness intervention: (1) the Bloom·e artefact; and (2) a smartphone application. Together, they should support the user in living virtuously and help them assess themselves, in a way that they reflect openly about their virtues. We also talked about integrating our intervention in a home environment. We therefore develop our intervention towards it being deployed within a home study, i.e. field study. This will let us collect data about the use of our intervention in situ.

7 Intervention Design

To design our intervention, we first define the overarching concept of the Bloom·e artefact and smartphone app, their purpose and functionality. This is followed by three user scenarios used to guide the design process and communicate the interaction experiences we wish to achieve. These scenarios lead us to our requirements, which thereby inform the design and development of the smartphone app and the Bloom·e artefact's behaviour.

7.1 Concept of the Bloom·e artefact

Our overarching concept should address our design goals and follow our design guidelines (Table 3, section 6.5). The three goals are as follows: virtues should be embodied in the artefact (goal #1), virtue enactment should be tracked over time (goal #2), and the user should be able to assess their performance based on their own value framework (goal #3). The design guidelines state that the behaviour of Bloom·e's affordances should manifest slowly (guideline #1), the artefact's presentation should be uncomplicated (guideline #2), and Bloom·e should not impose any judgement on the reflection (guideline #3).

Embodiment of virtues through time

The way we embody a person's virtues in Bloom·e is by having each of their virtues represented by a flower - Bloom·e has eight in total. The metaphor we create here is that the more the person enacts their virtues, the more the corresponding flower(s) bloom. This both embodies their virtues in Bloom·e's expression but also carries information about their virtues through time, addressing design goals #1 and #2. Bloom·e has only eight flowers in total, which means it can not deal with more than eight virtues at one time. For this reason, we introduce a *focus virtues* feature within the smartphone application, which asks the user to make a selection of up to eight virtues to focus on and thereby link to Bloom·e. This has the added effect of requiring the user to be deliberate about the virtues they want to pay attention to. We can see this as a *design friction* which asks the user to be mindful about the virtues they want to prioritize. If the user decides to have less than eight focus virtues, the flowers will be evenly distributed amongst those virtues. In the case of mixed fractions, some virtues will be assigned one extra flower. Newly assigned focus virtues will be added to Bloom·e by redistributing the flowers once more. Focus virtues already on Bloom·e will retain their bloom level, unless later removed and added again in which case they are reset to a closed position.



Figure 5. Each focus virtue is linked to one or more flowers

Supporting the user's own assessment of themselves

Bloom·e embodies virtue enactment through time, thereby allowing the user to reflect on their virtuous living. A simple metaphor, but in practice, several questions arise: What happens when the user does not enact their virtues? Or when they skip their reflections? How does Bloom·e embody this information over time?

One possible implementation would be that, instead of blooming, the flowers can dwindle – if the user concludes that they did not enact a virtue, its corresponding flower can close. A logical solution, then, if it were not for the fact that in doing so, the artefact is assigning judgement to the reflection. This is

because it would imply that the flowers are only open if the user enacts their virtues and only closed if they do not. This does not adhere to design guideline #3, which says that the intervention should not impose any judgement on the user's virtues. Here, Bloom·e is projecting its own value construct that 'open' is good and 'closed' is bad. And as a slow technology artefact, this simple narrative does not offer more room for interpretation. Reflections deserve nuance, and the user should be encouraged to form their own interpretation of Bloom·e's expression.

To avoid imposing judgement, we embrace the aesthetic quality of both the flowers opening but also closing, since we do not want to assign a linear narrative to its expression – closed flowers should not be 'bad' and open flowers should not be 'good'. In this way, we seek to lessen the message that flowers are closed as a 'penalty'. To achieve this, we use the opening and closing affordance in more than one way. When the user assigns new focus virtues, the newly assigned flowers are reset to a closed position. This gives the 'closed appearance' a more dynamic role and allows the expression to appear more often instead of only when the user is 'doing bad'.

We also make a distinction between enacting virtues on the one hand, and performing the reflections themselves on the other. As Stoicism encourages, we should always reflect on and keep our virtues at hand, and if we do not enact them the goal is to be more mindful the next time. One can say that the value is first and foremost in the act of reflecting and our actions in the world should come as a response to those reflections. To capture this in Bloom·e, we make it such that the flowers will always bloom whenever the user performs a reflection, while the amount that each flower blooms depends on how well its corresponding virtue is enacted – not enacting a virtue results in a baseline amount of bloom, strongly enacting a virtue is x times the amount of bloom, and so forth. This shifts the *monitoring* role of Bloom·e to prioritizing whether the user performs their *reflections* rather than whether they enact their virtues. This detaches Bloom·e from being *the* measure of success; just because the user is not reflecting with Bloom·e, does not necessarily mean that they are failing to live virtuously. Rather, they are simply not reflecting with Bloom·e. This also gives Bloom·e more permission to simply exist 'in the background' – its expression does not become *incorrect* or *false* if the user manages to live virtuously without it. A subtle difference, but ultimately, the artefact wants to invite reflection without imposing the use of itself as necessary for living 'well'.

By blurring the narrative that 'closed is bad' and 'open is good', we hope to allow the user to assess their virtuous performance using their own value framework (design goal #3). If one flower is more closed or open than another, what could that mean to them? Bloom·e does not seem to know.

Bloom·e as calm technology

Our design goals for Bloom·e came as a result of framing it under slow technology principles. We are also interested in the calm technology genre, where the technology should be unobtrusive. We see the opportunity to embed this quality in a notification system which reminds the user to perform their reflections. Although we will design a smartphone application to guide the reflections, we know that smartphone notifications can be considered a distraction [74] c.f. [59], [64]. Rather than have the app send notifications to the user in a distracting way, we hand over this role entirely to the Bloom·e artefact.

In thinking about how the artefact can remind the user to reflect in an unobtrusive manner, we follow design guideline #1 and use the slow technology principle of slow manifestation: Bloom·e will begin to glow when the user's scheduled time approaches, but will start off very dim. As the scheduled time gets nearer, the glow will get brighter (Figure 6). This slow manifestation, we hope, will not immediately distract the user or forcefully grab their attention, which could otherwise be the case if it turned on at full brightness all of a sudden. A gradual glow will also not demand immediate action, letting the user decide when exactly to perform the reflection. And manifesting in the periphery should mean that the user can notice it more subtly and intuitively, while the brightness of the glow can hint at how close the scheduled time is approaching. We hope this will be less obtrusive than the alternative: glancing at a smartphone screen when interrupted by a ringtone, and where many other notifications may be simultaneously present and attention-grabbing.

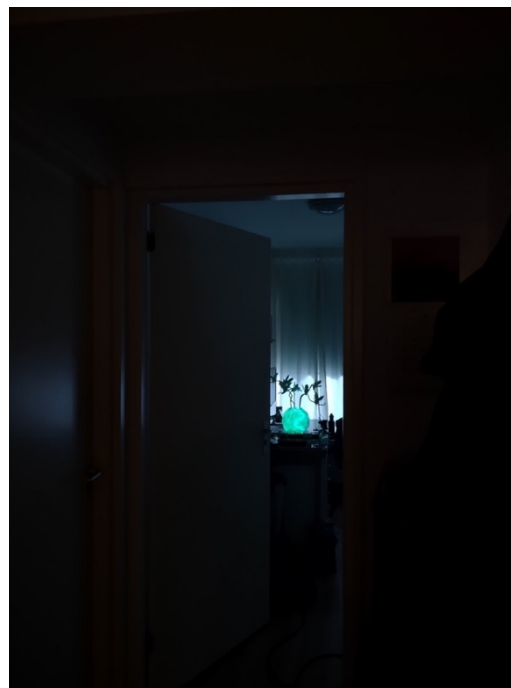


Figure 6. Bloom·e glowing in a separate room

7.2 Concept of the smartphone app

The smartphone app acts as the interface between the user and the Bloom·e artefact, which also gives it the role of guiding the reflection activities. We base our reflection activities on the routine outlined by Robertson [83]. During the *morning reflection*, the user considers their day ahead and mentally rehearses the virtues they want to exhibit. Throughout the day, they try to practise Stoic mindfulness, as if their role model is observing them; this is a role we hope Bloom·e can play by being present in the background. At the end of the day, they perform an *evening reflection* to assess how they did. The app should therefore facilitate these activities in some way.

Virtues and reflections

The first opportunity we see for the app is that it can facilitate in the defining and storing of virtues. In much the same way as a person uses a productivity app to list their to-dos, the Bloom·e app can ease the process of thinking about and listing virtues. Second of all, the app can guide the reflections with this stored information, asking the user how well they have enacted each virtue. Performing the reflections in the app will also enable it to send the results to the Bloom·e artefact.

If the app is to support the user in defining their virtues, it should make clear in what way this can be done. Robertson describes his routine as one that is pragmatic – the virtues you keep close to you are those which play a role in your actions throughout the day. He uses the terms ‘values’ and ‘virtues’ interchangeably without providing a clear formula, however he suggests that one thinks about a person whom they admire and subsequently write down that person’s traits. These traits should serve as inspiration for the type of person one aspires to be. Acting according to these aspirations is the Stoic goal of life, and we have previously linked this mindset to identity-based behaviour change [73] and identity-based habits [19] (section 6.3), where the ideal person we have in mind can inform our actions

and behaviour. Leaving the formulation of virtues open-ended would make guiding the evening reflection difficult and perhaps even intimidate the user in defining them, but keeping it strict would remove the nuance that is the point of virtue in the first place. As a middle ground, we use the following formulation which also makes a link to identity-based behaviour and habit-forming: users will think of their own virtues in the form of ‘*I am someone who...*’ and complete the rest of the sentence, e.g. ‘I am someone who finds time to read’, ‘I am someone who spends time with family’, or ‘I am someone who offers support to friends’. We use this phrasing to help provide a structured and consistent method of defining virtues, and also to encourage a formulation that is actionable such that the user can reflect on its enactment and whether they were that kind of person at the end of the day. As further aid, we use the four Stoic cardinal virtues of *morality*, *courage*, *moderation*, and *wisdom* (section 6.3) as categories which the user can add virtues to.

To ask the user how well they have enacted each virtue is not a simple task. Naturally, Robertson does not give step-by-step instructions for the reflections themselves, but rather explains that the individual can think about what went well, what went badly, and what they can improve the next time. While these are logical questions we could ask the user, they walk the fine line of encouraging a judgemental attitude (especially if the user did not read Robertson’s work prior) and they do not tackle a single virtue directly but are broader-leading questions. We could alternatively ask ‘What went well for [this specific virtue]’ but then we would have an open-ended question, which would make it difficult to tell Bloom·e what to do with such qualitative data. The solution, we found, would be in some self-report scale, where the strength of the response determines the strength of the corresponding flower’s bloom. A self-report scale would make it possible to assign quantitative data to each response, which can then be sent to Bloom·e. As typically done with self-report scales, the question prompt should hold as little interpretation in its subtext as possible. This means that asking ‘How well did you enact this virtue today?’ would be unreliable, given that ‘how well’ is up for interpretation. Instead, we use a more straightforward ‘Did you practice this virtue today?’. The idea is that the user selects an item on a response scale. We explore the design of our scale when detailing the development of the smartphone app in section 7.5.

Adding a weekly reflection

If we consider the role that Bloom·e plays in embodying the results of the reflections, we see here that it has a somewhat passive role, waiting for the final information to arrive and transforming its flowers as a response. But in framing Bloom·e as a slow technology artefact, the user should also be able to reflect through it. Arguably, the morning and evening reflections do not necessarily require the physical artefact during the reflection itself. The question thus becomes: what activity can the user perform in the app which makes direct use of the Bloom·e artefact?

In addition to the morning and evening reflections, we add a *weekly reflection*. Our weekly reflection is in addition to Robertson’s routine, one which tries to make full use of Bloom·e as a slow technology artefact. The idea is that the user can ‘walk through time’ and explore data about their virtue enactment throughout the week, instead of only focusing on a single day as in the evening reflection. The goal is for the Bloom·e artefact to behave as a tangible interface, allowing the user to explore the data intuitively and with curiosity, such that they can gain new insights about themselves.

7.3 User scenarios

To explore the experiences we wish to have around our intervention and to guide the design process, we construct three user scenarios: (1) General interaction and evening reflection; (2) Small number of defined virtues; and (3) Weekly reflection. One more scenario, *Not using Bloom·e*, was conceptualized but later discarded due to practical limitations of the project's scope. It can be found in Appendix C. In each scenario, we highlight in grey any actions performed by the user or the Bloom·e artefact and app – these help us later determine our *requirements* for developing the smartphone application.

General interaction and evening reflection

Our general interaction scenario captures the ideal use case and how Stoic mindfulness is cultivated in the user. Here, Bloom·e is easy to place in the user's home and can sit beside other personal artefacts. Using Bloom·e is pleasing and at the same time does not demand immediate attention when reminding the user to reflect. The way the flowers open and close over time does not judge the user in their practice, but rather gives insights about their changing priorities over time. The scenario is as follows:

Dan is a first year Master student who begins to wonder whether he has 'found himself'. After dinner, he usually checks his social media notifications and scrolls through his feed, sometimes comparing himself to his friends who appear to be happier than he is, some of whom have already graduated. He has recently begun to feel a general dissatisfaction with his life and also feels a lack of confidence with who he is and the person he wants to be.

Dan decides to use Bloom·e at home to practise Stoic reflection and to live more mindfully. After completing the onboarding process, he places Bloom·e in his living room, on a small table next to a family photo and other personal artefacts. When Bloom·e starts up, the flowers spring to life and move delicately before coming to a resting state; he feels a sense of preciousness.

Dan launches the companion app on his smartphone, which starts by connecting itself to Bloom·e. The app then asks him to enter up to eight virtues, which can fall under one of four categories: wisdom, morality, courage, or moderation. A short explanation is given for each. Dan enters three virtues in the form of 'I am someone who...': stays in touch with my family (morality); is a good listener (wisdom); and avoids binge watching on Netflix (moderation). The app asks Dan to water Bloom·e with these virtues in order to get started. He tilts his phone above Bloom·e which appears to respond to the interaction. The app asks Dan to set two recurring times to reflect: one daily reflection (whether or not the virtues have been enacted) and the other a weekly reflection (on the set of virtues overall and whether or not to adjust them). The weekly reflection is set to Sunday at 20:00 by default.

At the end of the next day, Dan is in the living room when he notices something glow in his peripheral view, prompting him to look towards Bloom·e. There are still some dirty dishes in the kitchen from dinner, which he decides to clean up first. Afterwards, he approaches Bloom·e and opens the app. The app begins a 5-minute exercise which requires Dan to observe Bloom·e and reflect on the extent to which he lived up to his virtues. He thinks about a moment in the afternoon during which he lent an ear to a friend. At the end of the exercise, he indicates in the app that he enacted 'is a good listener', and he also enters a note-to-self that

he should 'ask how my friends are doing more often'. He feels a sense of accomplishment as a flower appears to grow open a little.

Dan performs the weekly reflection on Sunday, and feels that he could put more effort into staying in touch with his family. He decides to improve on this aspect the coming week, while adding two more virtues on the list. The app asks Dan to water Bloom·e with his phone again, which responds to the interaction indicating the virtues are being updated. Bloom·e redistributes the virtues amongst the flowers, keeping track of previous progress while freeing up the necessary amount of flowers for the new virtues and putting them in a closed state.

Whenever Dan passes by Bloom·e he is reminded about his values. As time goes by he notices that the flowers open and close dynamically; the virtues he enacts are always shifting and sometimes even change along the way. After a few weeks of practicing Stoic reflection, Dan feels more confident with how he sees himself and is more mindful of his everyday actions. He feels more fulfilled and is driven with purpose, guided by his virtues and often reflecting on how to do better.

Small number of defined virtues

This scenario looks at what happens when the user has very few virtues they want to enact and how Bloom·e handles this. The scenario is as follows:

Larisa is an assistant professor at a University, who recently started to grow an interest in Stoicism and reflection practices. She also wants to develop a couple of good habits, and read about how the identity you assign yourself can motivate certain behaviour, which in turn can reinforce that identity.

Larisa decides to use Bloom·e at home so that she can reflect on her virtues. After the onboarding process, she places Bloom·e in her bedroom, on top of her chest of drawers. She plugs Bloom·e in and feels a slight jolt of surprise as the flowers spring to life and move delicately before coming to a resting state.

She launches the smartphone app, which starts by connecting itself to Bloom·e. The app explains that Bloom·e helps you reflect on your virtues, and each flower will represent one of them. The app then asks her to enter up to eight personal virtues, which can fall under one of four Stoic categories: wisdom, morality, courage and moderation. A short explanation is given for each. She begins to wonder about how she sees herself and doubts whether she can list that many virtues. All of a sudden she finds the number of flowers overwhelming.

Unsure of how to proceed, Larisa continues to read the instructions, which further explain that she can enter as little or as many virtues as she likes. If only a small number, Bloom·e will assign multiple flowers to one identity. There is no such thing as an 'ideal' number.

Larisa feels less intimidated and thinks about three ways to describe herself in the form of 'I am someone who...'. She enters this into the app and starts using Bloom·e throughout the week. Every time Larisa performs the reflection exercise and inputs that she enacted one of

the three virtues, a couple of flowers respond at the same time. Over time, Bloom·e appears to change as a whole.

After one week, Larisa performs the weekly reflection, contemplating on whether she would like to adjust the virtues of focus. She anticipates that some day she might reflect on more virtues, but is content for the meantime and feels confident that she can move at her own pace.

Weekly reflection

In this scenario, we consider what the user does during the weekly reflection and how it enriches their practice of Stoicism. We explore how Bloom·e's affordances can add value as a tangible interface by offering a unique way to support reflection about virtues over time. The scenario is as follows:

Larisa approaches Bloom·e and opens the companion app. Today was the day of the week Larisa scheduled a weekly reflection. The app presents Larisa with a default option to start her weekly reflection. Larisa confirms, and begins the session.

Larisa observes Bloom·e, which slowly plays a time lapse of the past week, visualising how the flowers transformed over time. Each flower takes turns moving, with a pause in between to give Larisa time to reflect on that virtue. When the time lapse ends, Larisa is able to select specific days in the app to see what Bloom·e looked like on that day. Every time a day is selected, Bloom·e transforms in appearance and the associated virtues for that day are displayed in the app. The ratings assigned to each virtue on that day are also displayed in the app, as well as any note-to-selfs left by Larisa. By tapping on a virtue in the app, its corresponding flower twitches to help Larisa identify which flower(s) is which virtue. With all this information to explore, she engages in ludic exploration about how certain virtues fared over time, gaining new insights about herself. At the end of the session, the app gives Larisa the option to adjust her focus virtues or keep them. She decides to keep them, and waters Bloom·e with the same virtues.

7.4 Requirements

Based on the scenarios described and with additional contemplation, we define our user and functional requirements for developing the smartphone app (Table 4). The *user requirements* point to the experience we wish to achieve when using the app, while the *functional requirements* describe the functionality that should be included in the app. For designing Bloom·e's behaviour, we will refer to Bloom·e's design goals and guidelines (Table 3).

Table 4. Requirements for developing the smartphone app

User requirements	Functional requirements
<ul style="list-style-type: none"> • Easy-to-follow onboarding procedure <hr/> <ul style="list-style-type: none"> • Peaceful atmosphere • Pleasant and easy to use • Slow-paced and calming animations <hr/> <ul style="list-style-type: none"> • No action by the user must feel judged upon • The presence of time must feel extended (in the moment) <hr/> <ul style="list-style-type: none"> • Reflection sessions must be clear and easy to follow 	<ul style="list-style-type: none"> • Onboarding tutorial <hr/> <ul style="list-style-type: none"> • Add a new virtue to one of the four Stoic categories • Add a virtue without pre-assigning a category, then assigning a category before finishing • Edit or delete an existing virtue • Move a virtue to another category • Find information on the meaning of any of the four cardinal virtues • Edit focus virtues linked to Bloom·e <hr/> <ul style="list-style-type: none"> • Get a quick glance at the next scheduled reflection sessions • Start a reflection session (morning, evening or weekly) • Rate virtue enactment during reflections • Add a note-to-self during reflections <hr/> <ul style="list-style-type: none"> • Adjust reflection schedules • Disable/enable Bloom·e's glow to remind about upcoming reflections • Reset the app to delete any user-added data

7.5 Smartphone app design and development

In this section we detail the design and development of Bloom·e's companion app. We start by walking through our visual mock-up of the app, before describing the usability studies and any design iterations informed by their results. We then present the final developed app that is used in our home studies.

App wireframe

Taking into account our app concept and the user requirements we have defined, the goal is to create an app that is friendly (non-judging and welcoming) and encalming. It also has to have a minimal aesthetic, especially as it is to be used during a reflection activity where any cognitive effort should be directed towards reflecting. To communicate key functionality, we create a wireframe of the app.

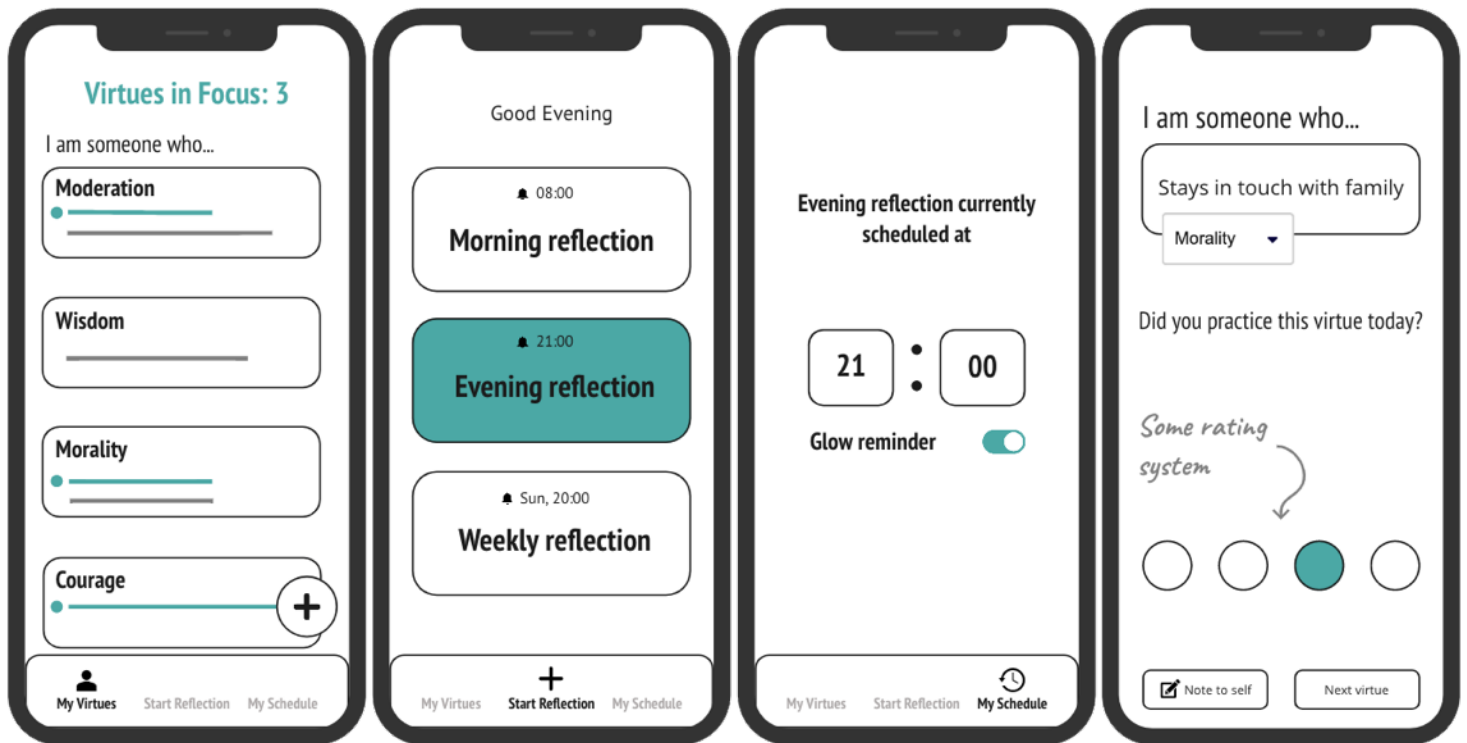


Figure 7. A wireframe representing key pages in the app

The app houses three main sections (Figure 7): *My Virtues*; *Start Reflection*; and *My Schedule*. *My Virtues* is where users can add virtues into one of the four categories, each with its own container. This page also shows which virtues are currently in focus with an icon next to each and the total number at the top. The *Start Reflection* page presents options to start a morning, evening, or weekly reflection, as well as indicates at what time each reflection is scheduled. The *My Schedule* page lets the user adjust their reflection schedule, where they also have the ability to turn off the glow function. If they turn this off, Bloom·e will not glow to remind them. We felt this was better than forcing them to use it, in case they do in fact find the glow obtrusive or distracting in their home or for any other reason.

We also created a quick wireframe of the evening reflection. At the top of the page, the focus virtue to be assessed is shown, along with the category it currently belongs to. The main prompt ‘Did you practice this virtue today?’ is displayed in the middle of the screen. Underneath it, we place the rating scale, where the user can tap on a point to assign a rating. At the very bottom, there are two buttons. A ‘Note to self’ button lets the user add a journal entry associated to that particular day, the currently assessed virtue and its assigned rating. This information will be used in the weekly reflection. The ‘Next virtue’ button saves the assessment and then displays the next focus virtue. The evening reflection cycles through all focus virtues in this manner.

Visual mock-up

Following the wireframing activity, we designed a visual mock-up of our app. The design language of the app consists of a relaxed, two-tone colour scheme in blue and green (Figure 8) to complement Bloom's mint-green shades. A rounded typeface is used for an elegant and gentle appearance. Flat, solid shapes are also rounded and use subtle shadowing to give certain elements a visual hierarchy but also to add depth to the otherwise flat design landscape.



Figure 8. Design language of the app

The app had to be intuitive and easy to use, not only because this is generally desirable in any application, but because we did not want any usability issues to interfere with our home studies – participants should not have to think about how to do something or why something did not work. Instead, we wanted participants to be more focused on the reflection activity and Stoic mindfulness itself. Since we are using context mapping techniques, any malfunctioning of a probe can limit the insights because the probe does not seamlessly form a part of the person's life. In our case, the probe is our intervention, which means it should be just as easy to use as a probe which asks participants to take photos at certain times of the day. If the researcher has to interrupt the home study to fix something or explain how to use the probe, then the participants' lifeworld at that moment is also interrupted and they have less agency to take the probe with them into their dreams and aspirations.

The visual mock-up was made interactive so that we could run usability tests before coding the final application. The mock-up consists of many screens and interaction states between them (Figure 9). Without being too exhaustive, we show and describe the key functionalities of the app through several screenshots. We note that any large amounts of text visible within a screenshot are not intended to provide further body to this research, but rather the content as a whole is meant to give a general impression of the user interface.

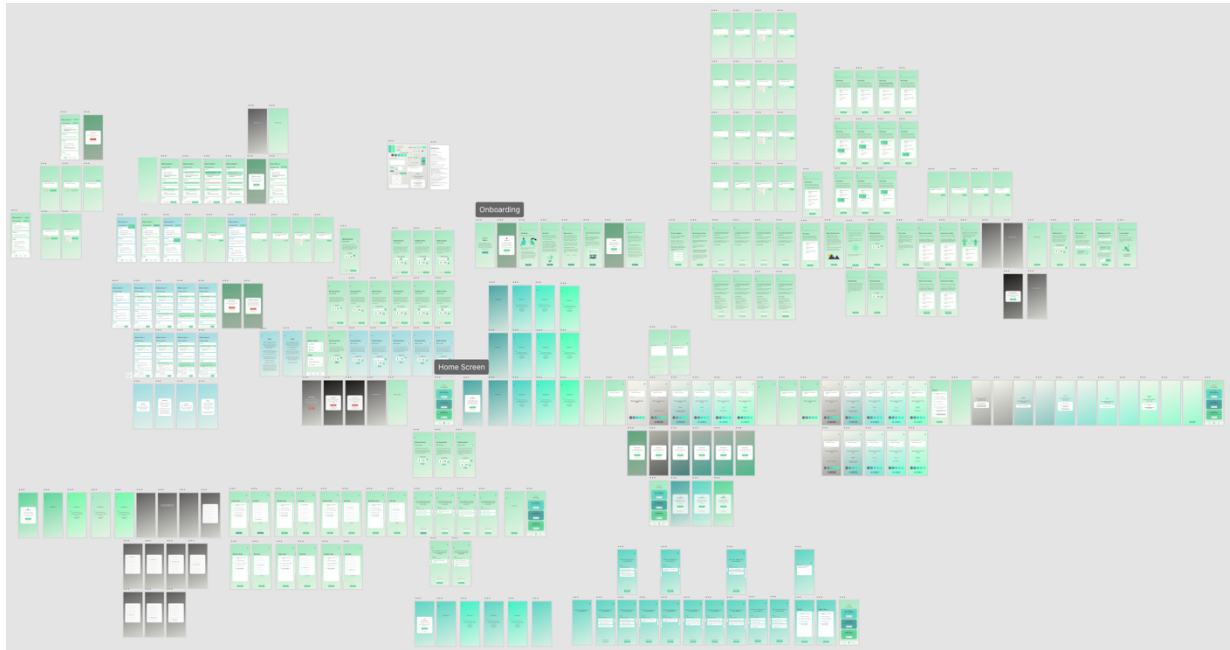


Figure 9. Overview of visual mock-up; elements on each screen are linked to each other to create an interactive and convincing prototype of a smartphone app

On first launch, the app begins with an onboarding tutorial (Figure 10). At the beginning, the user is introduced to key concepts of Stoicism and fulfilment, as well as an explanation of the role of virtues, the content of which is heavily informed by Robertson’s writings [83]. They are then guided through a values-clarification exercise as described by Robertson. In this exercise, individuals make two lists, one for the things they *desire* in life and the other for the qualities they *admire* in other people. The individual then goes on to compare the two lists, which are usually never identical to begin with, and are asked how their life would change if the things they desired were the qualities they admired in other people. In other words, this helps explain how one can make *virtue* a priority in life. The onboarding tutorial continues by asking the user to think of their own virtues in the form of ‘I am someone who...’ and completing the rest of the sentence. As advised by Robertson, the user is encouraged to refer to their ‘admired’ list of qualities for inspiration.

Intervention Design



Figure 10. Onboarding tutorial – some of the first steps

We also provide the user with the option to see some example virtues, in order to better explain what a virtue could look like (Figure 12). These examples are hidden by default in case the user does not wish to be influenced by them. The user then considers under which of the four Stoic cardinal virtues their virtue belongs – either *Moderation*, *Courage*, *Wisdom*, or *Morality*. We use the four cardinal virtues as categories to which a virtue can be added. When the user is ready, they can add their virtue to the app by tapping on the ‘Add virtue’ button. For our home studies, we require the user to add a minimum of three virtues before proceeding, so that they have something to work with. Furthermore, the user has to make a selection of *focus virtues*. This is because every virtue takes the form of at least one flower (see section 7.2 for an explanation) and there are only eight flowers in total. For our home studies, we require the user to set at least one focus virtue to proceed.

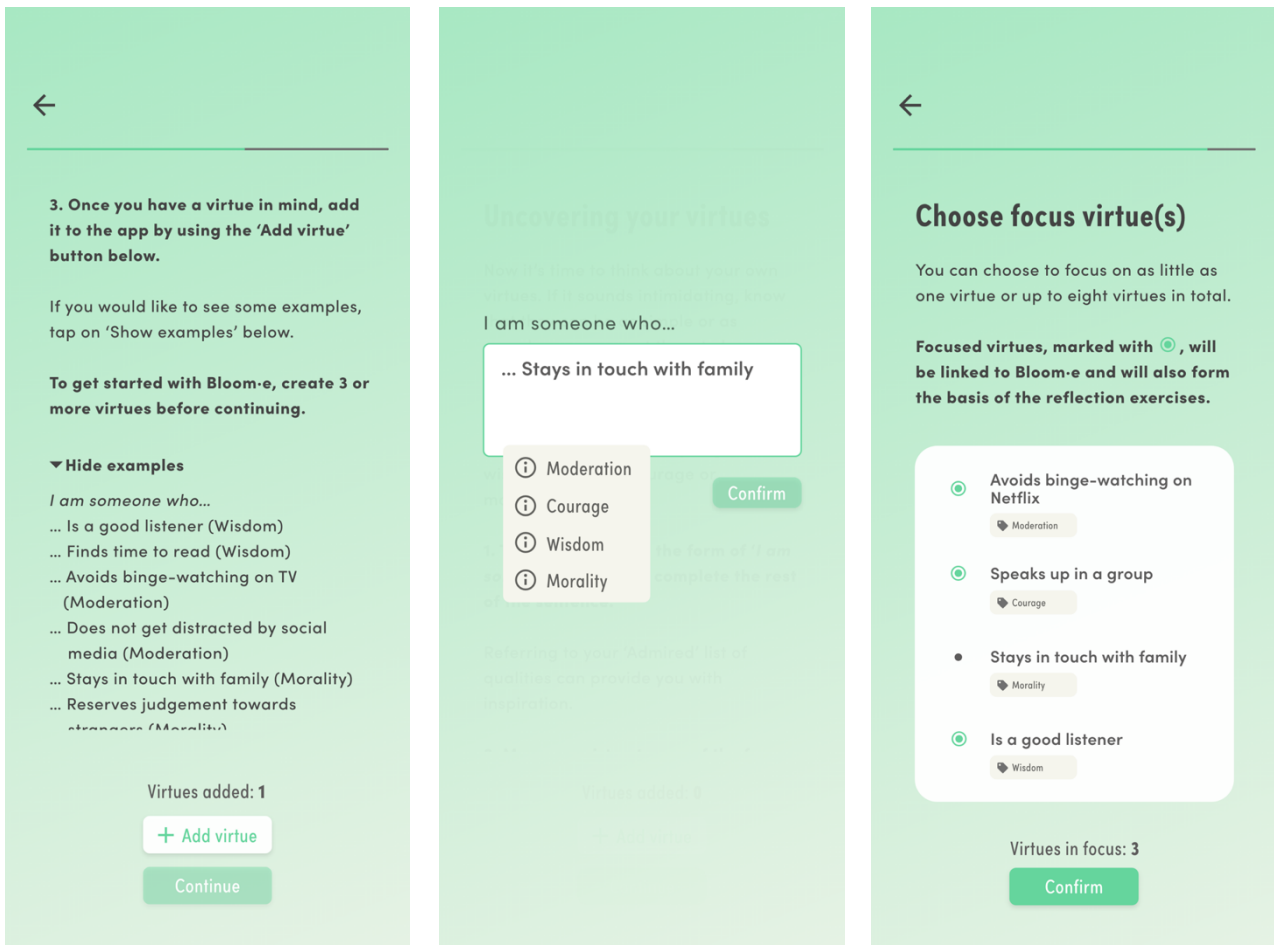


Figure 11. Option to show example virtues; adding a virtue; choosing focus virtues

Afterwards, an explanation of a daily reflection routine is given (Figure 12), and the user is told about how Bloom·e will glow to remind them about their upcoming reflections. They can then set their preferred times for each morning, evening, and weekly reflection. The tutorial ends with a brief explanation of the different sections of the app and a final screen informing them the set-up is complete.

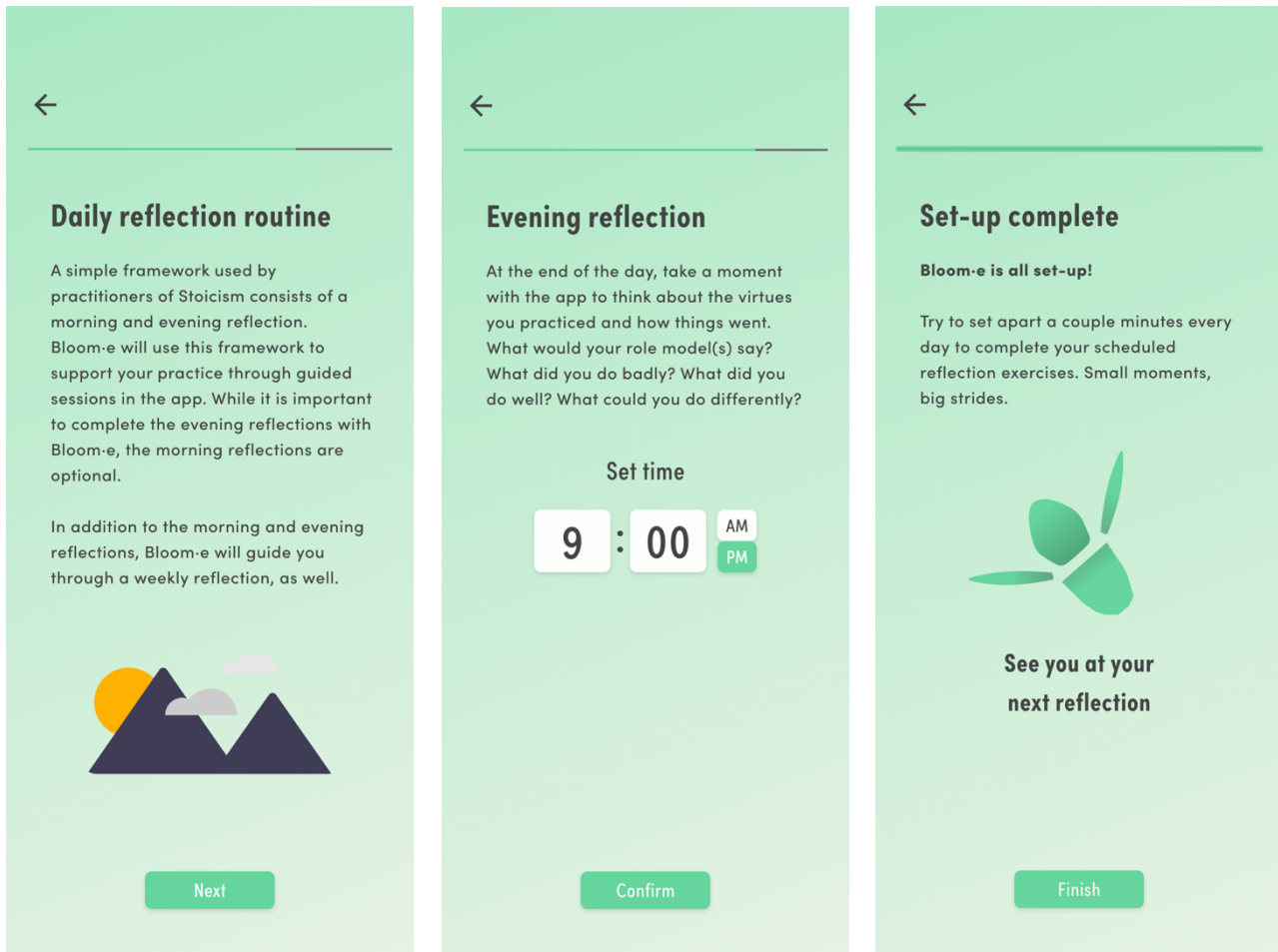


Figure 12. Onboarding tutorial – some of the final steps

After completing the set-up of the app, the user is brought to the app's main interface. The app consists of three pages (Figure 13): *My Virtues*; *Reflect*; and *Preferences*. *My Virtues* is where users can add, edit or delete virtues, as well as set new focus virtues. The page displays four containers, one for each cardinal category and each containing the virtues associated with them. If the user forgets the meaning behind each category, they can bring up their explanations by tapping on the category title or using the menu button at the top right corner of each container. When adding a new virtue, a full-screen dialogue pops up so that full focus is placed on the virtue without other UI distractions. This is to put them in a more mindful state when managing their virtues. If the user tap on an existing virtue, the same full-screen dialogue appears, but with options to edit the virtue (its content or its category) or to delete it. If the user attempts to delete a virtue currently in focus, a pop-up dialogue will warn them that deleting the virtue will also remove it from the Bloom-e artefact. The *Reflect* page is the default home screen of the app and welcomes the user with a dynamic greeting. It presents options to start a morning, evening, or weekly reflection, as well as indicates at what time each reflection is scheduled or if they have already been completed that day. The *Preferences* page has links to change the user's reflection schedule, access the onboarding tutorial again or find more information about the app. When managing the schedule, the user has the option to toggle the glow function on or off. We also give the option to reset the app which removes all entered data, since virtues are highly personal and the user might consider them sensitive information.

Intervention Design

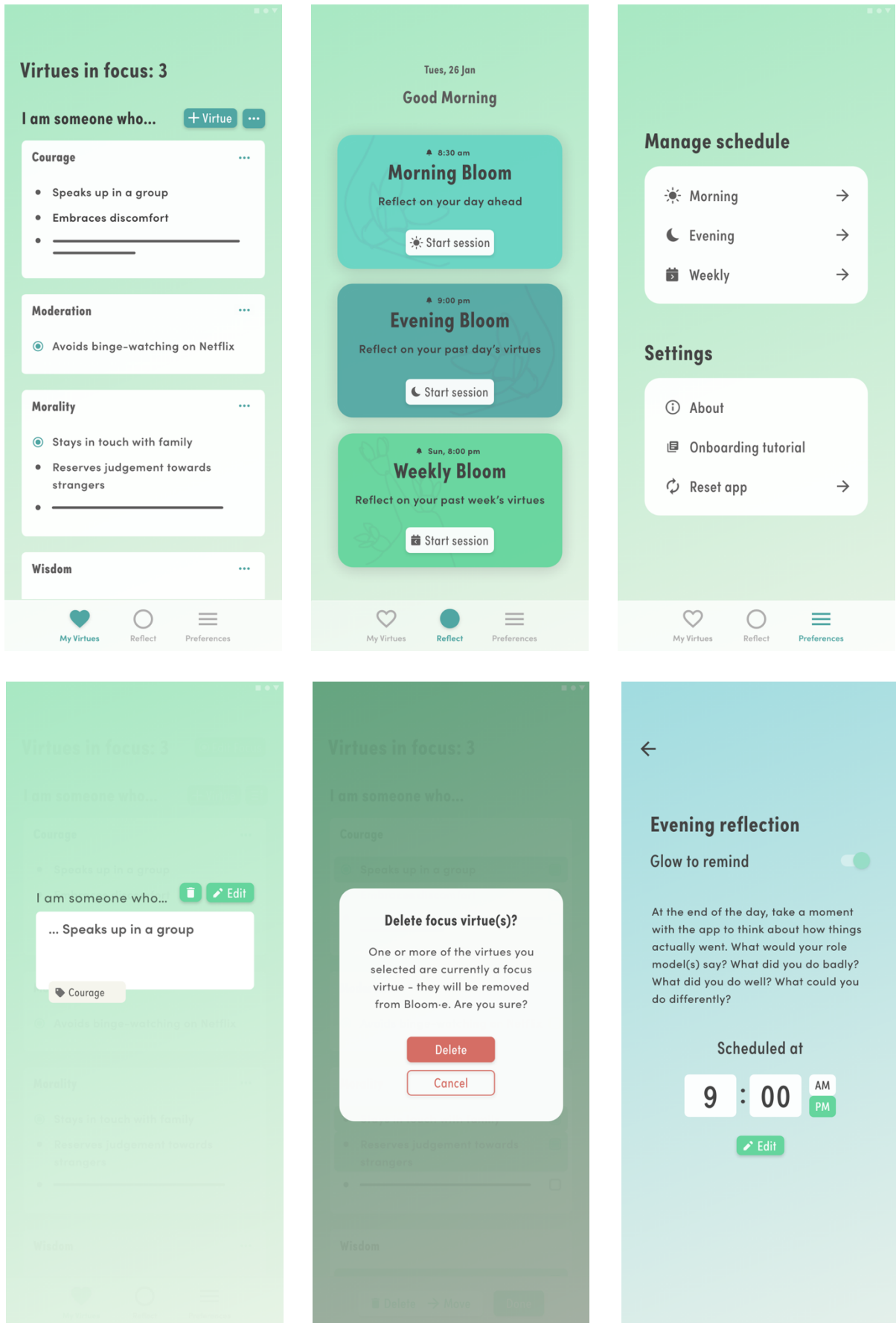



Figure 13. Some snapshots of the app's user interface

Virtues currently in focus are marked with . To edit focus virtues at any time, users tap on the menu button at the top-righthand side of the page (Figure 14). An option to ‘Edit Focus’ becomes available. We initially envisioned displaying a text summary to the user after they make a new selection of focus virtues. The summary would describe the virtues that will be removed, added, or remain linked to Bloom·e, such that the user understands clearly how the data is being synchronized. We anticipate, however, that such a method will only be considered tedious as it requires a lot of reading and an extra screen dialogue. As an intuitive approach to editing focus virtues with minimal text prompts, we use different colours to differentiate between adding new focus virtues (dark green), removing previously focused virtues (red) and already-in-focus virtues (light green). The user simply taps on a virtue to make a change. The colour-coding gives an at-a-glance overview of the virtues that will be linked to Bloom·e (green) once they tap on ‘Set focus’, and the virtues that will be removed from Bloom·e (red). A final pop-up dialogue lets them know what changes will be made and, as a design friction, asks for a deliberate choice to confirm the changes or to cancel the edit.

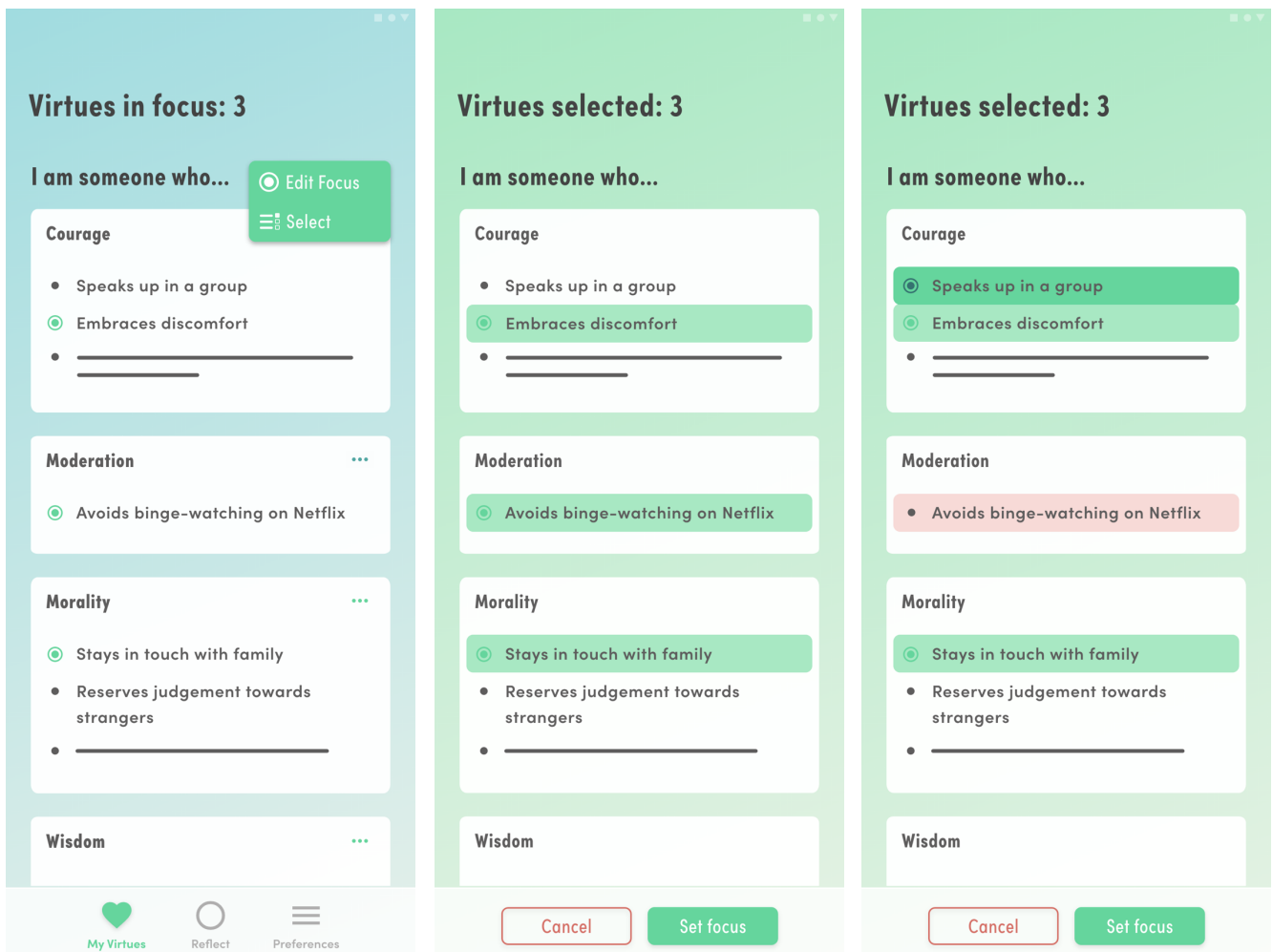


Figure 14. Interface for editing focus virtues

Evening reflection activity

Although we prepared design mock-ups of the morning and weekly reflections, these activities were not included in the final application due to practical constraints. The mock-ups of the morning and weekly reflections can be found in Appendix D. We present and describe here our evening reflection activity.

The core of the evening reflection activity is to evaluate how well the individual lived through their virtues that day. The way we embody this information in Bloom·e is by the amount each flower has bloomed. This implies some scoring system is needed; the higher the score, the greater the bloom. For this, we found a Likert-type scale to be suitable, because it provides a spectrum on which to rate how well a virtue was enacted. At the same time, Likert-type scales typically consist of opposing ends. For example, the bottom-most option might be ‘I strongly disagree’ and the top-most option ‘I strongly agree’. One of our user requirements is that the app should be non-judgemental, but using a traditional scale would mean the user would have to choose between a ‘bad’ versus ‘good’ assessment of their virtue enactment. To remove this judgemental characteristic, we break down the dichotomy by conveying no ‘sides’ or ‘middle’ point on the scale. Being non-judgmental does not mean that emotions should be suppressed or that there can be no ‘good’ or ‘bad’ to virtue enactment. Rather, the assessment as facilitated by the app is non-judgemental, and it is up to the user to associate a point on the scale with a particular emotion, which can arguably differ depending on the virtue being assessed or their goals with regards to virtuous living.

Figure 15 shows an early attempt at the design of the scale. The scale consists of five points, each point accompanied with a description. The scale is used in response to the question ‘Did you practice this virtue today?’. The first item, ‘Not applicable today’, allows the user to decide that a virtue was simply not relevant that day, which is to make the assessment more relaxed and less ‘forced’.

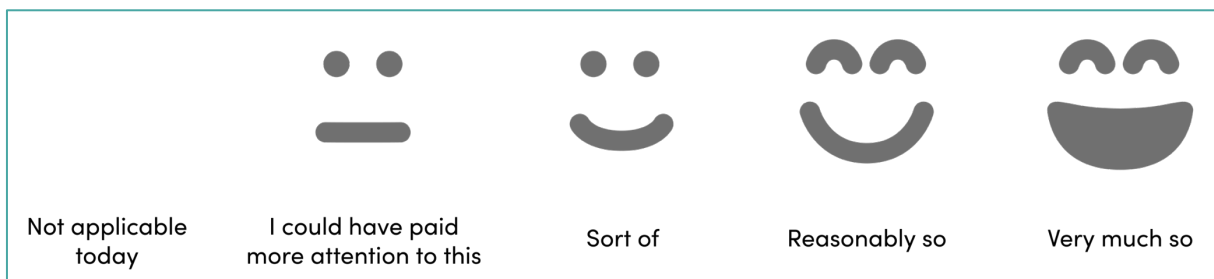


Figure 15. An early version of the rating scale – to be used during the evening reflection

We describe the rest of the ratings in terms of how strongly they enacted the virtue as opposed to how strongly they succeeded or failed. This is to encourage an observational, rather than interpretive, assessment. This ‘detachment’ to one’s experiences is core to mindfulness practice, where one tries to observe their experiences without judging them. We also attempted to make the assessment less ‘calculative’ by using colloquial language such as ‘sort of’ or ‘very much so’, such that it becomes about what ‘feels’ like the right response rather than what ‘is precisely’ the right response. The second item on the scale, ‘I could have paid more attention to this’, communicates that more effort could have been placed on a virtue than was the case. Instead of saying ‘I failed to enact this virtue today’, we use ‘I could have paid more attention to this’, which says more about whether they enacted the virtue rather than whether it was a success or failure. It is worth mentioning that we use the first person as the subject across the entire app, to enforce Bloom·e’s role as facilitator rather than external judge:

instead of ‘Your Virtues’, the page is called ‘My Virtues’; instead of ‘You could have paid more attention to this’, the phrase is ‘I could have paid more attention to this’ and so forth. The third item, ‘Sort of’, implies that the virtue was enacted in one way or another. The fourth item, ‘Reasonably so’, says that they enacted the virtue and there was no better or worse way to have done it. The last item, ‘Very much so’, implies a strong confidence in the enactment of the virtue.

To make the experience more visual, we assigned a corresponding emoji for each item. However, the presence of eyes in the emojis (Figure 15) made us wonder whether they might suggest that one end of the spectrum is ‘happy’ and the other end is ‘less happy’. In other words, the suggestion that one end correlates to higher levels of happiness imposes again some form of judgement, since it implies that one end of the spectrum is more desirable than the other. To avoid this effect, while still keeping the scale a ‘scale’, we removed the eyes altogether. Figure 16 shows the final scale, where the associated icons with each point on the scale are a halfway to emojis. As further visual aid, the colour of each item gets brighter the higher up on the scale it is. This colour scheme is also consistent with the Bloom’s artefact and the rest of the app. Even though these icons might hint at it, the assessment now becomes less about assigning an emotion and more about *rationalising* how well a virtue was enacted.

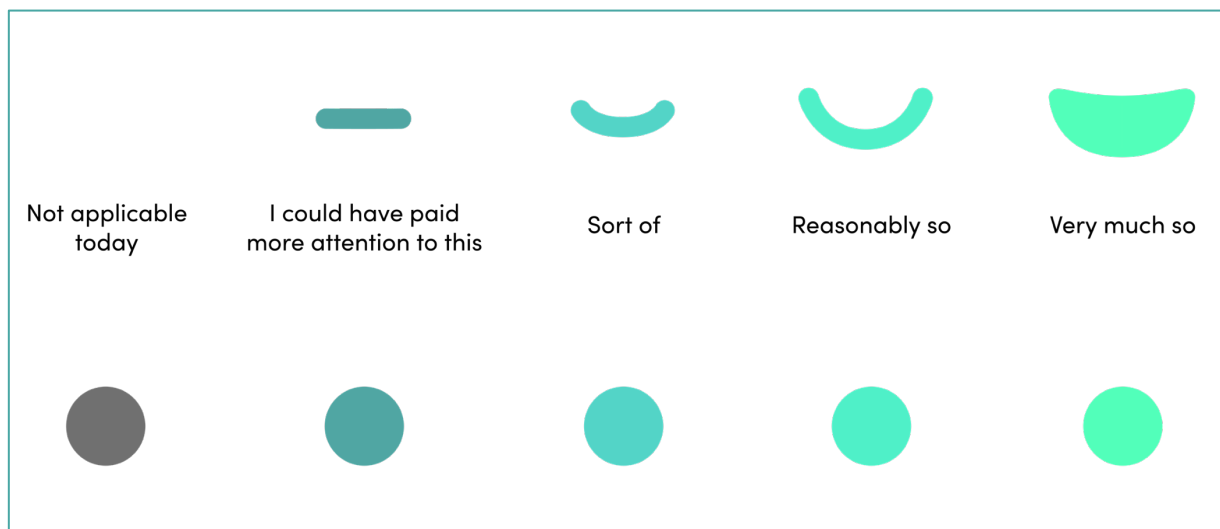


Figure 16. The final scale used during the evening reflection

When users launch the evening reflection, they are greeted with a loading screen (Figure 17). In fact, the loading screen is completely unnecessary but entirely intentional, using the principle of *design frictions* to prevent the user from rushing into the reflection and to slow down their thoughts, so as to put them in a more mindful state. We take inspiration here from traditional Japanese arts practices as informed by Zen Buddhism, where the master first helps the disciple discard extraneous thoughts to move into an attitude of *mushin* or ‘no-mind’, which is said to lead to an acceptance of the world as it is [28] – this is the non-judgemental attitude we can find in scientific conceptions of mindfulness with its roots in Buddhism). Instead of ‘no-mind’, however, we transition them into Stoic reflection. To keep them engaged in Stoic mode of thought – instead of looking away or thinking about unrelated things – a quote by a proponent of Stoicism slowly fades into the screen over a period of three seconds. The quote, which is different every time they start a reflection, is meant to keep them engaged in the activity, as well as offer new bites of Stoic wisdom during their time with the app. The loading screen lasts for 16 seconds before fading out, at which point the first virtue fades in and the reflection begins.

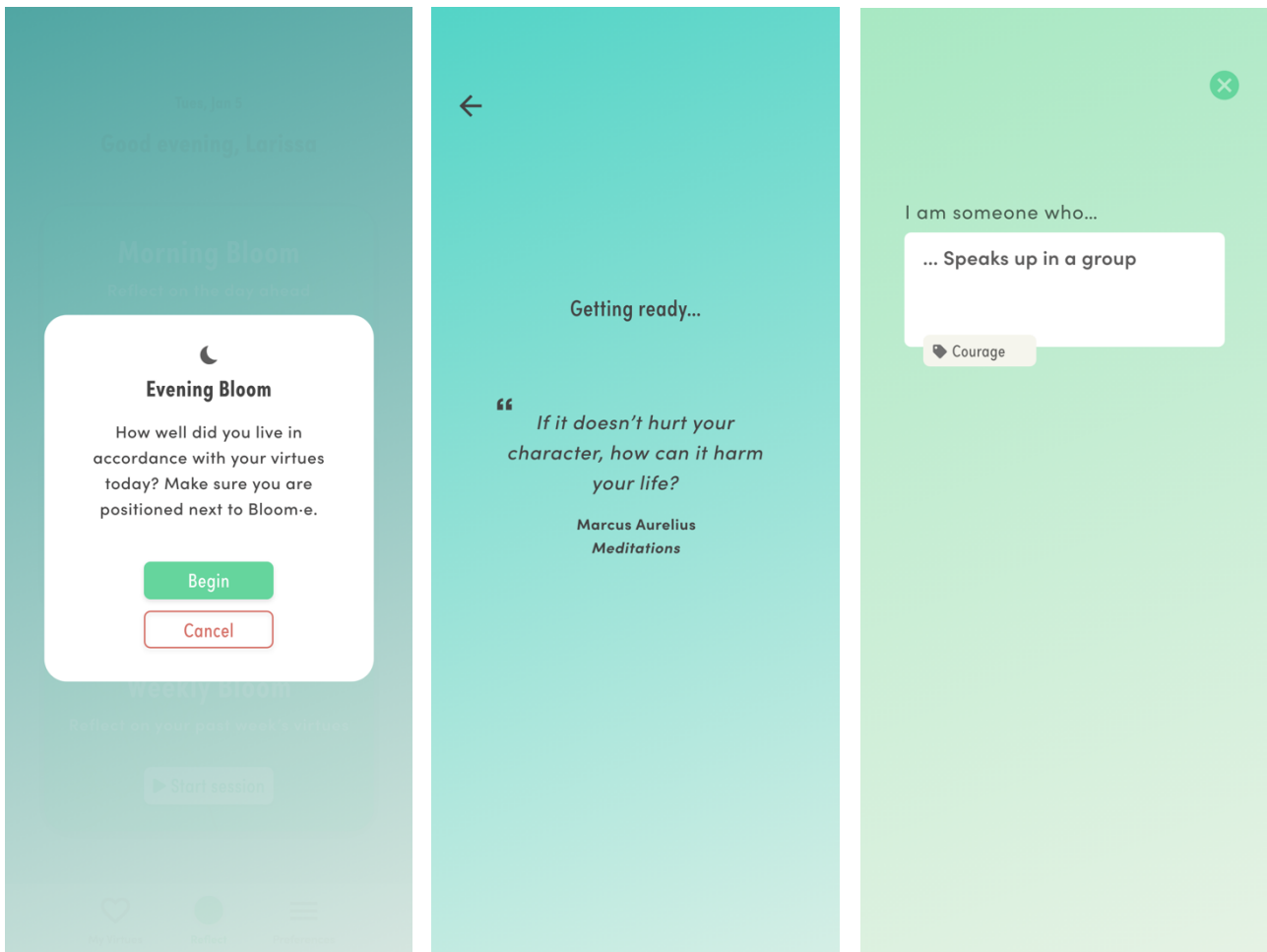


Figure 17. Launching the evening reflection – a loading screen appears for 16 seconds before the first focus virtue fades into view

The first focus virtue will gradually fade into the screen over a duration of three seconds, followed by the rating interface at the bottom also fading into full appearance in three seconds. These slow transitions are used, like the loading screen, as a *design friction*, to encourage the user to slow down their thoughts and give full attention to the moment as it unfolds. Each virtue is displayed one by one and takes up the entire screen, such that the user pays full attention to it and there are no other distractions. A rating is assigned by tapping on one of the coloured circles at the bottom of the screen (Figure 18). When a rating is assigned, its corresponding description, colour and icon are displayed. Once the user taps the 'Confirm' button, the virtue and rating system fade out over three seconds, the screen is blank for two seconds, and the next focus virtue appears. This process repeats for all remaining focus virtues.

Intervention Design

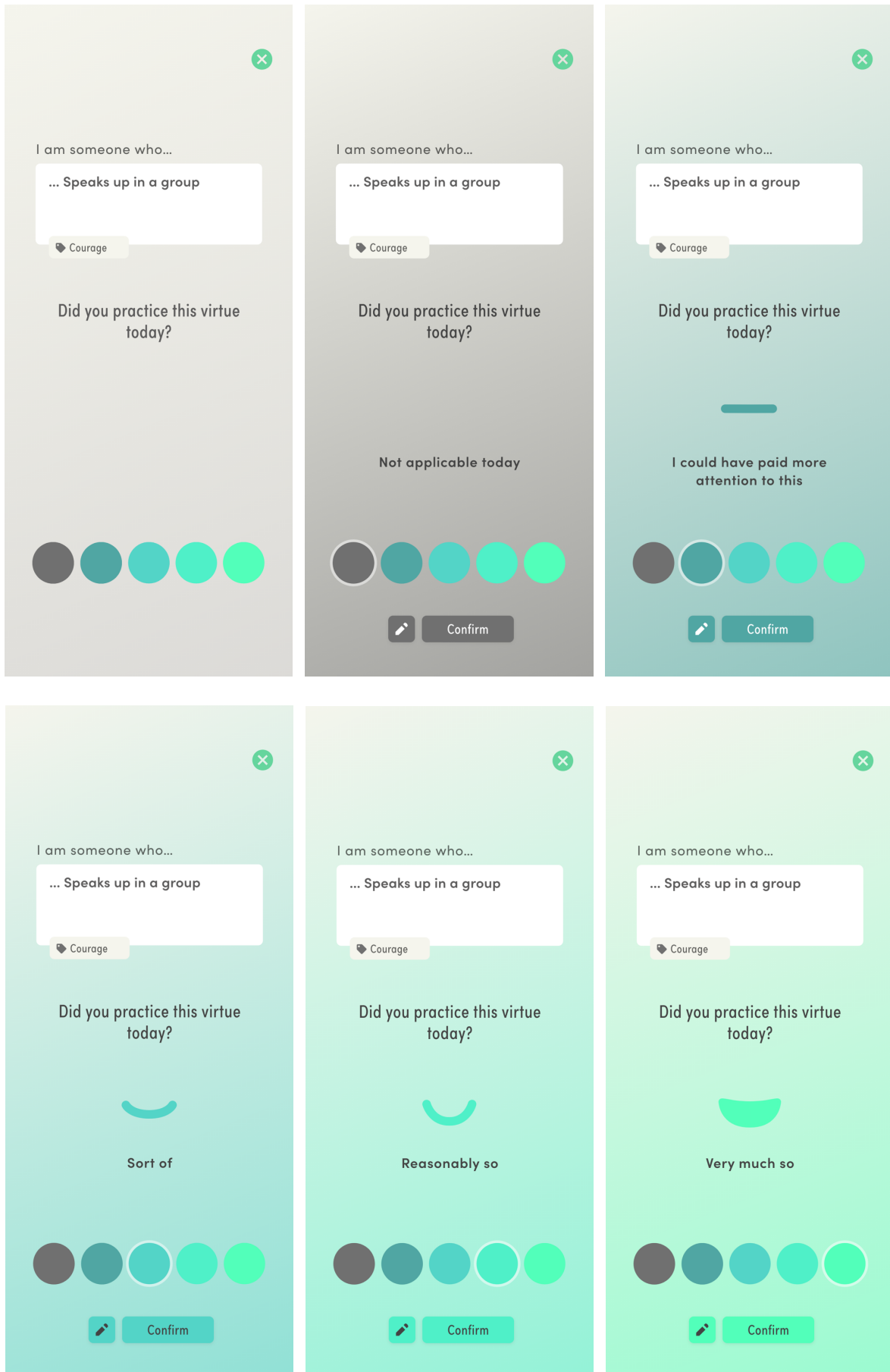


Figure 18. Rating a virtue during the evening reflection

Intervention Design

Users can also add a note to self (Figure 19), by tapping on the pencil icon to the left of the ‘Confirm’ button in case they would like to jot something down for themselves. A white border around the pencil icon indicates a note has been added. When all focus virtues have been rated, a summary card is presented. If a virtue in the summary card has a pencil icon next to it, it means the user has left a note for that virtue – tapping on it will display the note. We do not present any ‘final score’ to the user as is otherwise typically done with mindfulness measures such as the FFMQ. This is to avoid that the meaning of the reflections are reduced to some arbitrary number. The summary card allows the user to look back at the ratings they assigned without implying some form of success or failure on their performance. As the last step, the user taps on ‘Water Bloom·e’, at which point the screen fades out until only the background gradient remains and the results of the reflection are sent to the Bloom·e artefact.

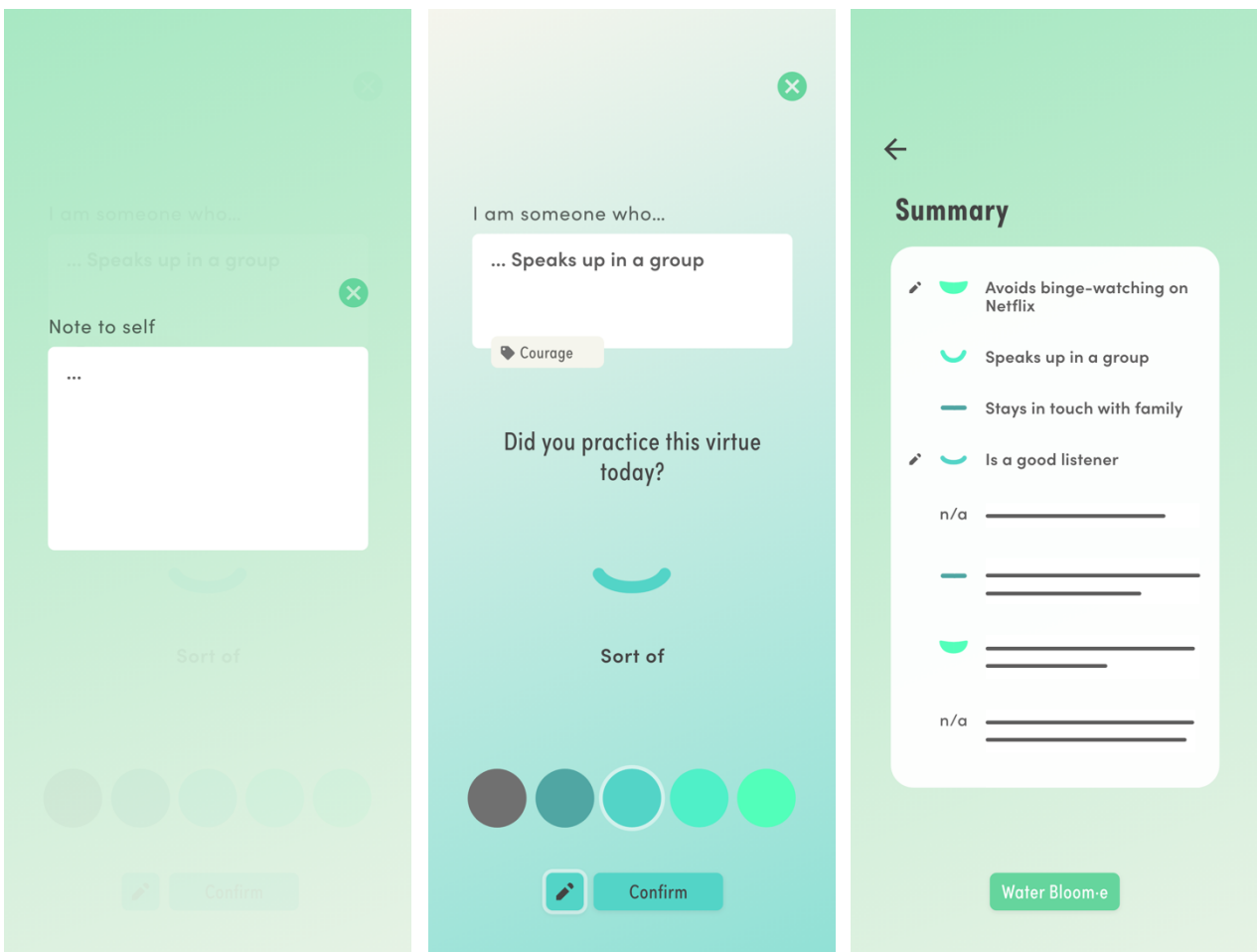


Figure 19. Adding a note to self (left); an indication of an existing note (middle); the summary card at the end (right)

Robertson explains that the goal of the evening reflection is not only to assess the past day, but also to make a mental note of how and where one can improve for the next day. To help the user make such a mental note for themselves, we recap the results of the reflection together with Bloom·e. First, all virtues with the same rating assigned are grouped together. Then, in order of lowest to highest rating, the first group of virtues fades into the screen (Figure 20). The virtues remain on the screen while their corresponding flowers bloom accordingly i.e. the higher the rating, the more the flowers bloom for that set of virtues. The exception here is that any virtues which were rated as *not applicable* do not have

Intervention Design

any associated changes in the artefact. When the flowers have finished blooming, the virtues fade out of the screen. This process repeats for the remaining groups of virtues. We go from lowest rating to highest rating as a metaphor for ‘always towards growth’. When all virtues have been synchronized with Bloom·e, the reflection comes to an end and the user can close the activity.

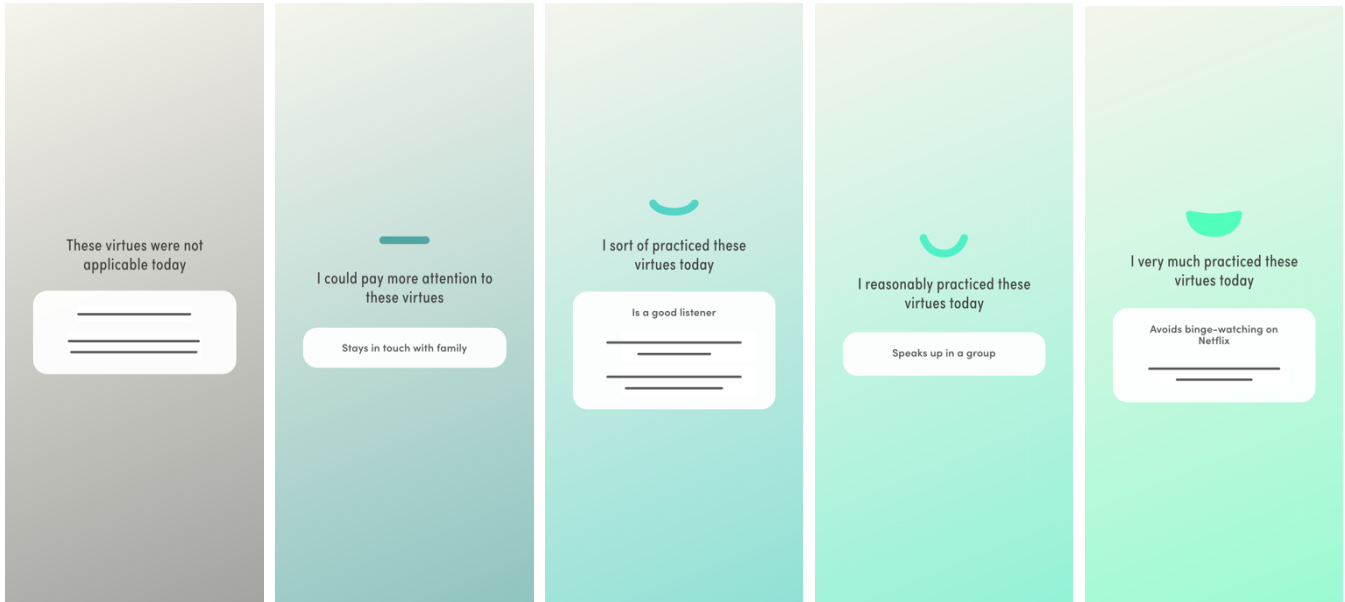


Figure 20. The app waters Bloom·e by cycling through each group of virtues with the same rating

Usability tests

We ran three usability tests to ensure our app was intuitive and easy to use. Although we asked participants to briefly run through the evening reflection activity, we did not dive into the content and meaning of the reflection itself. Our usability tests were not extensive as what is traditionally the case in evaluating a user interface (UI), but instead served as a simple check that the functions of the app were clear to use. We also used a human-centred approach to dive into the thoughts and feelings of our participants to gain insights into whether we reached our desired resultant experience.

First, participants opened a link to a webpage which displayed the interactive visual mock-up on their computer. Participants were asked to share their screen so that the researcher could see what they were doing, and then complete tasks derived directly from our functional requirements. While performing those tasks they were asked to think-out-loud about what they saw and how they felt. As participants voiced their thoughts, the researcher sometimes used ‘why’ prompts to get them to elaborate. This led to deeper insights about the way they were experiencing the app. We recruited three participants, all close associates of the principle researcher, and briefly discuss the outcomes below.

Participants had positive feelings about the app overall. One participant described the app as “light and breezy” and as if “floating in water”. She found the mint green colour “fresh, positive and calming”, and described the app as a “bank account for karma”. The other two participants had similar associations with the colour scheme, describing it as “friendly”, “comforting”, “soothing” and “relaxing”. The second participant described the app as an “invisible friend”, explaining that it could be “awkward” for someone to otherwise observe you, however in this case you make an “agreement”

with the app and have “some kind of responsibility”, so you do not give up easily. The third participant made a connection between the app and Gaia, the Greek personification of the Earth as a goddess, since the colours relate to nature and the sky. He added that the app has a meditative feel. Although he liked the colour scheme, he suggested to have some more colours in the app since it is mostly green. He later added that “maybe I am just not in the mood for reflecting right now, if I was then the green would be calming or appropriate maybe”.

The minimal aesthetic was also well-received, with one participant appreciating that there were only three main sections because this was not overwhelming and was “appropriate for a mindfulness-style activity”. She found the use of ‘three elements’ across the app such as with the navigation bar and reflection options “pleasing”. The third participant found that the way things were grouped was “cosy” and a good use of space, as well as that the rounded typeface was “comforting”. The second participant thought that the pop-up menus were simple and that there were no distractions in the app. Similarly, the first participant liked the fact that the app was full-screen so she could “not get distracted by notification or battery icons at the top”.

After briefly trying out the evening reflection activity, participants were positive about the experience. One participant found the fading animations “slow and calming”, reminding her of sunrise clock devices. She added that the slow timing makes her think about what is happening compared to other apps which “have things moving very fast and quickly”. She did wonder whether something was wrong during the loading screen, since nothing was happening for a while, and suggested that a loading icon would be helpful. Another participant liked the ability to focus on some virtues because then “you’re not stressed with everything”. She also liked that she could decide how long to spend in a reflection. Although only explained hypothetically in the app, she found the idea of the Bloom·e artefact nice because it would be a “visible reward, not like fitness apps with numbers and all these statistics. You can see that you’re almost there if you have a flower blooming. The flowers are nice, friendly, peaceful and positive”. She further explained that it was “nice that watering Bloom·e goes from bad to good, instead of ending on bad results”, although the association with ‘bad’ results is something to keep an eye on since we wanted to avoid negative feelings in the reflection. She elaborated that the summary of results at the end is useful because “then I know what I can try to improve next time”.

The second and third participant appreciated the example virtues given during the onboarding, even if the explanations of the categories was already clear to them. Although, one participant thought that the “Avoids binge-watching on Netflix” example was condescending and suggested making it about “TV” in general. The first participant thought that the images used in the onboarding were “awesome” and “could be bigger”. She also would have preferred less text and more images, as well as bigger buttons. The second participant had to reread some text due to the use of some “interesting” words, meaning the language could be made simpler. Two participants remarked that the requirement to enter three virtues as a starting point could be made clearer. The first participant also wanted to be able to swipe through the onboarding tutorial like a gallery of cards typical in other apps, instead of tapping a ‘Next’ button. Similarly, she wanted to be able to tap and hold to drag a virtue from one category box to another. The second participant suggested ending the onboarding tutorial with a more motivational message instead of just ending it abruptly.

Overall, participants were able to carry out all of the tasks with little to no difficulty, except for one participant not knowing for a while where she should tap to find more information about the categories and their meaning. After finding the button, however, she felt it was “logical and straightforward”. The

app was generally well-received, however we made note of the few pain points mentioned (Table 5) to improve the design of the final app. Any remarks about advanced touch-screen gestures were not tackled as we found this functionality to be a ‘nice to have’ feature unnecessary in our current prototype.

Table 5. Improvements made in the final deployed app

Onboarding tutorial	App user interface
<ul style="list-style-type: none"> • Bigger and more images, less text • Simplify text in onboarding, use simple words • End onboarding with motivational message • Make clear the requirement to enter three virtues to proceed 	<ul style="list-style-type: none"> • Make buttons bigger • Add more colour • Add animated loading icon during loading screen

The smartphone application’s final design

We developed a software package of the final smartphone application (Figure 21) based on our visual mock-up and deployed it onto a smartphone. Although some minor UI changes were made, the app largely resembles our visual mock-up and adopts the same design language. In the ‘My Virtues’ page, we added a function to filter the list of virtues for only those in focus, in case the user has many other inactive virtues they wish to hide temporarily. And even though we did not implement the morning and weekly reflections in the deployed app, their options remain visible although the buttons to start them are disabled.

Regarding the evening reflection, we implemented an animated icon during the loading screen (Figure 22) to let them know that the app is busy and active. The app randomly selects a quote from a stored list and displays it while loading. The quotes we used were directly pulled from an online article which lists powerful Stoic quotes, on writer Ryan Holiday’s *Daily Stoic* website [26]. The user can still add a note to self even though the weekly reflection is disabled (the weekly reflection uses the notes in its activity). During the rating of virtues, we added a back button at the top left-hand corner of the screen which becomes visible once a rating has been assigned. The back button allows the user to go back to their previous virtues if they wish to adjust the rating given. The button is intentionally small and almost hidden. This is done so that the currently displayed virtue gets the full attention, and to motivate the user to be more intentional when rating each virtue. At the same time, it gives the possibility to go back to a previous virtue if the user wishes to do so.

Intervention Design

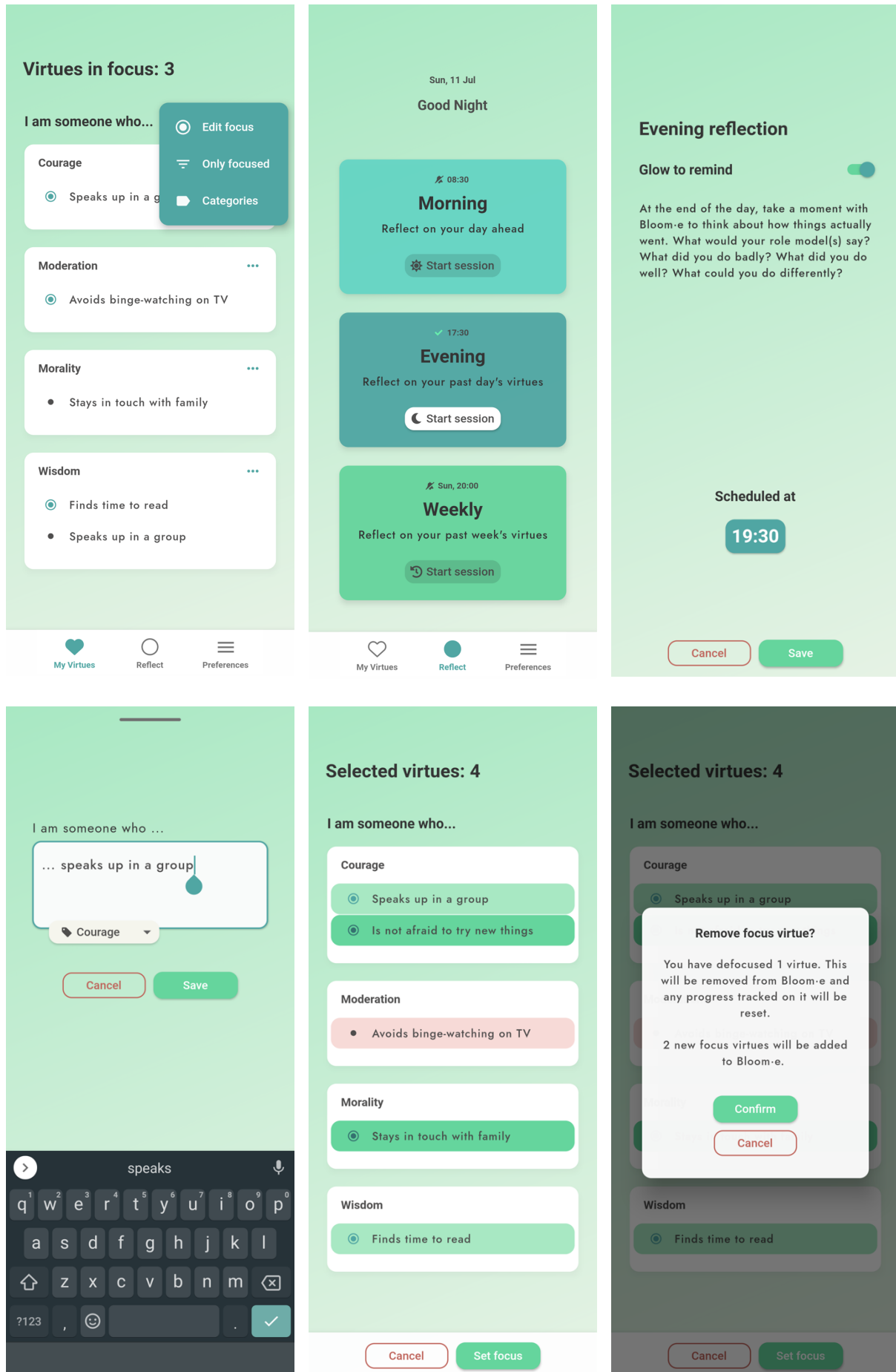


Figure 21. The final deployed application – some screenshots

Intervention Design

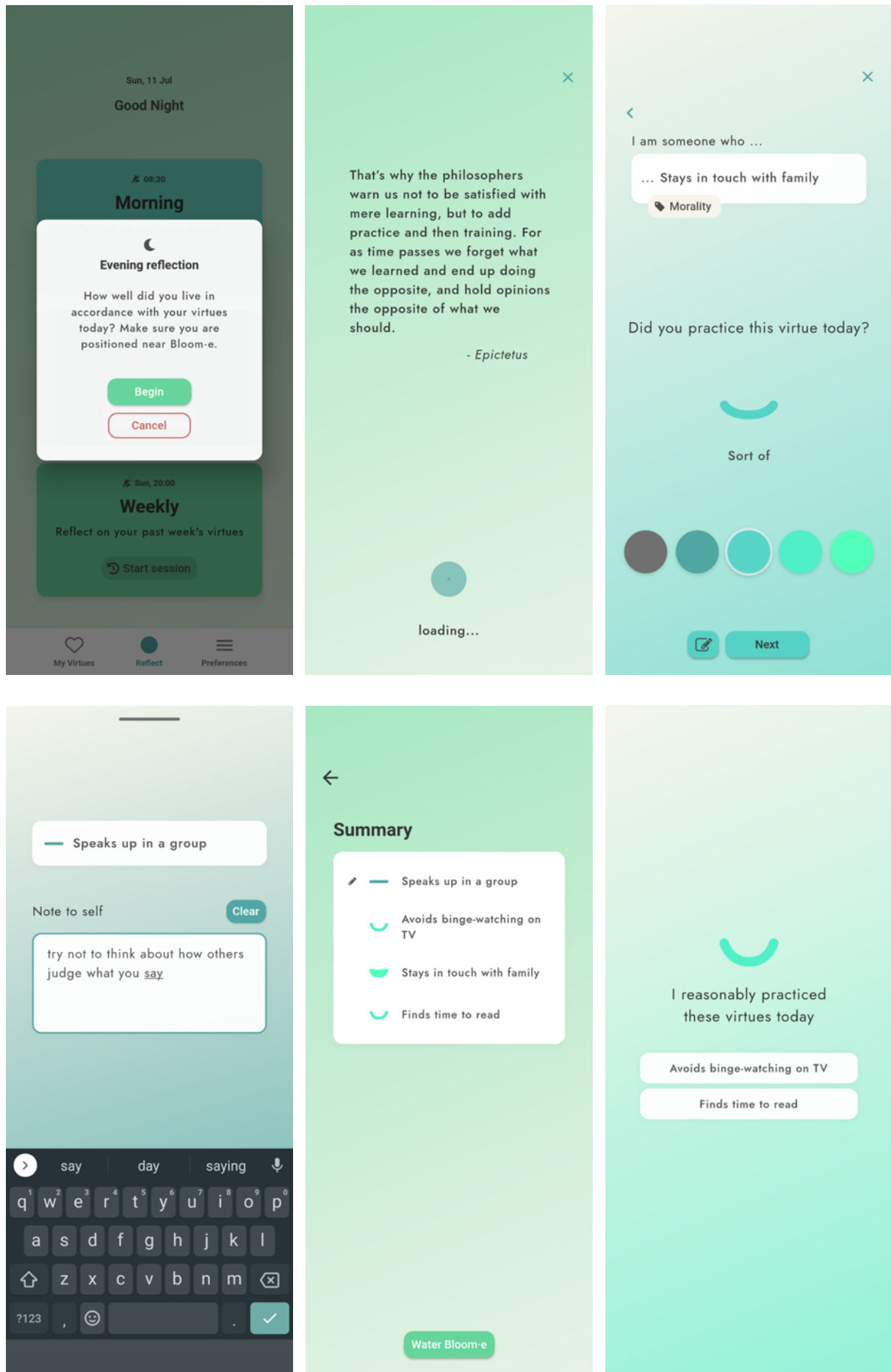


Figure 22. The evening reflection in the final app

The app uses Bluetooth to communicate with Bloom·e in a unidirectional manner. In this sense, the app will send information without receiving a response, assuming the information was transmitted successfully and using predefined timers to wait until it can send the next chunk of information. This was done to reduce the technical complexity of the communication protocol for the sake of the prototype. To make sure the data is always transmitted, the app checks that it is connected to Bloom·e before allowing the user to perform key actions, including making changes to their focus virtues, setting a new reflection schedule, launching the evening reflection, or watering Bloom·e with the reflection results. If the app is not connected to Bloom·e, a popup dialogue will appear (Figure 23).

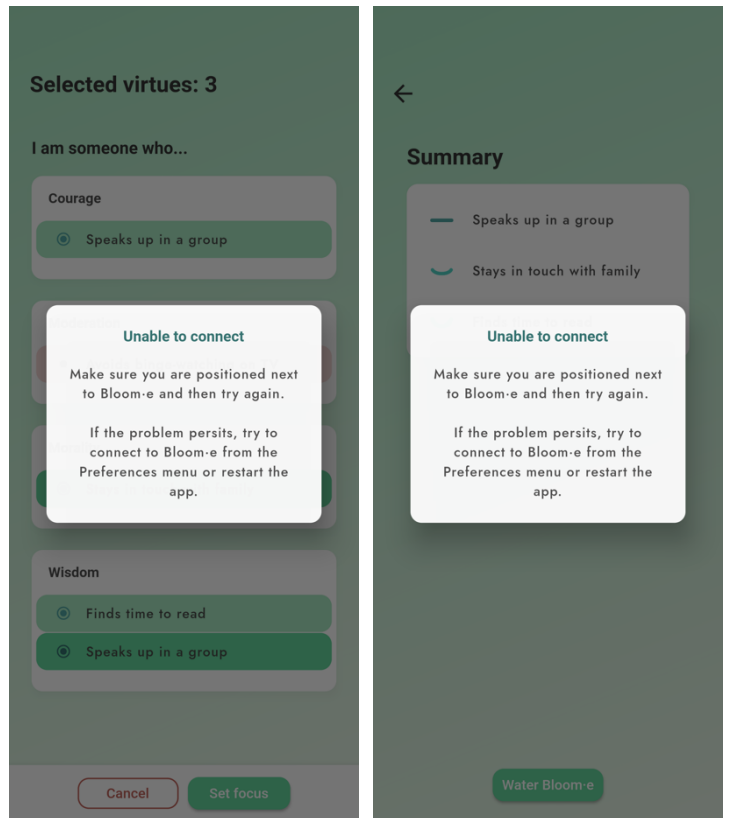


Figure 23. Popup dialogues when Bloom·e is not connected

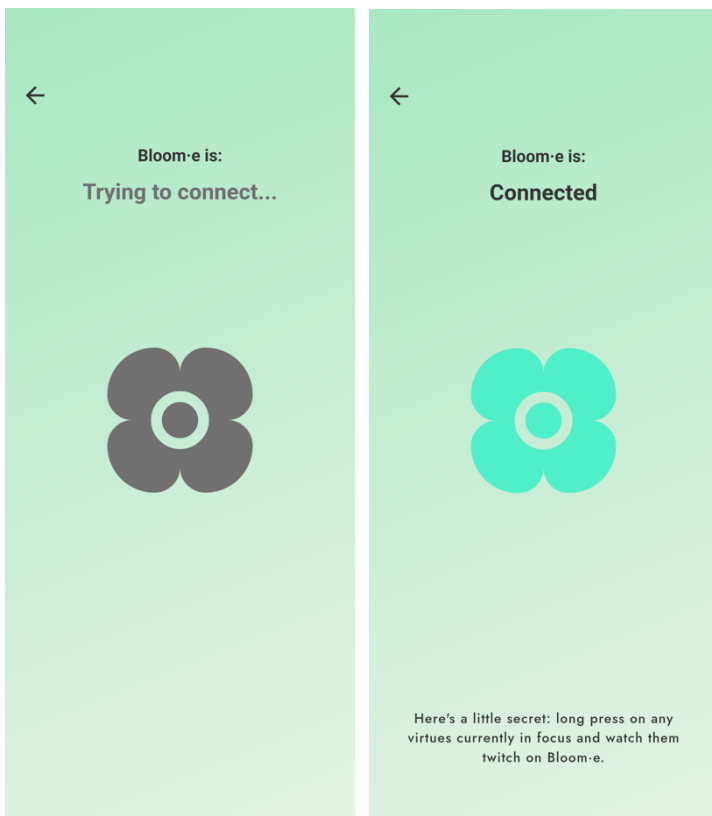


Figure 24. The 'Bloom·e status' screen

A 'Bloom·e status' page lets users check whether Bloom·e is connected (Figure 24). It also describes a secret interaction feature where users can long press on a focus virtue to see its corresponding flower twitch. This feature is meant to help the user correlate which flowers are connected to which virtues, especially since Bloom·e is abstract in appearance.

7.6 Bloom·e's behaviour

In this section we describe the use of the Bloom·e artefact. We divide this into two distinct roles: its active role during the reflection activity and its passive role as an ambient artefact.

Bloom·e's active role during the reflections

When the user performs a reflection and waters the Bloom·e artefact with the results, the flowers should bloom. Each flower uses a digital servo to 'spin' open or closed. Digital servos are capable of moving with high precision, but this precision is not reflected in Bloom·e's flowers. This is due to there being small amounts of friction in the ball and socket joints which link each petal to the base of each flower (Figure 25). As the rod pulls on the socket, the ball rotates inside of it, however friction causes the petals to 'skip' miniscule steps in its movement. On the one hand, this gives Bloom·e a certain charm, as the gentle 'stuttering' motion is comparable to playing back a time-lapse of a flower blooming in spring. On the other hand, the 'skipping' of steps creates vagueness in the flowers' behaviour since it may not be entirely clear to the user as to *how much* a flower has bloomed in comparison to others. To account for this, we emphasized a greater difference between the bloom amount for each rating: the first rating blooms 1x as much as the baseline, the second rating blooms 2x as much, the third rating 3x as much, and so forth. Of course, we need to define what the baseline is. For our home studies, we designed Bloom·e's behaviour such that if the user assigns the highest possible rating to a virtue three days in a row, its corresponding flower will have bloomed to its maximum position. This was done to both concretize the behaviour of the flowers for the person observing Bloom·e, but also to ensure that our participants get to witness more of a change in Bloom·e's appearance within their seven days of using the intervention. In keeping with our design guidelines, the flowers move slowly when blooming.

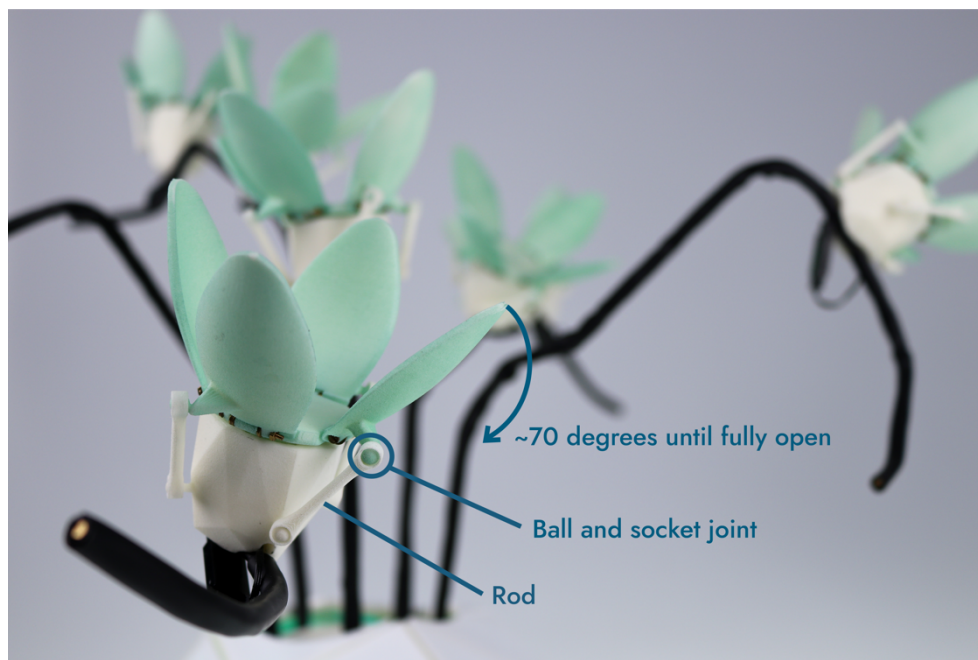


Figure 25. Bloom·e's flowers are not entirely frictionless at each ball and socket joint; each petal can rotate approximately 70 degrees at its hinge

Intervention Design

To further improve the aesthetic of the flowers' bloom, we use the Smoothstep approach [88], a commonly used technique in computer graphics and animation to make the movement of objects appear less jarring and more pleasant to watch. For example, if we imagine a human hand moving left and right with a completely fixed velocity, this can appear very strange and perhaps even artificial. The Smoothstep approach typically adds acceleration and deceleration at the beginning and end of the movement (Figure 26). Essentially, it makes the interpolation from point A to B appear less sudden and more organic by adding curves to the interpolation. We use Smoothstep to add elegance to Bloom·e's behaviour.

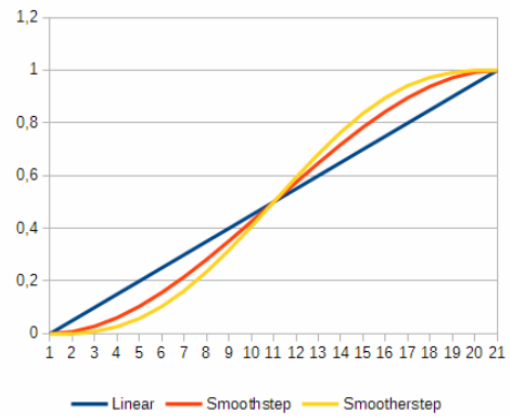


Figure 26. Linear interpolation vs. Smoothstep vs. Smootherstep. Image credit: <http://sol.gfxile.net>

We also switched out Bloom·e's servos for much quieter ones, as the rotating gears in the previous set were highly audible, which we speculated would be annoying to listen to during reflections. Especially in a quiet setting, the noise coming from the original set of servos risks being intrusive, something we did not initially anticipate but now attempted to account for.

As described in section 7.5, the results of a reflection are recapped by cycling through groups of virtues with the same rating. For every group of virtues being displayed on the app, its flowers bloom accordingly i.e. the higher the rating, the more those flowers bloom. Because the user is looking at two different objects (the phone and the artefact) we anticipate that it could be difficult to know when to look at the artefact, especially since the flowers move silently and slowly. To provide a visual cue for when the flowers are blooming, a glow with the same colour as the rating group will gently manifest in Bloom·e's base (Figure 27). This also means it will glow brighter as it deals with higher ratings. Every time Bloom·e glows, it is signalling in the periphery that something is about to change on the artefact. We hope that this draw attention to the artefact such that the user knows when to look and can witness any changes happening.

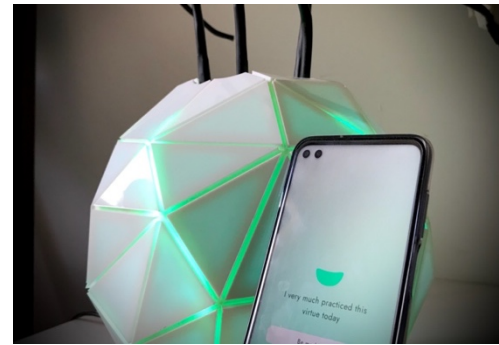


Figure 27. Bloom·e glows whenever the flowers are blooming

Bloom·e's passive role as an ambient artefact

We hope to accomplish two things with Bloom·e in the background or periphery of view: Bloom·e will glow to remind the user about their scheduled reflections; and Bloom·e will prompt the user to think about their virtues throughout the day.

The glow function begins 60 minutes before the scheduled time for reflecting, gradually getting brighter as the scheduled time approaches and reaching its brightest level at the scheduled time. If the scheduled time has passed and the user has not yet started a reflection, the opposite will occur, and Bloom·e will gradually dim until it stops glowing 60 minutes later. This means Bloom·e will glow for a time window of 120 minutes. The idea here is that it becomes a subtle reminder in the periphery, while still allowing the user to decide when exactly to start and not interrupting any activities they are currently engaged in.



Figure 28. The Bloom·e artefact and smartphone app together

Bloom·e was designed as interior décor, giving its user the option to decide its placement just as they would a personal or decorative artefact of their own. This personal touch means that the user's taste and preferences can play a large role in where they might want to place Bloom·e. We hope to gain insights into how and why a user chooses a specific location, and to observe how the presence of Bloom·e in the background influences their thoughts and activities. Whether they walk past it, stare at it or even pay attention to it depends on their intentions, the specific context, and the happenings in the environment, something our context-mapping approach seeks to uncover. The anticipation is that Bloom·e will serve as a reminder for the user to pay attention to their virtues – Stoic mindfulness during the day – or invite them to reflect on their virtues during the reflection activities performed in the app. Together with the app (Figure 28), we hope to understand how our intervention plays a role in supporting virtuous living.

8 Home Studies

To contextualize our intervention and bring forth insights, we deployed Bloom·e in three home studies. In this chapter, we describe the setup of the home studies and introduce the research dimensions which frame our data. Who also describe the content of the questionnaires used and explain how the semi-structured interviews are organized, followed by the way we process the final data. We end this chapter with the experiment procedure and a description of our recruited participants.

8.1 Experiment setup

The experiment takes place over a duration of seven days. On the first day, the researcher installs the Bloom·e artefact in the participant's home, at a location of their choosing. To ensure that the intervention functions correctly during the home studies, we provide participants with a dedicated smartphone – for which the build of the app is optimized – instead of allowing them to install the app on their own devices. When installed, the researcher leaves the premises, and the participant begins the experiment by launching the smartphone application and following the onboarding tutorial. The researcher does not interact with or observe the participant during the home study, except when asking them to fill in a questionnaire, interviewing them after the experiment is over, or picking up the research materials from their home. However, the participant can contact the researcher if they have any concerns or questions during the experiment period.

8.2 Research dimensions

Four key dimensions frame our data collection and method of analysis: (1) Daily life of participants; (2) Stoic mindfulness; (3) Bloom·e artefact; and (4) Bloom·e app. For *Daily life of participants*, we are interested in how Bloom·e plays a role in the participants' lives, from the location they choose to the situating of Bloom·e in daily routines and activities. This is the overarching context mapping approach. For the *Stoic mindfulness* dimension, we look holistically at Bloom·e as a well-being intervention, especially in how it supports the participant in learning about, practicing and/or committing to Stoic mindfulness throughout the experiment period. For *Bloom·e artefact* and *Bloom·e app*, we observe how the design of each handles the attention and cognitive capacity of the participant, as well as the role that each plays in the act of reflecting. This is the calm and slow technology focus. We can think of 'Daily life of participants' as the overarching research dimension, with the remaining three dimensions as more specific accounts underneath it; the entry point for collecting data starts with the daily lives of each participant. Table 6 maps our dimensions to our research questions, showing where each dimension plans to bring forth insights.

Table 6. Overview of research questions and which dimensions plan to tackle them

Research questions		Specific dimensions	Overarching dimension
RQ1: How can a pervasive technological artefact improve well-being by supporting more moments of mindfulness?	SQ1: Which practice can enhance the capability to live mindfully?	Stoic mindfulness	Daily life of participants
	SQ2: How can an artefact facilitate the practice?	Stoic mindfulness Bloom·e artefact Bloom·e app	
	SQ3: How to situate the artefact in the user's home?	Bloom·e artefact	
	SQ4: How to evaluate the effect of the artefact on well-being?	Stoic mindfulness	
RQ2: How can the design approaches and principles be used to design the artefact such that it is mindful of the user's attention and cognitive capacity?	Bloom·e artefact Bloom·e app	Daily life of participants	

8.3 Questionnaires

Participants fill in three questionnaires which are accessed on the internet and filled in digitally: (1) Pre-experiment questionnaire; (2) Mid-way questionnaire; and (3) Post-experiment questionnaire.

The *pre-experiment questionnaire* establishes the baseline of each participant and is filled in while the Bloom·e artefact is being installed. It collects basic demographic information (age, gender and current occupation) and asks about their motivation in joining the experiment, including anything they hope to get out of it. The questionnaire also asks them to describe the location they chose for the Bloom·e artefact and their reasoning, followed by their first impressions of the artefact. We additionally perform a crude check for whether the participant is already predisposed to mindfulness and Stoicism, as well as whether they have an affinity for technology interaction since we are dealing with a technological intervention for well-being. To check their predisposition towards mindfulness, we use the FFMQ [4] as described in section 2.2, where '1' is the lowest score possible and '5' is the highest. To check for their predisposition towards Stoicism, we created the *Affinity for Stoicism* (AFS) scale. Our 7-item scale asks the participant to state their level of agreement with a number of statements such as 'I try to practise Stoicism', 'I know what Stoicism is', and 'I don't know the kind of person I want to be (reverse-scored)' – the mean rating across all statements gives the final score, with '1' being the lowest score possible and '6' being the highest. We should note here that we created this scale ourselves because, to our knowledge, no such scale exists. Although we did not yet validate the scale, the aim was to have a coarse indication of whether the participants' behaviour is already – or not at all – aligned with Stoicism or virtuous living. Finally, to check participants' affinity for technology interaction, we use the previously validated *Affinity for Technology Interaction* (ATI) scale [35]. This 9-item scale assesses a person's

tendency to actively engage in intensive technology interaction – or to avoid it – with ‘1’ being the lowest score possible and ‘6’ being the highest. For the full questionnaire, see Appendix F.

The *mid-way questionnaire* aims to capture contextual insights surrounding the use of our intervention. It is filled in by the participant on the fourth day of the home study. First, the questionnaire asks to what extent the participant found the set-up process in the app (onboarding tutorial) easy to follow, and also to what extent they found it helpful. For each, they are asked to write a short explanation. Next, they are asked to think about their most recent reflection, and to write a detailed account of what they were doing beforehand, including the activity, people, their thoughts and emotions, and what prompted them to start the reflection. Then, the participant is asked to describe what happened during the reflection itself, their thoughts and emotions, and what happened in their surroundings. The questionnaire ends by asking the participant to rate their experience with Bloom·e so far by selecting one out of five emojis. These emojis depict facial expressions ranging from negative to positive valence (sad, frown, neutral, smiley, large smiley). An optional comment box allows them to further explain their response. This questionnaire is intentionally kept brief, since we do not want it to disrupt the flow of the home study. For the full questionnaire, see Appendix G.

The *post-experiment questionnaire* precedes the semi-structured interview and acts largely as a primer for participants to recall the past week. First, the participant is asked whether Bloom·e matched their expectations. Then, they are asked whether they felt that they gained anything from using Bloom·e. For both questions, they are requested to provide a short, written explanation. The questionnaire continues by asking the participant to list up to 15 words that they would use to describe both the Bloom·e artefact and the smartphone app separately. Lastly, the participant has the option to leave final comments for the researcher. For the full questionnaire, see Appendix H.

8.4 Semi-structured interviews

The bulk of our data comes from semi-structured interviews with participants at the end of each home study. The interviews are organized as per our research dimensions (Table 6, section 5.4). We start off with a focus on context mapping, diving into how participants felt about the *overall experience*, what they hoped to get out of it, and if they gained anything by participating, which is a direct elaboration of the post-experiment questionnaire. We then discuss how they experienced *Bloom·e’s active role* during the reflections, what the reflections meant to them and how the physical artefact and smartphone app each played a role. Lastly, we discuss *Bloom·e’s passive role*, how and why they chose its location, what they thought about its glow function, and whether they interacted with the intervention outside of the daily reflection activities. As described earlier in this chapter, the daily life of participants is the leading dimension, but in case the participant or the questions do not drive forward enough insights about the more specific dimensions, the remaining interview sections – Stoic mindfulness, Bloom·e artefact, and Bloom·e app – are meant to probe directly for those aspects. Table 7 lists exemplar questions for each section of the interview.

Table 7. Breakdown of semi-structured interviews

Sections		Exemplar questions
Daily life of participants (context mapping)	Overall experience	How do you feel about your overall experience? What did you hope to get out of it? Do you feel you gained anything?
	Bloom·e's active role	What did you think of the reflection activity? How did the app or the artefact play a role? The way the artefact responded to your results?
	Bloom·e's passive role	What made your chosen location suitable? What did you think of the glow-to-remind function? Did you interact with the app or physical artefact outside of the reflections?
Stoic mindfulness		What did you think about Stoicism itself? Do you think Bloom·e played a role in how you practised/your understanding of Stoicism?
The Bloom·e artefact		How did you feel about the way your virtues were represented in the flowers? Did the artefact's appearance play a role during your reflections?
The Bloom·e app		What did you think about the loading screen? The quote? What about the pacing of the reflections? The way the artefact and app worked together? Would you use the app on its own?
Concluding questions		Do you engage in other types of self-reflection? How does Bloom·e compare? Would you see yourself using Bloom·e in the long term? Would you see yourself practicing Stoicism, without Bloom·e?

Although we have a set of questions we use across all participants, we also add or adapt specific questions in the interview based on their responses in the pre-experiment and mid-way questionnaires. For example, if in the mid-way questionnaire, a participant describes an interesting account they had during a reflection, we plug in a question about it during the *Bloom·e's active role* section to probe for more details.

At the end of the interview, we ask a number of concluding questions. First, we ask whether the participant engages in other types of self-reflection and, if so, how Bloom·e compares. This is in relation to their predisposition to mindfulness and Stoicism, which we check for in the pre-experiment questionnaire. We then ask the participant whether they would see themselves using Bloom·e in the long term, and whether this would be the physical artefact, the smartphone app or both. We also ask if they would continue to practise Stoicism without Bloom·e. It is worth mentioning that these are speculative questions which ask for equally speculative responses. Although we can not consider those responses reliable, we do seek to understand how to better design the intervention in follow-up studies, or to provide insights into what is possible or desired in such an intervention. Such is the context mapping approach, where the probe is exactly the starting point for further work. For the full list of interview questions, see Appendix I.

8.5 Data processing

To uncover our insights, we conduct a thematic analysis of our data, which comprises participant responses from all three questionnaires and transcripts of the semi-structured interviews. To prepare the data, the responses from the questionnaires are compiled together for each participant. The open text responses are left as is, while the mean rating for each of the FFMQ, ATI and AFS scales are calculated. The semi-structured interviews are transcribed by the researcher and collated together with the survey data for each participant.

We code the data and then perform an inductive thematic analysis. To organize the results of the home studies (chapter 1), we report them under our four-research dimensions; these are, essentially, organized descriptions of our codes. From these codes, we generate themes for the discussion (chapter 1) which either say something about Bloom·e as a well-being intervention (tackling RQ1) or give light to a design implication (tackling RQ2).

8.6 Experiment procedure

Five key touch-points make up the procedure of the home studies (Figure 29). The participant first receives a short presentation about the research study, which is simply called *Stoic reflection with Bluetooth Object*. The content is intentionally kept vague to prevent influencing the participant to think about Bloom·e in a certain way – they are only told that they will perform reflection exercises inspired by the philosophy of Stoicism together with a Bluetooth object (Bloom·e) and smartphone application. Little is said about Stoicism itself, only that it is an ancient Greek philosophy which is characterized by its system of logic and virtue. They are informed that the experiment period will last seven days and that they will be required to spend between five and fifteen minutes reflecting daily, although they are free to decide how long exactly.

The materials of the experiment are then described. Approximate dimensions of Bloom·e are given (40cm x 40cm x 50cm) where a comparison to a medium-sized house plant is made. The participant is told they will have to decide on a location prior to beginning the experiment, and that the requirements for the location are that two power sockets are available nearby and that it is distant to water sources with minimal hazard of being knocked over accidentally. They are explained that the researcher will install the object themselves because it is delicate, and a dedicated smartphone will be provided for use during the experiment period.

The research then runs the participant through the experiment procedure. On the first day, the materials are delivered to the participant's home, at which point they also sign the consent form (Appendix J). The researcher begins installing Bloom·e in their chosen location, taking approximately 60 minutes, while the participant fills in the pre-experiment questionnaire on their computer. Once Bloom·e is installed, the researcher leaves. The participant launches the Bloom·e app and follows the instructions (onboarding tutorial) to begin the experiment. To help participants keep track of what is expected of them during the experiment, a brief check-list is provided which lists the procedure and main tasks to be carried out at the beginning, middle and end of the experiment (Appendix K). On the fourth day of the experiment period, the research sends the participant the mid-way questionnaire and a reminder via text message and e-mail to fill it in. On the seventh day, they are sent the post-experiment questionnaire and reminded via text message and e-mail to fill it in before the final

interview. After holding the interview, the research collects the materials from the participant’s home which concludes the experiment.

At the end of the information session, the participant reads an information brochure which summarizes the information (Appendix L), followed by a preview of the consent form. If they agree to participate, they provide implied consent by scheduling appointments with the researcher for material delivery, the final interview, and material pickup.

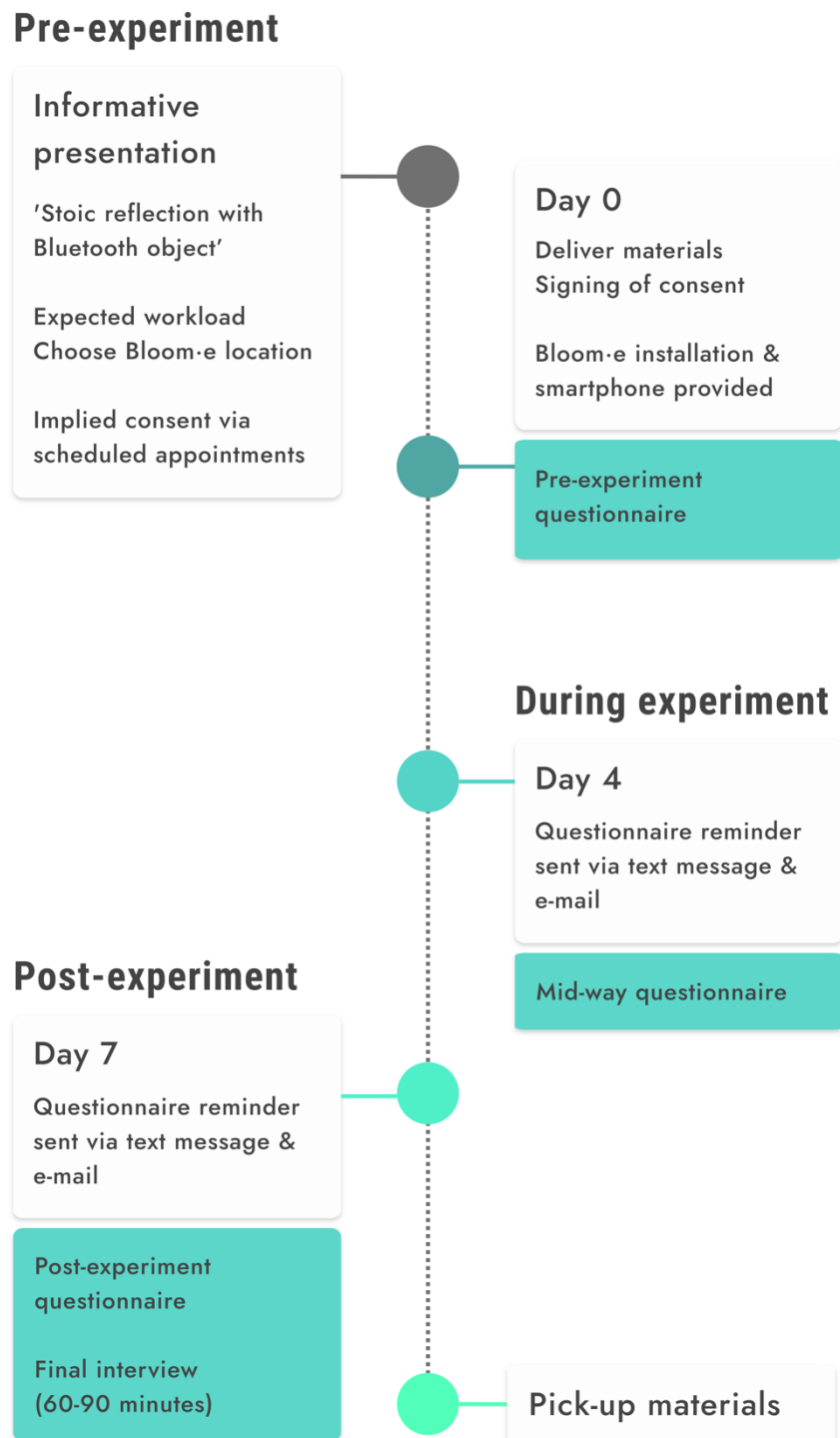


Figure 29. Experiment procedure across five touch-point interactions with the researcher

8.7 Participants

It was important for participants to have an intrinsic motivation in the subject area of the intervention, namely that they should be interested in Stoicism, mindfulness, and/or self-development. This is so that the intervention can align itself with their aspirations and vice versa – we are not investigating how to convince non-interested individuals to adopt Stoicism or mindfulness practice. Additionally, our intervention is not specifically targeted towards individuals with (mental) health issues, so we did not screen participants for this characteristic.

We recruited three participants for our home studies who met the criteria and were willing to participate. For readability purposes and anonymity, we assigned a pseudo name to each participant. We describe here each of them based on their responses in the pre-experiment questionnaire. For all responses, see Appendix M.

The first participant, Dan, was a 25-year old male currently attaining his Master’s degree (Figure 30). Dan hoped to learn something new about Stoic philosophy and how this could be mediated by computer technology. He also wanted to take the chance to do some deeper reflections about himself. The location he picked for Bloom·e was on the floor in a corner of his office room, describing it as “a somewhat isolated part of the house”. His intent was to face the wall so that when he used the artefact he would have a “sense of isolation and not be distracted through motion that [he] can observe visually”. He also chose this location to avoid any chance of the artefact getting wet or tipping over by accident. His initial thoughts about Bloom·e were in wondering how it would help him reflect.

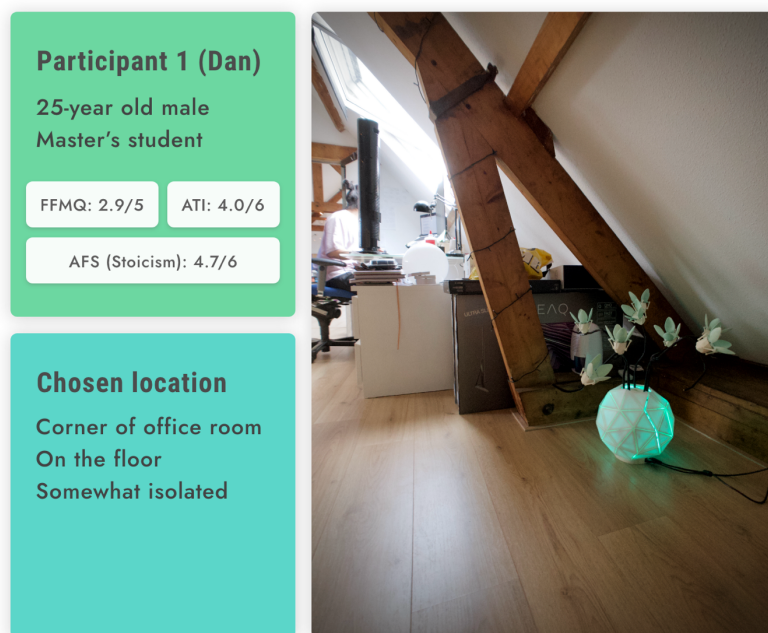


Figure 30. Participant 1 description and their chosen location

Dan scored a mid-way 2.9 on the FFMQ, which indicates that he may be neither strongly predisposed to mindfulness nor strongly misaligned with it (a score of 3 equates to ‘sometimes true’ on the scale). He leaned towards the upper range of the ATI scale, which indicates he has some interest in technology interaction. His AFS score was 4.7, which is a crude indication that he has some affinity for Stoicism and living through virtue.

The second participant, Jen, was a 26-year old female who was self-employed (Figure 31). She was Dan’s partner and they lived together. Jen thought that the concept of reflecting with a Bluetooth object was interesting to try out. She likes meditating and reflecting daily, so she was curious to see how that can be mediated by technology. Jen shares an office room with Dan and considers the office “pretty cosy” – it also has a dedicated corner for breaks and relaxation. In this corner, there is a coffee counter, couch, hanging chair and a beanbag. She likes to sit in this corner when she wants “a quick change of environment away from her desk” or when she wants to read or write about the day. She chose this corner as the location for Bloom·e, since it is where she likes to sit when she wants to take a step back and look at her “day, week or life in general”. She added that it is “where [her] mind rests”. Jen’s first impression of Bloom·e was that it “looks pretty cool” and she was “overall happy with the design and how it fits in the space”. She was very curious about how it worked.

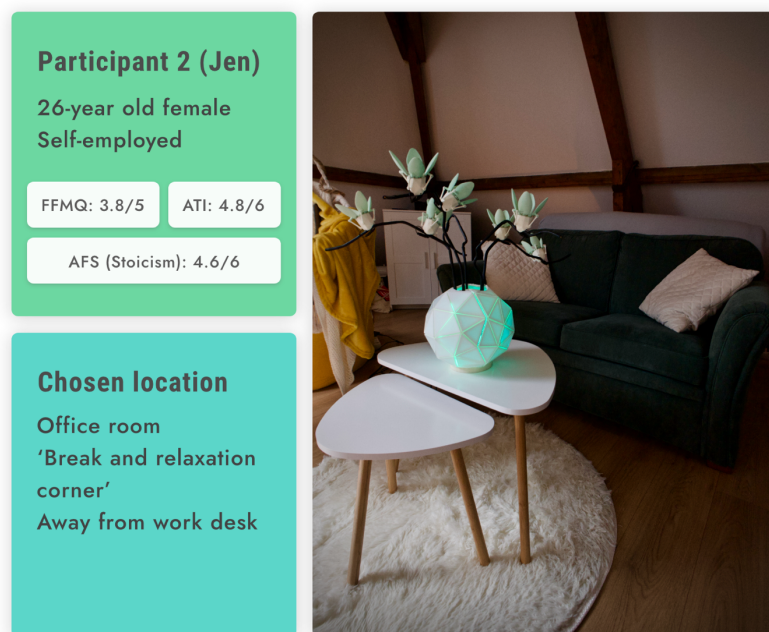


Figure 31. Participant 2 description and their chosen location

Jen scored 3.8 on the FFMQ, which indicates she is somewhat attuned to mindfulness behaviour. Her ATI score of 4.8 was on the upper end of the scale. Like Dan, she seemed to have an affinity for living virtuously with an AFS score of 4.6. Although Jen already saw Dan using Bloom·e before she started, she explained that they never discussed the intervention as they both wanted to experience it for themselves.

The third participant, Mia, was a 24-year old female who just recently graduated with a Master’s degree (Figure 32). Mia explained that the experiment captured her interest in “learning more about (or even practicing, to some extent) Stoicism” as well as reflecting on her values and virtues. She chose her desk as Bloom·e’s location because it was a central place in her room. It also “seemed like the only suitable spot” to place Bloom·e. Her desk is large and not crowded, with some decoration and general office supplies nearby. Mia’s initial impression of Bloom·e was that it “has a unique design based on the few components [she] has seen” and she thought it would look good in her room. She was excited and curious to see it.

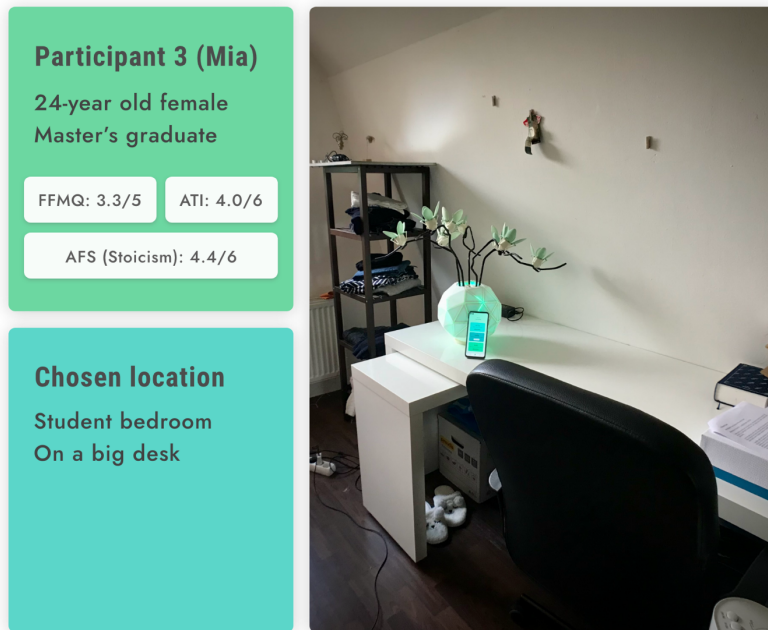


Figure 32. Participant 3 description and their chosen location

Mia was roughly mid-way on the FFMQ with a score of 3.3, which indicates that she may be neither strongly predisposed to mindfulness nor strongly misaligned with it. Her ATI score was 4.0 and her AFS score was 4.4, showing some affinity for virtuous living.

The scores regarding the FFMQ, ATI and AFS scales were only meant to indicate general tendencies, or oppositions, towards mindfulness, technology interaction and virtuous living – they were not intended to give a highly robust account of each participant. Although these self-report scores are only indicative, we use them here to establish a baseline for each participant and to check for any major differences between them, in case we could draw connections to the results. All participants had some affinity for Stoicism or virtuous living (AFS of 4.4-4.7 out of 6) as well as for technology interaction (ATI of 4.0-4.8 out of 6). Jen appeared to have some tendency towards mindfulness practice (FFMQ of 3.8 out of 5), while Mia (FFMQ of 3.3 out of 5) and Dan (FFMQ of 2.9 out of 5) were at the mid-way point on the scale. Overall, there did not appear to be any major differences between participants, apart from Jen who appeared to practice mindfulness more than the others.

9 Results

In this chapter, we present the results of the home studies grouped under our four research dimensions. We note here that any further mention of *Bloom-e* refers to the intervention as a whole, including both the physical artefact and the app, while *Bloom-e artefact* and *Bloom-e app* are specific references to the physical object and smartphone app, respectively. The results here serve as synthesized descriptions of participant responses from the mid-way and post-experiment questionnaires, as well as from transcripts of the final interviews. See Appendix N, O and P for each of the full responses, respectively.

9.1 Bloom·e in daily life

This section dives deeper into each participant's chosen location for the Bloom·e artefact, as well as describes, from a motivational point of view, the context surrounding the act of reflecting. Further contextual insights regarding Bloom·e as an intervention and the use of the physical artefact and smartphone app are described in the sections that follow.

Bloom·e's location

Participants had different motivations for placing the Bloom·e artefact in each of their chosen locations. Dan and Jen both placed Bloom·e in their shared office room but had different reasons for it. For Dan, his initial intention was to place Bloom·e in the corner and be isolated: "I thought it would be nice to be isolated...visually. Even though Jen might be sitting at her desk. Now I'm not isolated, but at least I can see that I'm isolated". He described the office as a suitable room "because of the fact that when [they] are here [they] are a little bit more focused". Jen, on the other hand, placed Bloom·e in the break area of the office which was a space for "chilling and spending time with yourself". For Jen, the area signifies "relaxing", and is a place she described as "you're not going there for work or for intensive cognitive activities... or you're there with the other to play". In Mia's case, her desk seemed like the only option because her bedroom "is like a tent", explaining "I don't have a lot of big surfaces that aren't affected by the tiltedness of my walls".

When asked whether he would change the location of the Bloom·e artefact in hindsight, Dan expressed that he would have preferred the location Jen later used, saying, "I would have put it on this table...it would be nice, because it's also right in front of the couch". For Dan, this would make Bloom·e more visible, saying "it's a centre of a space, it's symbolic to me". He further explained, "Being itself a centrepiece like that, I would look at it and say 'Oh, it's this whole thing that I'm doing'". The original location in the corner of the room was "behind this wooden bulk. [He could] see flowers, but [he could not] see the pot" when sitting at his desk. He expressed that he would have liked to be able to see the artefact more often, explaining, "I think the more it reminds me of the process the better for me. I would look at it and then it would trigger a line of thought immediately...it would remind me of something that is good for me or would have been good".

Jen and Mia would not have changed the location, although Jen contemplated placing Bloom·e on her work desk, saying, "I'm doing work that is so connected to myself, my work is really meaningful to me". There are moments when she thinks about herself and has "the urge to reflect". Jen thought that it would "have also been nice to have the artefact on [her] desk sometimes when [she's] in that state". For Mia, the only other option she could think of was positioning it "on the floor somewhere... but [the desk] was the perfect place because [her] room is small".

Performing the reflections

Dan did not perform his reflections at exactly the same time every day, although he did do them in the evening. On one occasion, he was "actually relaxing. [He] was reading [his] book and then decided to do a reflection which [he had] been doing at the end of the days." Nothing prompted Dan to do the reflection, as he "started doing it in a standard way at around the same time". On one occasion, though, he was "already in bed, super tired" but "[he] went out and did it".

Jen sometimes felt in the mood to reflect and other times did not. One evening, around 7:30pm, Jen received the remainder of her belongings from a previous city she used to live in. Some belongings were 10 years old and she felt “nostalgia” and “joy” upon seeing them, explaining, “I was in some kind of self-reflection and in a very emotional state, as well. And I felt the need to go and look at what I wrote down, reconnecting with who I am and who I aspire to be in the future”. Jen thought it made sense to “go to the app, because that’s where I wrote down those things”. To her, it “felt like the right moment” to do a reflection. On another occasion, Jen and Dan went to see Dan’s family, spending a whole day with them. They came back a little late at night, and Jen felt “it wasn’t really a day where I would sit down and start reflecting on myself because I...was connecting more with the external world.” She felt it was “not right to reflect at that moment, but [she] did it anyway”. Jen tried to engage with the reflection but found it “a little hard. It was definitely harder than you choosing to go there”. Jen explained that a good addition to Bloom·e would be to “put somebody in the mood of reflection”, adding that “maybe something is also super neurological, too technical, not really connecting you with your emotions” and that it is a “little bit of a hard transition” to start reflecting. She added that, “usually, what puts [her] in the mood, for [her] at least, is music, and a specific type of music”, later saying, “Maybe [the artefact] could emit some music...I could use it to have my music on when I’m reflecting. Or it could be dancing to the music or doing something”.

In Mia’s case, there were two nights when she skipped doing the reflections: “I did not use it every single day, because sometimes I was just too busy...or I was not home or not in my bedroom.” At the beginning of the interview, she mentioned that “[her] past week was a little bit more stressful. It’s not because of Bloom·e but it was because of other factors”. When it was time for bed, Mia once thought to herself “Oh, I will just go to bed now and maybe do [the reflection] in the morning”. She also recalled one night that she was “watching a movie with [her] roommates, and then [she] started getting ready for bed and [she] saw the installation, but of course, it was not glowing anymore”. She “remembered about it, but [she] was kind of tired to do it”. To Mia, she “just didn’t do it for two nights, which is good. [She’s] impressed with [herself]”. When asked if she felt something was missing from Bloom·e, Mia explained that, although the Bloom·e app was on a separate phone and therefore not always with her, “if [she’s] not in [her] room, but [she] has the phone with [her]...maybe it could give a light indicator on [her] phone”. Mia described a feature she had on her own phone where, when she receives a message, a tiny light at the top of the phone would blink in different colours: “For example, for WhatsApp, it’s pink. And for Messenger, it’s green”. For Mia, this tiny light is like “dopamine, like ‘Oh, something new is waiting’”. When Mia would see it blinking, she would “be curious what’s going on, and [she] would tap to see...if [she’s] in a meeting, [she] would not immediately respond to it, but [she] would still be aware of it”. She suggested that “maybe Bloom·e can have its own colour to discreetly remind [her to reflect]” when she is away from her room.

9.2 Stoic mindfulness

In this section, we describe participant responses that relate to their learning about, practising and/or committing to Stoic mindfulness during the experiment period. This includes what they feel they gained from using Bloom·e, how they defined and managed their virtues, the way each participant reflected, what they anticipate doing in the morning and weekly reflections, and finally, their aspirations for engaging in mindfulness or Stoicism in the long term, if any.

Participants' perceived gain

Dan expected to learn something about Stoicism and thought that he “definitely did”. Even though he had “read books about Stoicism and read the *Meditations* from Marcus Aurelius, reading is very different from actually trying to implement it into your life”. He felt that Bloom·e helped him practise some of his virtues, and “discover through reflecting about [his] virtues what other virtues [he] wants to follow and that [he] currently feels like [he] needs to practise”. He described an account during the week where he was “in a moment of doubt and feeling of inferiority”, but by holding onto the virtue he defined for himself he could “gain confidence that at least, [he] did some of the actions that were in line with the virtue, and that consequently gave [him] some sort of confidence boost”. Dan thought that process and the way the intervention is structured helped in “reminding [him] to think about [his virtues], that it gave [him] a little bit of a push to do that every day”. Using Bloom·e also helped him “discover what other virtues [he] should pursue to alleviate some of the troubles [he] was experiencing prior and during the experiment, as well”. He also thinks he is “quite harsh” in how he judges himself, while at the same time he is “very keen on growing”. He further explained that he “would like to do something bigger than [himself] while [he] is here”, but that sometimes it “gets a little out of hand...or [he] would be paralyzed because of problems coming”. Dan felt that Bloom·e showed him that he “can react in [a better] way, instead”, although there were “also instances where it didn’t help”. Overall, he feels like he “[has] memories now of practicing [Stoicism] actively. In that sense it’s more of, [he] learned something that is applied”. He compared this to only reading books about Stoicism, where he did not practise it even though “[the books] did say so but [he] didn’t.” For Dan, it was “the difference between theoretical knowledge and applied knowledge.” His virtues did not always support him, however, as there were “also instances where it didn’t help. And where [he] freaked out basically”, although the interview did not discuss further details of those events.

Jen did not have any expectations in the experiment: “I just went in for the experience. But I did get a few things out of it”. She explained that she “tried to use apps in the past to reflect, but it was either too guided, or...not working for [her]”. She was surprised to find that Bloom·e worked better for her, explaining that it was mostly because she “was forced, or more like encouraged” to look at her virtues every day, and to reflect on them. Jen normally did this once or twice a year, thinking about the kind of person she aspired to be, but did not evaluate herself on “whether [she] worked towards specific goals or not”. In using Bloom·e, Jen reflected on her goals and “what they mean and where they come from. Do they come from [her] own experience, or are they coming from external environments, and are there patterns of connection between them?”. She found that seeing your virtues in front of you “tells you more about who you are, really, and what drives you in life”. She added that “being more aware of your state and your work though the day, and how aligned it is with which you think you are aspiring to be is very important”. Jen mentioned one moment during a reflection where “it made [her] more self-aware and more aware of the reasons why [she] was driven by certain things and why [she] was aiming for certain goals, which goals or virtues [she] was neglecting”. Jen continued by saying that these “in [her] case seem to be the ones that are linked to [her] deepest emotions”. She further added, “It might explain why I feel agitated and a lot of distress whenever I feel emotional”. At the same time, Jen expressed that, while she thinks Stoicism “is a nice philosophy...it’s not completely aligned with [her]”. During her time with Bloom·e, she “did not really focus on the Stoicism itself, the philosophy. There was nothing in the app really making me think about focusing on Stoicism...there was nothing about what Stoicism is, about ‘How can you practise Stoicism?’. How is this related to it?”. She referred to her story about receiving her belongings from the previous city she used to live in: “I’m more driven by emotion, which does not mean that I act upon emotions...but what I mean is that I really put as

much importance to reason as to emotions, because I think that they speak the language of the subconscious that is not always so logical”. While Stoicism did help Jen to reflect on this, she found that prioritizing reason was “not always true for [her]”, saying, “There were a lot of times in my life where I just followed my instincts and my emotions...and it did lead me somewhere”.

Like Jen, Mia did not have any expectations: “I was not searching for getting something out of it. But I was curious about it...I didn’t know too much about [Stoicism] before that”. Mia’s time with Bloom·e coincided with a stressful week she was having: “The perfect time to have Bloom·e, maybe?” she remarked at the beginning of the interview. During the week, Mia spent part of her day at work and part of her day at home, where she would normally be in her bedroom. She contemplated her time “away from [her] room, then [she] could have just used [the] app, but it was not on [her] phone...[she] was not bringing the other phone around with [her]”. When asked whether she thought about her virtues throughout the week, Mia responded by saying that “no, [she] was too consumed with other things, unfortunately, during this week. [She] wishes it was different. It was a little bit of a stressful week”. Despite the fact that, “throughout the day, [she] was not thinking about [her] values too much”, Mia felt that Bloom·e was still “not forcing [her], but kind of reminding [her]...to take the time to reflect.” At the “end of the day”, Mia would be reminded to “take a moment to think about my day...[she thought] ‘Oh, yeah, okay. I did follow this, but I did not follow that’...it’s still one step towards mindfulness”. She liked that Bloom·e reminded her to “take some time to reflect on [her] feelings and reactions”.

Defining virtues

Participants found the onboarding tutorial in the app helpful in setting up their initial virtues. Dan felt that he was “successful in practicing some of [his] defined virtues, which the [onboarding] tutorial helped a lot with to make concrete what you mean by virtue”. He thought the tutorial had a “process in place to get to defining some virtues”. He has “tried to specify [his] virtues before...either written down or thinking about it” and felt that the virtues aspect was “familiar, but what was unfamiliar was the practice...[he] thought it was really nice. That [he] was able to actually practise [his virtues]”. Similarly, Jen “appreciated the way [she] was walked through the process. The first exercise was a good introduction to the purpose of the app”. She added, “The examples that were given to define the virtues were simple and the explanation of the virtues categories were also helpful to start defining my own”. At the same time, Jen would have appreciated to know more about “what virtues are in a little bit more detail...some sort of extra option where [she] can go to know more about [Stoicism]”. She additionally “found it slightly hard to specify the level of granularity of what [she] can define as virtue”. She further explained, “For instance, there is a difference in abstraction between ‘I am someone who is productive’ versus ‘I am someone who has the courage to choose to strive for good’”. She thinks that “the more your virtues are precise the better the chances that you would work in their direction effectively”. For Mia, she found the tutorial “straightforward and the language was clear”, however she said that “the reflection exercise for [defining] the virtues took some time because of its nature”. Additionally, Mia mentioned that the four Stoic categories was something new that she learned about, saying, “I didn’t know about the separation of [the categories]”.

Throughout the week, Dan “would add more virtues or change focus”. He felt like he “gained some knowledge about [him]...[he] reflected and speculated what kind of virtues would help [him] currently in some emotionally distressed situations”. Dan thought that “it actually helped. And it was really cool to observe that, how it helped, and what different behaviours [that triggered]...like reading certain

books...it changed some of [his] behavioural decisions”. He “looked at [his virtues] as a whole”, describing, “I had I think five virtues [in focus], and then I was not sure if I had the right virtues. And then the next day I added a bunch more...then I scaled it down again”. For Dan, the act of setting focus virtues “helped [him] to say ‘Okay, what do I actually want to focus on and what do I need?’ And it was actually one topic where [he] said ‘Okay, this is the one that I want to focus on’”. Even though Dan had multiple virtues in focus, there was one he “felt that [he] needed it right now. Focusing on that felt good”. Halfway through the week, Dan realized that “what [he] is actively trying to focus on is ‘gratitude’...there’ll still be a few in focus...but it would be ‘that one is the critical priority one’”. He described not being grateful as “when you’re frustrated about certain things that maybe you don’t have to be frustrated about”. His virtues “gravitated towards ‘gratefulness’”, and although multiple virtues were about gratefulness, Dan “would just make the best judgement [as to] which ones were things that are more actionable, and things that were not that actionable”. He mentioned another virtue he had – ‘I am someone who does not let emotions dominate my decisions’ – and how it “was pretty helpful in [his] current learning journey of trying to trade in cryptocurrency”, adding that he “actively tries to use [the virtue] in trading”.

Jen thought that the ability to edit virtues in the app “was a cool feature”, saying, “I did add, and refine the virtues and I think it’s very important...because you do want to experiment with this and iterate on them. Because you’re also evolving as a person”. She found that “writing them down and looking at them every day, with those words...and repetitively the same sentences and the same virtues definitely was different”. A lot of Jen’s virtues were “related to [her] work, but also, [her] work is really related to [her] life...It’s also related to [her] past experiences...And that’s probably why [she’s] so passionate about [her work]”. Jen had about “five [virtues] per category” and “if [she] could, [she] would select all of them” as focus virtues. The first time she set her focus virtues, she tried to select “a ninth virtue and that didn’t work out...you had that message that said, ‘Only hold a maximum of eight focus virtues’”. Although she wishes she could select more, she thought, “actually, eight is a reasonable number. I shouldn’t overload myself with 30 virtues or so”. During the week, Jen found it “very hard to know whether you’re on the right track. And [she] knows that it’s very subjective, you can’t really have a *right* track...but [she] is not sure whether [her] virtues are so aligned with Stoicism.” Like Dan, Jen also had some virtues she considered practical and others she considered abstract: “I am not sure to which level of granularity I should express my virtues for them to be more practical, versus too abstract for me to act upon them”.

When Mia was setting up the app, it “actually took quite some time to think about values and virtues”. She “didn’t know what [she] was going to do with them. So they were very broad and ‘not everyday’ stuff”, similar to Dan and Jen’s more abstract virtues. When Mia performed the reflection the next day, “[she] thought ‘Oh okay. This is not really relevant to me right now. I’m going to change them tomorrow’. And the next day [she] changed them”. Later in the week, “[She] added a few more [virtues]”. After adding them, she “paid more attention to the new ones...because they were kind of more relevant for the situations that [she was] in” compared to the previous which were “not that relevant to [her] days”. Mia liked that adjusting the virtues was “really taking your time to think about yourself.” She also noticed that she had “a lot [of virtues] for one of the categories and not too many for some others”, which “made [her] think about, ‘Okay, let’s try to think about virtues for the other ones’”. Mia had three focus virtues at the beginning, “and afterwards [she] had four or five in total”.

Process of reflecting

During the evening reflection, participants reflected in different ways. Dan asked himself, “How did I act on what I have specified?”, seeing “if there were things that [he] did that day that respected the corresponding virtue” and if yes, he “would just [his] performance as positive”. There were also other questions he asked himself: “What did trying to live up to certain virtues do with my mood in certain situations or my actions? My decisions in certain situations?”. For Jen, it “helped to have [the virtues] written down so you don’t have to occupy your mind...so you have more space in your brain to be able to focus on other things surrounding the virtues themselves”. She reflected on the patterns and connections between virtues, and “looking at them made it easier for [her] to reflect upon how they are linked together and to [herself]”. Jen realised that the virtues she did not pay attention to “were closely related to awareness of [her] emotions” and that many of the virtues she defined “were closely connected with a lot of negative experiences of [her] life”. In Mia’s case, she liked that “it did not require too much time rating the virtues. Because [she] would just think about [her] day, which would not take [her] too much [time].” Her reflection was “purely reflective”, and she “was calm, [she] was not nervous, or [she] was also not angry or upset with [herself] when [she] could see that [she] hadn’t practised the virtue”. Mia “tried to accept that [she] needs to pay more attention to certain situations”.

Morning and weekly reflections

Although the morning and weekly reflections were disabled in the app, participants speculated about what they might do with them. For Dan, seeing the morning reflection “gave [him] that prompt to think about your day ahead in the morning, either in terms of the things [he] had to do but also the virtues that [he] had in focus”. He referred to the structure given by the evening reflection, saying, “it would maybe be helpful that [the morning reflection] would have structured it a little bit for me”, since he “thought [the evening structure] was really helpful”. Jen responded similarly, saying, “More something about setting the intention for which [virtues] you are going to focus on during the day”. Mia also expressed that “it would be useful because at the beginning of the day, you will somehow start the day with the virtues in your mind. So maybe, throughout the day, you’ll be reminded of them, or more aware of them”.

The participants considered the weekly reflection as another way to explore their Stoic practice. Dan said, “It would be interesting to see how [the weekly reflection] can be structured that takes into account the whole week instead of day by day”. He felt that this would “help you zoom out into a different level of granularity...[he] could maybe come with different insights because of that”. Jen was not sure “if planning the week is a thing that would really attract [her]”, however she “would maybe reflect on [her] individual reflections or the group of all reflections...and have some kind of analytics or something to tell [her] how [she] did”. Jen firmly believes that “as human beings, we don’t have – it’s always good to have some kind of other perspective. And [she] thinks that alone, we will always have a biased perspective”. Jen feels that having analytics “sometimes gives you information that you would not have paid attention to...or you just don’t have the ability to do so many calculations in your head”. When asked if she would want graphs or tables, she responded, “That would be too boring...I think something that would be more into the artefact would be nice, something represented by the artefact”. Mia would expect a “sort of overview of the week...more awareness of how [her] week was, maybe compared to the previous week...comparing the weeks”.

Longer term aspirations

Dan considers himself “a person who would reflect a lot”, saying, “I think I have done it to the point where I was not able to act anymore. Like it was too much reflection. Too much introspection”. He also contemplated why he did not apply what he learned about Stoicism when he read books about the philosophy, saying “I think a lot of times in the abstract, and it makes it consequently less applicable...I would like it to be more applied than just me being in this cloud of my thoughts”. Dan thinks these other moments of reflection are “on a different level of granularity...way more on, ‘What is it in me, in my unconscious, that is trying to tell me something?’...the realm of the unconscious”. For Dan, Bloom·e “would be more of, ‘How did [he] do today?’ [He] has made something explicit”, saying that “it’s a little different”. He described Stoic reflection as “something that would be nice to just continue on [his] own. Make it a habit”. Here, Dan is referring to “taking over exactly the same process...[he] would write [his virtues] down, and then [he] would remind [himself] to do it in the morning and remind [himself] to reflect in the evening”. Although he is not sure if he would commit to it, Dan “thinks it would be good for [him]”.

Jen likes “meditating and reflecting daily”. She finds that meditation is “a totally different type of reflection. When [she] meditates, what [she] usually does is try to focus on [her body] and on [her] breathing”. She further explained that, for Bloom·e, “you’re not focusing on your breathing...you’re focusing on understanding yourself better and connecting with yourself better and how you’re doing daily”. Jen would like to use it as an additional reflection, meditating “in the morning to really relax and set [herself] up for the day” while using Bloom·e to “reflect upon how my day went...and who I want to become and how I’m doing on that”. Although Jen “used it for less than a week...[she] does feel that it did help [her] connect more with [herself] and realize certain things in such a short time that [she] would like to do [the reflections] more for [herself]”. Using Bloom·e “made [her] have a different type of reflection that [she] would not have had if [she] didn’t use it. So [she] would like to continue doing it”.

Mia does not actively perform any other types of reflection, and has not “practised [Stoicism] before using the app. But [she] kind of wants to be more mindful...because sometimes [her] emotions overtake [her] reasoning. Which is not a bad thing, but sometimes [it does]”. When asked if she would see herself practising Stoicism in the long term, she responded, “I would hope so”. Towards the end of the final interview – and after agreeing on an appointment with the researcher to pick up the materials – Mia said, “I’m going to use [Bloom·e] for a few more days. Because, why not?”.

9.3 The Bloom·e artefact

In this section, we describe accounts related to our calm and slow technology focus with regards to the physical artefact. This includes how participants experienced the glow reminder, how they attributed meaning to the Bloom·e artefact, and the way they described the artefact’s aesthetics as well as their sensory experience surrounding it.

Glow to remind

Jen and Mia were able to experience the Bloom·e artefact’s glow reminder, while Dan did not. When asked what he thought of the glow to remind function, Dan did not know what the researcher was talking about: “So it did not glow to remind me. I don’t know why”. He further explained that he

“would have liked it to remind [him]. It would have been easier for [him] to say, “Oh, you know, let’s do it now”. Since the Bloom·e artefact was “behind this wooden bulk”, Dan explained, “if it would glow, I could see it from [my desk] as well”.

Jen and Mia both appreciated the glow function. For Jen, seeing the Bloom·e artefact glow “didn’t feel like ‘Oh, again, I have to go reflect’ or something”. Jen would be “walking in the house and sometimes forgetting that it’s time to reflect. And then [she] would just spot it glowing...[she] would say ‘Oh okay, time to reflect’”. She “was not anticipating the glow”, but still found the pattern of glowing “very calming for some reason”. Jen does “not really like seeing notifications on [her] phone, it just means there are things that aren’t done and that you have to do”. She thinks the glowing “is way better” as a reminder. She explained, “It’s not hard timing, because sometimes I do it a little later, sometimes not...the most important thing is just that I noticed that it’s glowing”. She considered it a reminder “to reflect in the future. But then you can choose when”. Similarly, Mia would notice the glow when she “was completing some tasks”. She found the glow “very discreet, somehow”, and considered it to be “not invasive”, describing the way it gets brighter as “talking to [her] in silent language. So [she] actually liked that. [She] liked that it started glowing slightly and then at 10 o’clock it’s at its full brightness”. The glow reminder made the reflection “not feel like that much of a task”, and Mia “liked that [she] could decide when to do it...because [she] could do it later”. She explained that “it was very dependent on the day, to be honest, because if [she] was still busy with something, [she] would not pay too much attention to it”.

Attribution of meaning

Dan felt like he was “giving water to [the Bloom·e artefact]”, explaining, “That’s how I felt...I would read [the reflection results] and say ‘Ah, I sort of did these’ and then this [artefact] glows, and then you see things bloom”. He was not sure whether the artefact did “anything with the reflection”, but he would “imagine it being a part of [him]”. When Dan assigned virtues with lower ratings, it “would bloom a little but the ones that [he] ‘definitely did’, they would bloom more. It definitely felt like it was more in line with [how he] judged it...[he] did a good job on certain things”. For Dan, seeing the results “left [him] a trail of [his] progress. So [he] thought that was cool”. At some point during the last three sessions, Dan was “not sure whether it felt like it, or if [he] imagined it, that [the Bloom·e artefact] was an extension of [him]”, later describing it as “[his] reflection tree”. Seeing the difference between the “position of the flowers gives [him] an indication of the progress [he] had previously...and that it’s blooming”. He felt as though “it was growth that [he] was having. But external, [he] can see it in front of [him]”. In the post-experiment survey, Dan listed, among others, words such as “extension, trail, progress, self, and potential” to describe the Bloom·e artefact. Additionally, Dan “did not notice” and “had no concept of each individual flower corresponding to a certain virtue. [He] thinks that would be hard to memorise, as well”. Instead, he saw the Bloom·e artefact as an overall metaphor for growth: “It didn’t reflect my virtues...I viewed it as me growing, or progress towards some growth of the self”.

Jen considered the Bloom·e artefact as “a companion that is there listening to you and responding to you and calming you down”. She further explained, “The fact that it responds to...how much you worked on a specific virtue, and then you have that external response...there’s something about that I cannot really explain. But it’s just very powerful”. She described the Bloom·e artefact as “some kind of weird presence that responds to your mental answers, because you’re kind of talking to yourself. And then it’s talking back to you, physically in the external world”. Jen liked the “instant reaction of the external world to [the ratings] she is choosing...it’s like somebody, they’re saying ‘I hear you’, you

know what I mean?”. In the post-experiment survey, Jen listed, among others, words such as “sentient, spiritual, telepathic, soothing, and calming” to describe the Bloom·e artefact. With regards to its expression, Jen could not identify which virtue was connected to which flower during the reflection. She “thought it would be nice if you could see it visually...so just look at the artefact and would know”. For Jen, having “this link, the moment [she] looks at the artefact, that would also help [her] reflect more upon which virtues [she] is really focusing on...which ones [she] is neglecting”. She also found “if the range of motion was a little bit larger, that would be easier to spot”, further adding, “you really have to look at them and stare, sometimes you would hear them moving but then you don’t know exactly which one is moving”. Comparably, Mia mentioned that the flowers were “not changing too much. But still, [she] could see it change. [She] could see some of them less open than the others”. Jen would interpret what she saw in the flowers “as though [she] focuses more on certain virtues over the others”. She considers this “important to know” which would lead her to “reflecting on ‘Why am I focusing more on these? And neglecting these? Are these actually not important for me? Or is it because I am hiding them? Or what is the reason?’”. Overall, Jen wishes the flowers were “more reactive” so she could see these differences.

Mia’s impression of the Bloom·e artefact was that it “adds this tangibility to the experience...It’s always nice to have something tangible”, which “makes it more precious, somehow”. She liked to see the response of the moving petals and the “changing look of the flowers”, which also gave Mia a “rewarding feeling after [she] completed [the reflections]”. In the post-experiment survey, Mia listed, among others, words such as “gentle, blooming, beautiful, calming, and aesthetic” to describe the artefact. Mia expressed that her experience with Bloom·e matched her expectations at the beginning of the experiment, explaining that the Bloom·e artefact would “light up to remind [her] to take time to reflect on [her] values” at the end of the day, which “she usually does not do”. For Mia, the flowers that were “blooming were the virtues that [she] had practised more of today”, while the others were those “that [she] hadn’t practised that much” and therefore “something to [work] on”.

Dan “would not pay much attention to [the Bloom·e artefact] outside of the reflections”, unlike Jen and Mia for whom the artefact was more visible. Jen explained that the artefact was “always catching [her] attention, because it’s kind of at the centre of the room...The shape of it is definitely almost futuristic. So that definitely makes it stand out”. Seeing the artefact “would make [her] think about the virtues”. Occasionally, this would also make Jen “curious about re-reading [her] virtues during the day. [She] would go into the app and review the virtues”. For Mia, the artefact’s location was very visible to her, saying, “If I’m on my bed, I could see Bloom·e. And if I’m on my desk, I could see Bloom·e, as well”. Mia did not have “too many virtues” in general, but when she saw the artefact she more strongly “remembered the [virtues] that [she] didn’t practise to be honest, rather than the ones that [she] practised”. It prompted her to think “Oh, I need to be more mindful about this”.

Aesthetics and sensory experience

The participants described several aesthetic qualities belonging to the Bloom·e artefact. Dan considered Bloom·e a “beautiful object, that [he] would have liked to be more centred”. Mia expressed that she “really also enjoyed seeing the flowers move, the petals of the flowers move. That was also quite fun”. During the reflection activity, she “would pay extra attention after submitting [her] ratings for each of [the virtues]. [She] would, somehow, just stare and look where it’s going to move”. Mia likes “the colour. [She] likes that the sphere has these triangle, abstract shapes around it. And overall it just looks like a nice product”. She also enjoyed “seeing [the artefact] lit up. It looks beautiful. And

it's nice. It makes [her] room a little bit more cosy, as well, so [she] liked that". She described how "it was very fitting with the environment that [she] was in. Because also, during that time, it starts to get dark slowly. Then when it glows it's nice, it brings some light [to her room]". Comparably, Jen thought that the glowing was "attractive enough for you to go towards it and try something", saying she "would not change anything about it...[she] really likes it". She considered the glow "very welcoming".

Jen expressed that she liked how the artefact "sets the right environment for [the reflection]", saying, "the shape of it, the pattern of glowing, but also the brightness of the light, all of it together, kind of sets the environment for getting deeper into the reflection, actually – very calming and soothing". She further explained that "there's something mystical about it...you would literally imagine yourself in nature, in a space that is a little bit outside of this world". She compared Bloom·e to her meditation routine, saying "[Bloom·e] is more guided, focused, visual and generally a pleasant reflection companion to have", saying that she "really likes the physical element to it and the way it glows, overall [it is] very soothing and makes the experience so much better". Jen "never really used anything to do reflection...[she] tries to do meditation, but [she] doesn't really use anything else but the music to really isolate [herself] from the surrounding experience". Using Bloom·e "was an interesting experience for [her]". She later expressed that "the artefact was there to make you connect with [the reflection] more and help you get more into the reflection process and make it more enjoyable". Jen described graphs and plots as "very standard" while the flowers as "more appealing", saying, "interpreting [your virtues] in a visual, more beautiful, aesthetic way like this is much, much better. Because it takes the load off of you as the user". She feels that "it is more intuitive to get to that conclusion, from what you see in this sense, rather than looking at a graph and then trying to interpret what the graph is trying to say". She later explained, "It could be that it is appealing for me like this because I do, on the side, really like art, and it seems very artistic to do it this way".

Jen and Mia both seemed interested in touching the artefact. When Mia was "distracted from [herself], from the work that she's doing, [she] would look at it", and sometimes she "would touch it". When Jen contemplated moving the artefact to another location, she expressed that she "probably would have held it closer to [her]...on [her] lap or something...to play more with it, touch it". For Jen, having the artefact "closer to [her] would just put [her] more in the environment of relaxing and the calming environment that it emits with its light and glowing and everything...just being more immersed in the process".

When participants adjusted their focus virtues, they were close to the artefact. The first time Dan made adjustments, he "was sitting here...and then [he] heard something and thought 'Oh, wait a second I heard something'. And then every time [he] did it after that [he] would be close to [the artefact] because it would react to the changes". He elaborated further: "The mere fact that it reacted to what I did on the app was a prompt for me to say 'Oh, I should be close to it when I change certain things'". Dan wanted to "have it stay as a thing that is an extension of [him]". Jen felt that the artefact's location was "the reflection spot really. It didn't make sense to do anything not near it". She thinks it was "due also to the relationship or at least feeling that it is a companion for you", saying, "whenever you want to reflect or talk to someone for this matter, you would just go there". At the same time, Jen explained that it is "really hard not to be near it" because "the room is so small...if [she] was in a house of three floors or something, [she] doesn't know if [she] would change floors for [adjusting focus virtues]". Mia did not have any particular reason for being next to the artefact when adjusting her focus virtues: "I was sitting in my room and I think I was on my yoga mat. I was very close to [the artefact]...because it was my bedroom".

9.4 The Bloom·e app

This section describes accounts related to our calm and slow technology focus with regards to the smartphone app. This includes what participants thought of the user interface, how they received the reflection loading screen, the pacing of the reflections, and the language used in the app and in the virtue rating scale. The section concludes with participant responses regarding whether they would use the app on its own and the value that the app and the physical artefact each brought to the experience, if any.

The user interface

Dan and Jen both described the smartphone app as “soothing”. Dan thought that it “had a calm vibe” and likes that “it’s green. And that it’s a little bit of a nature vibe”. Jen found the colour palette “one of her favourites”, saying, “it’s on the cold tone, but also on the nature side. So I thought it was actually going really well with the whole purpose of reflection”. She also considered the way the app is designed as “very simple and it’s not overly done. So it gives some kind of a ‘breeze’ to your brain...it’s very easy to understand...it’s concise, it’s focused, it’s clear”. Likewise, Mia found it “very easy to use”, saying, “I didn’t have any troubles or I was not in a situation where I thought ‘Oh, what should I do?’”. She “really liked it” and found it “very beautiful”.

The reflection loading screen

The participants appreciated the quote on the loading screen. Dan explained that “before it starts the reflection, you have this little quote. I really liked those”. He recognized the authors, saying, “I saw Seneca and I think Marcus [Aurelius]”, adding that he “was sitting there thinking ‘Okay, let’s get into it’ and then reading that gets [him] into it, it calms [him down]”. Seeing how the quote “slowly fades in and slowly fades out...that did something” for Dan, and he thought the quotes were “really powerful...that single line could just show you a different perspective”. Jen liked “the fact that it’s changing. So every time you don’t really know what is in there”. For Jen, the quote was “a prompt to push you to reflect already...you start thinking, having thoughts. So that was really nice”. She added that the quotes were “in the same spirit [of Stoicism]”. Mia felt the quotes “put [her] in a philosophical mindset...it just put [her] in this mood of reflecting and being wise”. She thinks that it “had some influence on [her during the reflection]. But more on the background of [her] thoughts”. Mia also found that, the “mixture of the quote, and also the colour” made her “more mindful...[She] already knew what [she’s] going to do...to take this phone and reflect on [her] day. So [she] was already putting [herself] in this mood, as well”. The interface felt like “it’s to continue with the reflection”. Comparably, Dan felt that “the change in mental state, reading [the quote] and then following up into the process of reflecting, that it does have an influence on what comes next. But [he] would not know specifically what”.

Pacing of the reflection

Dan and Mia had no issues with the pacing of the reflection, while Jen had mixed feelings. Dan described how the loading screen “slowly goes in and out” and considered this a signal “that it’s calm”. He explained it was “because it shows slow movement, [it was] very natural”. He likened this to the rest of the reflection, saying, “all the movements, the reflection side was quite smooth...all things would fade in and out”. Similarly, Mia thought the fading animations “felt organic”. She also thought the speed of the reflection “was neither too slow, neither too fast”. Jen, on the other hand, wishes she

“had the option of sometimes controlling the speed of the fading in order to really match how [she’s] feeling inside”. She “didn’t really know what to do in between [each virtue]. [She] just waited for it to come...but [she] thinks that was [her] problem and how [she] did [her] reflection”. Jen explained that this “was in the very beginning...then over time, once [she] could understand how the app works, [she] adapted to this”. She found that she “started planning how to enjoy it more, and changed [her] reflection process...and it was nice”. Although she wishes she could set the pacing herself, she is not sure whether it would be a “good idea. Because, at that moment, you really need to calm down, and you really need to relax”. She contemplated how the pacing “forces you to just take a break, wait and take that time to reflect upon what just happened. So it might be a good pace, actually”. She further explained, “Sometimes I did feel that the pace specifically helped me calm down with myself and just think ‘Why are you rushing, you could just breathe and take the time to think about it. This is your reflection time’”.

Language used in the app

Jen and Mia appreciated the language used in the app. Jen described the app as having a “friendly tone” and attributed this to the text in the onboarding tutorial as well as the rating descriptions. She found that the phrase ‘I could have paid more attention to this’ was “super friendly and encouraging versus saying, ‘I did not really do well on this’, it’s very negative on yourself. But saying you could have paid more attention to this is more friendly, also with yourself, because you are reflecting”. Jen said that she is “super hard with [herself] compared to how [she] interacts with other people”, but by having “an app that was so friendly”, it “pushed [her] to be friendly with [herself]. So that was really helpful”. Mia described a similar account, saying, “I think the ‘Not applicable’ [rating] was helping, somehow, to not be too harsh on myself. But also, I feel like even if I clicked the second one, I would also not be thinking ‘Ugh, Mia, why did you do that?’”. She explained that she “knew that it would take some time for [her] to change some things. So maybe [she’s] just patient with [herself] right now”. She found the ratings “more positive” than negative.

Participants were not always certain about how to assess themselves using the ratings. Dan explained how he “had to determine how much [he] did, how much [he] lived up to a certain virtue”, saying, “most of the times I thought ‘Ah, I’m not sure, sort of’”. Other times, he thought “Yeah, [he] definitely did this”. Dan “did not know [himself] if [he] assigned [the ratings] correctly”. Mia found it was “very intuitive and easy to select [a rating]”, likening the scale to “these questionnaires where you select ‘I totally agree, I totally disagree and in the middle’, so [she] is very familiar with them”. She also found the colours to give “this gradient of rating. [She] could easily see the level of agreement to the statement”. Simultaneously, Mia “never clicked on the ‘totally agree’ one”. When asked why this was the case, she explained, “because I was having doubts if I practised the virtue to the fullest”. Additionally, Mia “interpreted” the question ‘Did you practise this virtue today?’ as more of “following [her] beliefs and [her] values”, since she “didn’t feel like [she’s] practising [her virtues] much, but following [her] beliefs about how [she] should react to different things”. Because of this, Mia was “not sure if [she] used it right”, adding, “Maybe if I had a virtue like ‘Meditate every day’ then I could say ‘Oh, yeah, I practised this today or I didn’t practise this today’”. Jen experienced similar confusion, where some of her virtues “were a little bit so abstract that for [her] to answer the question that [she] practised them is even difficult”. Instead of reinterpreting the question prompt during the reflection activity like Mia did, Jen decided to unfocus those abstract virtues: “I did unfocus them. And I thought I should think more about this and how to rephrase them in a way that is a little bit more practical”.

The app versus the artefact

Participants were asked whether they would use the app on its own, without the physical artefact. Dan considered the Bloom·e artefact and app as working “well together. One is the organising factor, the reflecting factor, and the other reacts to your actions”. Together, Bloom·e as a whole “is a tool for [him] to reflect on [his] Stoic virtues...It’s a tool for [him] to do the process”. Despite this, Dan felt that the artefact was not “a critical thing for [him] to have done the process” and “would not purchase it”. During the reflection activity, Dan Similarly, Mia thinks the “Bloom·e installation and Bloom·e app are matching very well together. You can definitely say that the app was made for the installation”. At the same time, she thinks the app “could be used on its own” even if the Bloom·e artefact “adds tangibility to the experience”. She later added, “If I’m moving somewhere, I would need to move the artefact as well. And it’s just too much of a hassle. Maybe if it’s smaller?”.

Although Dan saw himself using the app on its own, he speculated that “maybe [the artefact] would remind [him] that [he] should do [the reflections]. So it’ll be a visual reminder”. When asked how the artefact contributed to the reflection activity, Mia explained, “It was reminding me to take this time [to reflect]”. Jen felt more strongly about this and said that the value would be in “pushing [her] to continue the reflection process with [herself]”. Additionally, the artefact “helps [her] be in the mood...it helps set the environment for the reflections”. She further explained, “[the artefact] is there in the external world. And it signifies, that ‘Oh you know you can do it’ and encourages you and welcomes you”. She feels that using “the app on its own is like you listing your virtues...[she] would probably just use a piece of paper and pen” since she likes “to connect more with the external world rather than digital”. Likewise, Jen also feels the artefact “would not make sense to use on its own...it would lose all its purpose if it was on its own”. For Jen, “Bloom·e is the app and the artefact”. When asked if she would practice Stoicism in the long term, Jen had to clarify that “if it is about focusing on specific types of virtues that [she] would define, then yes, definitely”. When asked if she would practise Stoicism without Bloom·e, she expressed that she “would probably skip some sessions over time, and then come to the conclusion that [Stoicism] is not for [her], and then stop”, since “it would be a little bit harder...the effort has to come from you”. She later mentioned that “it’s really weird because [she’s] not a user of these things”, saying, “I don’t usually use apps and I’m not a fan of apps, I usually just have my bank account apps on my phone. For me to say that I would use this, it’s odd”.

10 Discussion

In this chapter, we analyse the results of our home studies and discuss a number of emergent themes. The chapter is organized into four parts. First, we examine Bloom-e as a mindfulness intervention, looking at the ways in which the intervention supported participants in living virtuously. Then, we consider several design implications, linking back to the design methodologies and principles we used in our intervention. We then discuss the limitations of our research, followed by a critical analysis of calm technology and a proposition of a calm technology design framework. We conclude the chapter with a number of opportunities for future work.

10.1 Bloom·e as a mindfulness intervention

This section looks at the ways in which the intervention supported participants in living virtuously, including the impact of the intervention on participants, multiple conceptions of living virtuously, the way the smartphone app guided the process, and abstract versus actionable virtues. We also discuss participant doubt in self-assessment, the way the artefact acts as a non-linear self-report measure, how the artefact's location influences its embedding in daily life, as well as the role intrinsic motivation can play in the effectiveness of the intervention.

Impact of the intervention on participants

All participants expressed having gained something from using Bloom·e, albeit Dan and Jen more strongly than Mia. Dan felt that, unlike his previous readings of books about Stoicism, the intervention supported him in putting the principles into practice which was the difference between “theoretical knowledge and applied knowledge”. He also described how the evolution of his focus virtues helped him gravitate towards “gratitude” as a value to work towards, which he felt was appropriate to both his current situation and life in general. Similarly, although Jen usually considered her virtues and aspirations once or twice a year, she did not do so more often than that. By looking at her virtues “every day”, Jen felt that she learned more about what “drives” her in life. For Mia, she liked that Bloom·e reminded her to take the time to reflect on her “feelings” and “reactions” throughout the day. She and Jen also appreciated the way the language used in the app encouraged them not to be so harsh with themselves during the reflection. This tells us that there may be value in the way Bloom·e guides virtuous living by offering a structured process that one can follow, whether from the daily reminders to reflect, the mindset taken during reflection as guided by the smartphone app, or being deliberate about focus virtues over time.

The “process” provided by the intervention also gave Dan a “push” to be mindful about his virtues every day. At one moment during the week, he was able to remind himself of his virtues and gained a “confidence boost”. But even though the intervention showed Dan that he can react “in [a better] way” to certain situations, there were other instances where it “didn’t help”. Comparably, we can see this in the way that Mia’s “stressful week” prevented her from thinking about her virtues throughout the day even though she knew there were virtues she was “not practising” – she only thought about them “at the end of the day”. Evidently, our intervention was not always effective. This is in line with findings which suggest that the effects of pure self-help interventions are comparatively smaller than guided self-help interventions where a therapist is involved, although pure self-help interventions have still been found to be more effective than control conditions in some studies [16].

Although the glow reminder was found to be “welcoming” for Jen and added “cosiness” to Mia's room, participants were not always in the mood to reflect. We can see this in the way that Jen found it “hard” to engage with the reflection after coming home from seeing her partner’s family. Mia found herself in the same situation when she went to her bedroom after watching a late movie with roommates, although unlike Jen, Mia decided to skip the reflection altogether. On another occasion, Jen felt compelled to reflect when she was feeling “nostalgic” and thinking about a challenging part of her life and the memories associated with it. This prompted her to begin a reflection in the app, and the combination of events led to her realizing why she was neglecting certain virtues over others, making her more “self-aware”. Jen engaged with Bloom·e following an event which had reflective qualities of its own, and the reflection activity guided further contemplation and reflection towards a

positive outcome. We can see here how some moments led more naturally into the reflection, and in the instance of Jen even enhanced the outcome, while others did not.

Participants were also guided by constraints set by the intervention, for example by having to set focus virtues. In this case, Jen had to be deliberate about the virtues she wanted to prioritize, despite initially wanting to set as many focus virtues as possible. It is not clear whether this is better than allowing for an unlimited amount of focus virtues, but Jen did consider it a positive constraint in that she should not “overload” herself. The act of setting focus virtues also led Dan to consider “gratitude” as an overarching value to pursue, with several virtues related to it. The ‘Did you practise this virtue today?’ prompt during the evening reflection also encouraged participants to define more actionable virtues, which prompted them to either add new virtues or reformulate existing ones such that they could be ‘practised’. Jen liked the ability to edit virtues since she wants to “experiment” and “iterate” on them and because she believes we “evolve” as persons. Here we can observe the way Bloom’s sets constructive constraints to work with, whether by setting focus virtues and thereby requiring the user to be more deliberate with their practice, or in the way it asks the user to define their virtues such that they can say they practised them during the evening reflections. These constraints were received positively for the most part, except when Mia felt she had to interpret the evening prompt as ‘followed’ instead of ‘practised’ in an attempt to make more sense out of it, and was evidently still confused about it during the post-experiment interview.

All participants mentioned wanting to continue to practise Stoicism in the long term, although they only speculated doing so. For Dan, the smartphone app would be sufficient, since the artefact was not “crucial” to the process. At the same time, he mentioned that once he is “familiar” with the process, he does not know if he would use the app anymore. Jen would have liked to know more about Stoicism so that she could “practice it right”, but mentioned that if it was about virtues she would define, she would “definitely” continue in the long term, and thinks she might “already” be practising it. For Jen, the physical artefact and smartphone app also worked together to motivate her, and without them she thinks she would just “stop” doing the reflections since the effort would have to come from her. In particular, she saw the artefact as a “companion” which acknowledges her inner thoughts and immerses her in the activity. Mia “hopes” she would continue to practise Stoicism, but thought the app alone was sufficient, despite her feeling that the artefact made the process “more precious” and “added tangibility”. Based on these responses, it is not clear what the impact of the intervention might be on the retention of Stoic mindfulness itself, and what role the smartphone app or artefact would play in the long term.

Multiple self-conceptions of virtuous living

Participants varied in the way they aspired to live ‘virtuously’. Dan’s journey was largely about discovering which virtues were relevant for the current situation he was in, eventually gravitating towards virtues of “gratitude”. Jen sought to gain insights into the “patterns and connections” between her virtues, in an attempt to understand what drives her and why she “neglects” certain virtues. And although Jen enjoyed using the intervention, she thought that Stoicism is “not completely aligned” with her, although she would continue to practice Stoicism if it was “about focusing on specific types of virtues” that she would define herself. Here, we can make the argument that, for Jen to acknowledge that emotion speaks “the language of the subconscious that is not always so logical”, is in and of itself a form of rationalization. Even if Jen decides to “put as much importance to reason as to emotion”, this decision comes from a rational point of view; she rationalized about being irrational. Unlike Dan

and Jen, Mia did not think of virtues as that what you practice, but rather reflected on a higher level about her values, beliefs, or “morals” which she aspires to “follow”.

Although we based our intervention on the works of Robertson [83], his values-clarification exercise and description of a daily reflection routine, our intervention did not focus strictly on the practice of Stoic doctrine but rather on the pursuit of virtue, an aspect that can be found in other schools of thought such as the Aristotelian concept of *eudaimonia* or *the pursuit of virtue or excellence*. We also do not mention the word ‘Stoicism’ anywhere in the app except during the onboarding. Indeed, when framing Stoicism under the capabilities approach to well-being, we acknowledged that there may be no single correct way to approach the philosophy and that we must allow for the valuing of external goods (section 6.4), especially when considering the gradation of values as to what one might consider a preferred versus dispreferred indifferent, as well as the simple fact that virtues are highly subjective to the individual. By default, this implies some flexibility in the way individuals choose to pursue virtue, and we aimed to allow users of intervention to bring forward their own value framework when using Bloom·e. Based on the variety of ways participants considered their virtues, it appears we were successful in this regard, yet we wonder whether our intervention supported Stoic living per se or, more broadly, virtuous, or eudaimonic, living. Perhaps it is this complexity – in the way virtue is cultivated in one’s own life – that has become one reason for the virtue aspect being largely absent from measures of eudaimonia, or for the continued dispute in the exact nature of Aristotle’s meaning regarding exercising the eudaimonic life [79].

If we observe the abundance of online resources today which seek to, in casual writing, disseminate Stoic methods of self-regulation to a general audience, we can also question to what extent these teachings remain *purely Stoic* in their application, even if they are inspired by the original philosophy. For example, just because the Stoics argued that nothing external is needed to achieve eudaimonia (their version of happiness), should we declare that a person, who believes that money does in fact play a role in achieving said happiness in our society today, is ill-deserved of embracing Stoic teachings even if only a part of it? And if we consider the influence of cultural norms and values on an individual’s moral attitudes [96] and thereby their idea for what it means to live ‘well’, then we must also, perhaps paradoxically, respect the Stoic principle that we can and should embrace societal norms within the way we live virtuously [27] – this will without a doubt differ across individuals whose cultural backgrounds and upbringing differ, as well. One could also say that the only way to becoming a true practitioner of Stoicism is to study the philosophy’s manuscripts intensively, but, almost ironically, the original Stoics were not expected to write a single line of philosophy [39]. Perhaps it is this very quality of Stoicism which gives the philosophy its timeless relevance and popularity today – that, in pursuing virtue and avoiding vice, one can shape their life in a way they see fit and within their own values, without strictly adhering to (a subset of) Stoic doctrine.

The French Philosopher Michel Foucault (1926 – 1984), whose works primarily addressed the relationship between power and knowledge, connected his ideas to the role of self-monitoring in Stoicism:

The objective of philosophical training is to arm the individual with a certain number of precepts which permit one to conduct oneself in all circumstances of life without their losing mastery of themselves or without losing tranquillity of spirit, purity of body and soul [34].

Through self-mastery of the sort that we find in Stoic mindfulness, can an individual develop freedom from external forces [85] c.f. [33]. Foucault suggested that it is possible to take inspiration from ancient practices (e.g. Stoicism) although only to create something new and appropriate to our own contemporary situation. In this way, we can say that it is beneficial, perhaps even favourable, to allow users of our intervention to pursue their own ideals of what it means to live virtuously today. But in doing so, we can begin to wonder whether our intervention supports Stoic living as strictly informed by the philosophy, or some other abstraction of it.

The smartphone app guided the process

In defining virtues and carrying out the reflection exercises, participants were guided through the process by the smartphone application. The onboarding tutorial was perceived as helpful in defining virtues as a starting point. We also observed participants being deliberate in the virtues they aspired to be mindful about using the ‘focus virtues’ feature. Dan and Mia chose virtues most relevant to them during that period, while Jen made a choice about which eight virtues to focus on despite wanting to choose all of them initially, saying it was reasonable not to “overload” herself. With regards to the reflection activity, Dan and Mia could do without the physical artefact. Dan found that the physical artefact did not play a role during the reflection activity, only that he imagined “it being a part of” him. Dan considered the app more critical for following the “process” of reflection. Likewise, Mia expressed using only the app in the long term. Although Jen would not use the app without the physical artefact, she did think that the artefact without the app would also lose all its meaning, so there is something to be said about the way the concrete activities in the app informed the reflection activities.

The slow animations in the app also helped Jen avoid “rushing” through the reflection process and encouraged her to slow down in future sessions, while the friendly tone of the language used in the rating scale helped Jen and Mia in being less harsh in their assessment of themselves. All participants enjoyed reading the Stoic quotes shown on the loading screen. For Dan, the loading screen put him “in a calm state of mind”. For Mia, it put her “in the mood” and prompted her to be “wise”. And for Jen, it prompted her to already “start thinking, having thoughts” and described the quotes as being “in the same spirit” of Stoicism. While it is not entirely clear how the quotes influenced the content of the reflections themselves, we can see here how the app not only guided the steps in the reflection process, but also in the user’s *attitude* towards their reflections.

There is also something to be said about how the aesthetics of the app may have made the reflection activity more enjoyable. Dan appreciated the “calm vibe” of the app, while Mia thought that it “looked beautiful” and that the app “was made for the [artefact]”. Jen described the app as “soothing” and giving “a breeze to your brain”. We can wonder what might happen if the app did not possess these aesthetic qualities, and how this would influence the way participants experienced the reflection activity. It is evident that the app’s aesthetics led to a positive user experience.

From abstract to actionable virtue

Among all three participants, there was confusion in defining abstract virtues versus actionable ones. Throughout the week, Dan made judgements about which virtues were actionable and prioritized them over the abstract ones. Similarly, Jen unfocused those which were too abstract to practice and refined them such that they became more pragmatic. Mia, on the other hand, remained ambivalent and decided to think about her virtues not as being practised but rather as beliefs being followed, although she was still unsure if she used the app correctly.

Our reason for using the ‘I am someone who’ construct was to both provide consistency in virtue definition but also to encourage the user to think more pragmatically about their virtues. The examples provided in the onboarding tutorial were designed to serve the same purpose, and participants found the values-clarification exercise helpful in defining their initial virtues, although there were mixed responses regarding the clarity of what is meant by ‘virtue’. For example, Dan thought that the onboarding tutorial helped make “concrete” what is meant by ‘virtue’, while Jen found it “slightly hard” to specify the “level of abstraction” of her virtues. Mia did not express any difficulty in defining her virtues, although she defined them more as “morals” she would like to “follow” instead of something she would practise. Given the confusion that persisted during the home studies in abstract versus actionable virtues, it appears that our strategy did not execute smoothly. However, in prompting participants to ask themselves whether they ‘practised’ their virtues during the evening reflections, we saw that Dan and Jen were encouraged to adapt their virtues such that they could more easily enact them in daily life. We could say that this is a positive quality of the intervention, since our goal was to encourage action through virtue, and removing vagueness in a virtue allows one to consider how best to put it into practice. This is reflected in Dan’s mentioning that he feels he now gained experience in practicing his virtues, as opposed to just reading about it in books. Our takeaway is that the app should more strongly encourage actionable virtues to begin with, or at least facilitate adapting abstract virtues into more actionable ones, for example through another exercise during the onboarding. This would certainly provide more clarity to the evening reflections for Mia.

Alternatively, the prompt during the evening reflection can be adjusted so as to not talk about ‘practice’ but instead whether the virtues are kept ‘ready at hand’ as described by Sellars in talking about Stoic mindfulness [85]. This would more closely align with Mia’s interpretation – even if the person did not find a suitable situation in which to enact the virtue, they at least held it close to them and thought about it deliberately. How exactly one keeps their virtues ready at hand, however, can remain vague as a thing to work towards. There is also the question of *habituation* i.e. as virtuous acts become habitual, they may require less conscious effort and possibly become less amenable to self-report [79]. So just because somebody does not consciously keep their virtues ready at hand, does not necessarily mean that they do not act virtuously. Habits allow us to perform actions without having to think about them [20] – there is no reason to believe the same cannot be said about acts of virtue. Reflecting periodically about whether virtues were explicitly practised, instead of kept at hand in the moment, would therefore seem more productive. Our conclusion for now is that the combination of periodically asking whether virtues are practised, together with virtues being defined in an actionable format, may prove most effective when an intervention such as ours aims to facilitate virtuous living and a self-assessment of one’s own performance.

Participant doubt in self-assessment

Participants were not always sure how to assess themselves. Mia, for example, never chose the highest possible rating, since she “doubted” whether she was practising the virtue “to the fullest”. Dan was also not sure whether he assessed himself “correctly”. While the friendly tone of the rating scale helped Mia and Jen in being less harsh towards themselves, it seems that we cannot say that Bloom·e provided participants with an uncomplicated method of assessment. Our scale was intentionally casual, using phrases such as ‘sort of’ and ‘very much’ to promote a more relaxed form of assessment, but in doing so may have created vagueness in its interpretability. The goal was never to create a valid cross-individual scale, however, since our intervention seeks to serve the user’s own perspective of their

performance rather than compare them to an objective account amongst other individuals. Additionally, the Bloom·e artefact does not require such precise and accurate ratings of the user since its abstract expression does not aim to present concrete numerical scores. Instead, the artefact presents a general indication of which virtues receive more attention than others by observing which flowers are more open or closed than others. The way the user uses the scale is therefore up to them, so long as the way they use the scale remains generally consistent with their own idea of what it means to vary much practice or sort of practice a virtue. Although the resolution at which the flowers open and close can be improved – as suggested by Jen – we do not think a more elaborate rating scale is needed for the purpose of reflecting with Bloom·e.

The more important question, also faced by other ‘self-help’ interventions, is about the extent to which our intervention is just as effective used alone as it would be used with support from a responsive teacher. One possible advantage of the self-help format for mindfulness and acceptance-based interventions is an increase in self-efficacy, or self-agency in change for the learner, while a disadvantage is the absence of a responsive teacher and teacher-guided enquiry process, which are both thought to contribute to learning mindfulness and acceptance [16]. A key aspect of such an enquiry process in well-established programs such as mindfulness-based stress reduction (MBSR) is that the teacher embodies a kind, curious and present moment-focused attitude towards the experiences, which is thought to provide a model for participants on how they themselves can respond to experiences [16]. This means that aspects of the intervention, such as the language used in the app, should strive to embody the same attitude, and we can extend this requirement to the design of any self-help intervention for mindfulness in general. Based on Mia and Jen’s responses, the friendly tone of our rating scale appeared to serve exactly this purpose, since the model it provided was to show that they can be less harsh and more forgiving towards themselves. However, we cannot immediately think of a solution to support the participant in ‘correctly’ assessing themselves, since there is no such thing as ‘correct’ in subjective well-being, and self-help interventions can only accomplish so much on their own.

The Bloom·e artefact as a non-linear self-report measure

Dan and Mia made deliberate choices about the virtues they felt were most relevant to focus on during the week in which they used the intervention. Similarly, Jen had to select the virtues she wanted to prioritize because of the design limitation that the Bloom·e artefact could only hold a maximum of eight focus virtues. When the user makes a new selection of focus virtues, the flowers on the artefact reset to a closed position. Our intention with this was to remove the linear narrative that ‘closed = bad’ and ‘open = good’, by giving the affordance a more dynamic role i.e. the flowers will eventually close again when new focus virtues are set, which is not to say that the user has failed in some aspect, but rather that they have new goals they would like to pursue. Furthermore, the ‘neutral’ rating of ‘Not applicable today’ does not affect the artefact in any way – if a virtue is not applicable several times within a set period, its flower will remain static. A flower can therefore be more closed than others just because that virtue was less applicable within a given timeframe. We also tried to shift the monitoring role of the artefact to whether users *performed* the reflections – since the flowers always bloom regardless of the rating assigned – as opposed to the *enactment* of virtues themselves. The effect we wanted to achieve here was that, if the user does not reflect with Bloom·e, its static expression should speak more about the fact that they are simply not reflecting with Bloom·e, rather than that they are failing to live virtuously. This was also meant to keep Bloom·e as non-judgemental as possible. For the many ways flowers end up more closed or more open than others, it is up to the user to decide how to interpret

this information, which gives them agency to assign their own meaning to the artefact as a measure of success, as opposed to working towards a numerical ‘high-score’.

We previously spoke about the concept of *habituation*, where, as virtuous acts become more automatic, one does not have to think about them so consciously. There is an aesthetic to the way the flowers close and open over time, an aesthetic of which could lend itself to the idea of supporting habituation rather than of aiming for a high ranking on something, as in traditional self-report scales. For example, the FFMQ is normally used to assess mindfulness before and after some intervention, with the goal of having a higher score the second time round. Improvements in self-reported mindfulness as measured by the FFMQ have been shown to be strongly correlated with time spent in home mindfulness practice [3], so it is understandable that practitioners would seek to improve the score on a particular well-being measure. However, an abstract artefact such as Bloom·e may hold the advantage that it does not seek to reach some ‘high’ score as an all-encompassing, ultimate metric, but could instead support with the habituation of virtuous living by embracing, in its expression, the dynamic role of open and closed flowers, old and new goals. By doing so, the intervention does not behave as a single-purpose, linear measure of well-being. This can also allow it to remain relevant as an intervention in the longer term, since its core function would never ‘expire’. With the artefact, open flowers do not signify the end, because new virtues can be placed in focus with the aim of habituation, or previously neglected virtues can come into priority. Instead of, “Now what?”, there can be, “What is next?”.

The artefact’s location influences the way it is embedded in daily life

In deciding their placement of the Bloom·e artefact, participants had different ways of attaching meaning to the act of reflecting. For example, Dan saw his office room as a place to focus, justifying the location as appropriate because there, he is “a little bit more focused”. He also wanted to isolate himself, such that there would be no visual distractions. Jen, on the other hand, chose a location she associated with ‘relaxing’, where “you’re not going there for work or for intensive cognitive activities”. We see here that Jen associated the reflection activity with a location designated for ‘relaxing’, while Dan associated the activity with a location intended for ‘focus’.

Mia had no particular motivation to place Bloom·e on her desk besides the fact that it seemed most appropriate due to space limitations. This also meant, however, that Mia performed other activities in very close proximity to Bloom·e, including relaxing on her bed or working at her desk. This may have given Bloom·e a stronger role as a background artefact, hinted perhaps by the way it “fitted the environment” by “bringing light” to her room. Reflecting with Bloom·e meant that Mia had to perform a reflection in the very spot she used for other activities, whereas Dan and Jen had separate, dedicated areas which they *went* to for the act of reflecting. Additionally, Mia appeared to spend less time around the artefact especially when not in her bedroom, whereas Dan and Mia spent much of their day in their office room where the artefact was also placed. We can see here the way in which the intervention embeds itself differently in the daily life of the user. It is also worth mentioning that contextual cues can influence the maintaining or disrupting of habits [66], meaning in this case the location, as well as the other activities which take place in that location, can influence the habit of reflecting in one way or another, although we did not look into the topic of habit-forming in our work. Certainly, if we consider the habit of reflecting every day, habit-forming principles can also play a role.

With the exception of Mia, we also saw Dan and Jen contemplate moving Bloom·e to another location, hinting at the role *portability* could play in keeping the intervention compatible with the changing moods

and needs of the user. Whereas Dan would have liked a more “centred” and therefore “symbolic” location in hindsight, Jen thought about how using the artefact at her work desk might be relevant since her work “is really meaningful” to her. Although the placement of the Bloom·e artefact may have seen limitations because of its rather large size and fragility, we can note overall the value in, and significance of, the user being able to decide where to place the object, especially when they are seeking ways to bring it with them into their daily lives and aspirations.

Intrinsic motivation influences effectiveness of intervention

It is worth mentioning that the insights gained from our home studies were bountiful, if not for the high levels of motivation coming from Dan and Jen in using our intervention. At the beginning of her interview, Mia mentioned how stressful her week was and how she wishes it could have been different, implying that she could have engaged with Bloom·e and the reflections more strongly. Even though Stoic practitioners argue that Stoicism can help you tackle challenges in life, our intervention did not appear to provide much help to Mia’s situation. Based on this observation, we can consider ways for the intervention to help the user relieve stress, such as performing breathing exercises with the artefact, or to motivate them to carry out their reflections should they want that kind of encouragement. Jen similarly suggested to help the user “get into the mood” of reflecting, expressing that she feels there is a “step missing” from when the artefact glows to when she begins a reflection.

10.2 Design implications

In this section, we discuss the implications of using calm and slow technology principles in the design of the smartphone app and Bloom·e artefact. This includes the way participants attributed meaning to the artefact, the way the artefact acted as an interactive data sculpture, and how we can frame the artefact as a scaffold for mindful living. We also discuss challenges in designing for the periphery and in developing a ‘calm’ intervention, as well as discuss the role of using design frictions to cultivate mindful behaviour, shedding light on the discrepancies surrounding calm versus obtrusive technology.

Open-ended design enables self-attribution of meaning

We expanded on the slow technology themes introduced by Hallnäs and Redström [38] with the addition of the *introspective environment* as a thing to amplify in the design expression. Here, we embodied the user’s virtues in the Bloom·e artefact with the following metaphor: the more they enact their virtues, the more the flowers bloom. To avoid a unidimensional narrative of ‘closed is bad’ and ‘open is good’, we keep flowers in the same position if the ‘Not applicable today’ rating is assigned, and flowers reset to a closed position whenever new virtues are placed in focus. Giving the closed flowers a more dynamic role, as opposed to only showing which virtues the user is ‘failing’ to enact, was to keep the visual expression open-ended and therefore allow for freedom of interpretation, since the flowers can be both open and closed for multiple reasons.

Dan was unaware that one or more flowers strictly corresponded to a focus virtue. To him, seeing the flowers bloom over time was a metaphor for an overall “growth” he was having. For Jen, the idea of some virtues being less enacted than others was a prompt to reflect on why some virtues were less prominent in her life than others – the reflection brought her insights about why she might be “neglecting” certain virtues and leaning more towards others. She would have liked to link virtues to flowers during the reflection to more strongly observe these differences. In Mia’s case, seeing that

some flowers were closed served as a visual “reminder” of the virtues she knew she was not practising, which more strongly came to mind than the virtues which she was practising. To her, the closed flowers were a reminder that she should try to pay more attention to those virtues which she knows she neglects. The variety of interpretations we see here was exactly what we hoped to achieve by using Bloom·e as a slow technology artefact, and the results shed some light on the different ways participants attributed meaning to its design expression. We believe this quality can be a powerful mechanism in well-being interventions, especially when dealing with subjective topics such as virtuous living where neither the researcher nor the user may know upfront what virtuous living *should* look like. Self-attribution of meaning also helps to work around measurement challenges such as self-report bias and inaccuracy [79], since we are less concerned about interpreting numbers than we are about supporting open-ended reflection as the thing to generate the insights.

Aesthetics of Bloom·e artefact encourage engagement in the intervention

Participants developed a relationship with the artefact in different ways. Eventually, Dan felt like the Bloom·e artefact was an “extension” of him, and whenever he changed focus virtues, wanted to be near the artefact so that it would “stay as an extension”. He considered the artefact “beautiful” and also expressed wanting to move the artefact to a more central location such that it would be “symbolic” of his pursuit of Stoic mindfulness. Jen also wanted to be near the artefact whenever she did something on the app, although instead of seeing the artefact as an extension of herself she considered it a “reflection companion” which welcomed her with an “attractive” glow and “immersed” her in the activity. For Jen, the artefact added to the experience and made it more soothing overall, motivating her to do the reflections. She also felt as though something external was acknowledging her efforts and motivating her that she “could do it”. She also enjoyed using Bloom·e even though she does not usually use “apps like this”. Mia did not mention such qualities like Dan and Jen did, but appreciated the way the artefact fit in her room, bringing light to the environment when it began to glow as it simultaneously became dark outside. It made her room more “cosy”.

The open-ended design and appealing qualities of Bloom·e allows the user to appreciate the artefact in their own way, and can also influence the way they respond to, interact with, and behave around it. These emotional associations with the intervention illuminate some of the emotional needs of the participants: Dan may want to think of the artefact as an extension of him, Jen may want to think of the artefact as a companion that encourages her to practice reflection and that immerses her in the experience, while Mia likes using the artefact as ambient lighting to bring about cosiness in her room. Enabling such emotional responses can also bring forth positive user experiences [47], and we argue that enabling such positive associations can only enhance engagement in well-being interventions and make the process more meaningful to the user. We can see this in the way Jen expressed that the physical artefact “makes the experience so much better”, the way the artefact made Bloom·e feel “more precious” for Mia, and the way Dan called the artefact his “reflection tree”.

Weekly reflections show most value for the physical artefact

Our original concept for the weekly reflection was to facilitate ludic exploration of virtuous performance over time. The user could replay the way the artefact changed over the course of seven days, as well as jump to a specific day to see a visual snapshot of the artefact on that day along with all the associated virtues, ratings, and notes-to-self. Although we did not implement the weekly reflections in our home studies, participants speculated about what they might get out of it. All participants considered using the weekly reflection to gain more insights about their performance over the week.

Dan felt this would give him a different level of “granularity”, while Jen imagined having “analytics” to tell her more about how she did. Rather than reflect on the week itself, Mia speculated comparing multiple weeks between each other. Here we can again see ways in which the weekly reflection could be interpreted and used differently.

We previously described the genre of technology known as *ambient displays*, in which information is communicated through alternative forms of unobtrusive displays, instead of using traditional graphical user interfaces. An ambient display communicates information in both the periphery and at centre of attention, and because of these characteristics the information usually deals with small pieces of data. For example, a water fountain will grow larger depending on the amount of traffic nearby, or a live wire hanging from a ceiling will twitch more aggressively depending on the amount of internet traffic experienced by the local network. The visual impression of the flowers on Bloom·e does not communicate information about virtues in the periphery, rather the information of value, or insights, are generated when the user *reflects* on its presentation and the way the information is embodied in physical form. This is the concept of *data sculptures*: highly data-oriented physical forms, possessing both artistic and functional qualities, which facilitate an audience’s understanding of the underlying data [95]. For example, piles of rice grains, where each pile represents a country and each rice grain one person, demonstrates how much people eat. While there is certainly some overlap between ambient display and data sculpture, we can distinguish the two by their primary focus on either *communicating information in the periphery* in an unobtrusive physical form (ambient display) or by *generating insights through reflection* about data being embodied in physical form (data sculpture). Upon further reflection of our intervention, we can relate the reflective quality of the Bloom·e artefact more closely to a data sculpture than to an ambient screen, even though it possesses ambient qualities in the way that it unobtrusively and seamlessly embeds itself into the home environment.

Some participants did not see the need to use the physical artefact based on their experience performing the evening reflections and their use of the smartphone app. We can perhaps find more ways for the physical artefact to provide value to the experience, by considering the opportunity to engage in ludic exploration with Bloom·e as a data sculpture, for instance during our envisioned weekly reflections. Maintaining openness and ambiguity is core to ludic design [37] in which an artefact is not meant for a specific purpose but allows the user to find their own meaning in it. Similarly, the weekly reflection would provide only the function of jumping through data, but what the user gets out of that experience is up to them. We see the marrying of ludic exploration and data sculptures as a compelling way to engage in introspective reflection, and this combination shows potential for Bloom·e’s added value as a physical artefact if only to be explored further.

The physical artefact as a scaffold for mindful living

We previously discussed how the location of the artefact influences the way the intervention embeds itself in daily life, including the way participants were motivated to stay close to the artefact when changing focus virtues or reflecting, and the relationships they formed with the artefact. The same can be said about the glow to remind function, in which the participants, apart for Dan who did not get to experience the feature, noticed the glow as they went about their day. Here we can see not only how the glow served as an unobtrusive reminder – the calm technology approach – but also how it manifested as an ambient cue interwoven in daily life.

We can think of the artefact as a *scaffold* for mindful living, whereby it supports the user in performing, thinking about, and sustaining Stoic mindfulness. We use the term ‘scaffold’ as derived from philosopher Andy Clark’s concept of *cognitive scaffold*, which refers to artefacts that serve as external representations in order to ‘offload’ cognitive burden onto the environment [18]. Upon seeing the glow, Jen and Mia would sometimes perform their reflection at that moment and other times did so after finishing the tasks they were currently busy with, keeping the reflection in the back of their mind. The idea of scaffolding also extends to the way the artefact functions as a data sculpture, which Jen felt was a more “intuitive” way to conclude that she’s focusing on some virtues more than others based on how much the flower is open or closed. For Jen, this “takes the load off” of her, allowing her to focus on the reflection itself rather than “trying to interpret what the graph is trying to say”. Interestingly, the offloading of cognitive burden here did not mean participants were not cognitively engaged, it just meant that cognitive efforts could go towards other activities of higher priority. In considering the value of the physical artefact, we can see that the glow function and tangible data visualization aspects serve as scaffolds for mindful living, positioning Bloom·e as a pervasive technology artefact which does not encourage moments of mindlessness but rather paves way for moments of mindfulness.

Designing for the periphery requires understanding user context

Designing for the periphery proved a challenge. While Dan and Jen positioned Bloom·e in a location (their office) they spent much of their day in, Mia placed Bloom·e in her bedroom which she sometimes spent time away from, either at work during the day or in the living room at night. On one occasion, she did not notice the artefact’s glow because she did not enter her room during her scheduled reflection moment only until it was late at night when she was going to bed. Although Dan did not get to experience the glow function due to faulty code, we wonder how well he might have noticed it since Bloom·e was mostly hidden behind a wooden bulk. We did not foresee these aspects when designing Bloom·e’s glow. To design for the periphery effectively, requires an understanding of the user’s context including information about the physical space as well as the routines and happenings which take place there. This can be unique to each individual, a challenge that we can recognize from our own experience of constructing our intervention. We recommend conducting user research [46] prior to designing for the periphery to better understand the user’s context.

Challenges in the development of a ‘calm’ intervention

Another challenge faced during development of our intervention was in managing the connection between smartphone app and physical artefact. Much effort went into ensuring that the two components were felt as one experience, rather than two separate pieces. This was partly achieved by using a consistent design language, but we also took care that the Bluetooth connection functioned smoothly. Participants did perceive the components as working very well together, however we had the advantage that the smartphone we provided during the home studies did not leave the vicinity of the physical artefact. This ensured that a Bluetooth connection between smartphone and artefact remained stable throughout the participants’ time using our intervention, something we cannot say would hold true for cases where the participant would use their own smartphones.

There was also the complexity of developing an intervention for long term use, where lack of extensive testing meant that unforeseen errors occurred after the intervention was deployed. For Dan, the glow function only appeared to work on the first day of installation. For Jen, the way the artefact glows at each cycle of ratings while watering Bloom·e was non-existent. And Mia was unsure of whether the

artefact glowed during watering as she was transfixed on watching the flowers move; we can only speculate that the glow was either *too* ambient or did not function at all. Although this is with regards to the technical performance of our intervention, the challenge of designing for *slowness* and the longer term also applies to the way the flowers are meant to change slowly over time and where time is needed to experience the artefact through its intended purpose, as opposed to being able to test the product in single or shorter sessions.

We also experienced the challenge of seamlessly synchronizing data between two remote objects. To keep our solution manageable, we used a straightforward communication protocol between smartphone app and artefact, namely that the app would send information without expecting any response back while the artefact simply listens for incoming data. This meant that communication was a one-way affair. A more elaborate protocol would certainly safeguard the connection although would require more development time. For the purpose of our home studies, we ‘brute-forced’ a requirement for the app to already be connected to the artefact whenever the user performs activities such as starting a reflection, managing their focus virtues or setting a new schedule. If not, a dialogue box would appear, asking the user to first fix the issue of connection. Fortunately, participants did not mention experiencing any such issues. Unexpected events, such as dropped connections during the watering of Bloom·e and chunks of data failing to reach the artefact are unlikely but, in the real world, very necessary scenarios to consider. These technical challenges, in service of making the technology work seamlessly and without frustration, are a heavy burden on the designer and engineer, but can make or break use situations, especially in our case where the user engages in calm, focused reflections. How might they react if, during a reflection, the artefact stops responding? Or, when setting new focus virtues, the artefact fails to receive them? And what are the backup systems in place to deal with these scenarios? While no technology is error-void, it turned out that, in pursuing an ultimate exemplar of calm technology, the pressure for the hardware to be *fundamentally encalming* [102] in the way that it would work effortlessly, was higher than we could have initially imagined.

One person’s friction is another person’s treasure

In designing our smartphone app, we used the concept of *design frictions* to prompt the user to be mindful of certain actions or to prevent them from rushing from one context to another. For example, the loading screen is 16 seconds long for no reason other than to help the user transition into the reflection. The forced waiting time is complemented with a Stoic quote, which was shown in our studies to prompt participants to adopt a certain mindset: Dan felt a calm “state of mind” as he loaded the reflection screen, Jen “started thinking and having thoughts” already, and Mia felt “wise”. She also felt as though the loading screen supported the *continuing* of the reflection; she already “intended” to reflect when she launched the app, but the loading screen and its aesthetics felt like a motivation to “continue with the reflection”. None of the participants complained about having to wait, except for Jen who initially wanted to speed up the pacing of the reflections themselves but later appreciated the way it slowed her down. These results support the notion that, if designed well, design frictions or microboundaries can be desirable in an interaction and can indeed facilitate mindful behaviour [62]. Loading times can negatively impact user satisfaction of mobile apps [56], but whether they exist intentionally or unavoidably due to hardware limitations, can in fact be used to support the user in transitioning into the activity. In the case of Bloom·e, this was done in a calm manner and with mindful intent.

We also used a microboundary in the form of the focus virtues feature. The requirement to make a selection of focus virtues led to Dan and Mia in contemplating what is most important to them and which virtues are most relevant. For Dan, this led him on a path towards “gratitude”. Jen, although initially wanting to select all twenty or so of her virtues, realized that it was best not to “overload” herself. By requiring deliberate or mindful action, participants were able to pursue virtuous living in a way which more strongly aligned with their core values. Based on these results, we argue that design frictions are a powerful tool to use in mindfulness interventions, whenever the user needs to think deliberately and with intention. Here, our *obtrusive* loading screen supported a *calm* interaction. Almost ironically, the *effortful*, rather than *effortless*, use of our intervention helped to create a sense of calm, which leads us to wonder what exactly calm technology is. Indeed, our second research question, which had to do with designing the intervention such that it was mindful of the user’s attention and cognitive capacity, now deserves reframing. We tackle this by critically examining calm technology in Section 10.4.

10.3 Limitations

Despite the rich insights gained in our work, there are several research limitations which we hope to cover in this section.

Limited generalisability

We ran three home studies in total, and although we obtained rich qualitative results we are unable to generalize our insights to the general population. This is due in part to the unique nature of case studies [105] and the user-centric method of context mapping, but also to the largely homogenous pool of participants, who did not fall on either end of the extreme regarding ATI and AFS scores. Our intervention is promising for individuals who are interested in virtuous living and at the same time possess an affinity for technology interaction. We cannot say what the appeal of the intervention would be to individuals with a low ATI score or who are not interested in, or have never before considered, virtuous living. We included the FFMQ scale to check for differences in mindfulness attenuation prior to deploying our intervention, and although Jen obtained the highest score of all three participants, we were unable to draw any connections to the results. Participants were also in the age range of 24-27, and we therefore cannot substantiate our findings to individuals in younger or older age groups.

Weak Affinity for Stoicism (AFS) scale

We created the 7-item AFS scale to assess whether the participants’ behaviours were already aligned with Stoicism or virtuous living, however the scale has several limitations. Our self-report scale mostly asks questions regarding virtues, with only two out of the seven items related to Stoicism (‘I try to practice Stoicism’ and ‘I know what Stoicism is’). Our scale might more suitably be called Affinity for Virtuous Living, but even then we only assess the value participants place in virtues and whether they know and try to practice their virtues. We suppose that our scale only gives some indication of the interest they have in living virtuously as opposed to their affinity or capacity for Stoicism.

Self-reported data

In the mid-way questionnaires and semi-structured interviews, participants had to recall their experience in using Bloom’e across the seven-day experiment period. This means that participants had to use selective memory to describe their experience, which is inherently biased in the way that they

may select certain pieces of information to recall over others. There is also the issue of telescoping, which is when an event is recalled as happening during one moment when in fact it happened during another. We expect these inherent biases to have a minimal effect on the results, however, since we were not concerned with precise details of events as much as we were of the general experiencing of the intervention by participants. Our focus is also on supporting the participants in their own subjective conceptions of well-being, meaning that it is not so much an issue whether participants are biased in the recalling as it is the point for the intervention to support their own needs. Still, these biases are worth mentioning especially as our analysis depended heavily on the self-reported data.

Home study constraints

For the purpose of ensuring successful home studies, we introduced two constraints for participants. Firstly, the Bloom·e artefact was not to be moved due to its fragility and had to be placed somewhere safe. This could have influenced the studies in the way that, by removing some of the freedom associated with placing, or moving, the artefact in their home, the participant may not have experienced the intervention to a fuller extent, in which other positive or negative experiences could have emerged. Secondly, we provided a smartphone device on which the Bloom·e app was pre-installed – this was the device they had to use. This meant that the app experience was isolated from their personal smartphone context, and there was nothing else to do on the provided phone other than use the Bloom·e app. This could bias the results by encouraging participants to commit to the reflection exercises since the context is more formal to the experiment rather than personal to their individual lives i.e. there is a dedicated phone on which a certain activity must be carried out.

The duration of the home studies was also relatively short (seven days). In such a short time span, participants may have more easily retained motivation to engage with the intervention and perhaps therefore experienced only positive associations for the most part. We do not know whether long-term use with the intervention would remain appealing or if there would be retention post-intervention. Participants were also invited to participate in the home studies given they were interested in the topic, so they may have also been predisposed to engaging with the intervention simply because they knew they were part of a study.

Calm technology versus mindfulness intervention

We started this research from the philosophical perspective that technology interaction leads to more mindlessness than mindfulness. This formulated our first research question, in which we were going to investigate how a pervasive technology artefact can lead to more moments of mindfulness than mindlessness. We took a straightforward approach by creating a well-being intervention which inherently deals with mindfulness activities (Stoic mindfulness). We tried to separate the mindfulness activity (the intervention) from the calm technology focus (design implications) in our analysis, however we cannot say with confidence whether our insights apply to other domains which do not have to do with the design of a mindfulness intervention.

Not a controlled study

Our home studies provided us with an initial exploration of Bloom·e as a well-being intervention. This meant, however, that we did not control for any specific variables and it is therefore difficult to discuss the underlying mechanisms which led to the results observed. We presented Bloom·e as a package comprising both the physical artefact and the app, and asked participants whether they would use

either one on its own to gauge whether the physical artefact provided any value since the smartphone guided most of the activities. Two participants said they would not need the physical artefact, while one participant stressed its value to the experience. These answers were all speculative, however, since participants had to imagine whether they would continue to use the app, artefact or both. To say with certainty that the artefact is of real value to the intervention, would require running controlled studies. For example, some participants could receive both the app and artefact, while another group would receive only the app. Results could be compared to gain insights into the role of the artefact in the intervention. Similarly, participants all enjoyed the loading screen, but to understand whether the addition of the loading screen provides any real value would require a controlled study where some participants experience the loading screen and others do not. Our results here provide only initial insights into the potential of Bloom'c as an intervention.

Absence of mindfulness experts

Although the researcher has some experience with and a great interest in practicing mindfulness, the philosophy of Stoicism was an unfamiliar topic at the start of this research. For this reason, we attempted to solidify our understanding of Stoicism by referring to reputable books such as Marcus Aurelius' *Meditations* [39] and Donald Robertson's *How To Think Like A Roman Emperor* [83], as well as several online resources which explain the philosophy to the general audience, e.g. [27], [32], [42], [43], [63], [77], [84], and [94]. We also referred to well-being literature, e.g. [14], [51], [71], and [72], in order to link Stoicism to well-being. Furthermore, we grounded our intervention in Robertson's work [83]. Despite the effort, we cannot say that we are experts on the topic nor can we confidently say that we practice Stoicism deeply ourselves. Because it is considered good practice to state clearly our epistemological stance when carrying out qualitative research [54], we must consider the possibility that our lack of expertise on the subject may have driven our curiosity and interest in supporting flexible and subjective conceptions of virtuous living, one of the key themes of our discussion.

We can also note here the lack of expertise in health-related studies or (clinical) psychology, specifically with regards to well-being. In carrying out the home studies, some participants touched upon sensitive topics in which the researcher did not probe further. This was because the researcher felt it was out of their jurisdiction or scope of the study to discuss distressing events in more detail. It could be that some of the responses may contain more meaning if analysed by well-being experts, which otherwise went unnoticed by the researcher.

Research grounded in HCI, not Psychology

Mindfulness interventions have their home in the Psychology field, where an abundance of work can be found investigating the effects of mindfulness interventions on participants and the psychological mechanisms driving these effects [24]. In our work, we did not document or measure these effects, and we also did not inform our intervention with this expansive body of work. The perspective taken in our research was that of an HCI researcher, rather than that of a Psychologist. We therefore acknowledge that this work lacks the expertise of a Psychologist studying the subject, who might have otherwise interpreted the results of our home studies differently.

10.4 A critical analysis of calm technology

The original conception of calm technology in 1995 was a response to the idea that ubiquitous technology, if not handled well, could get in our way instead of empower us. More specifically, we should not be distracted by technology, nor should technology demand our attention – it should work effortlessly in the background and come to the foreground only when we need it. Weiser and Brown explained that for technology to be fundamentally calm, it should not overburden our brains, and by recentring what was previously in the periphery enables calm through increased awareness and power [102]. They go on to say that calm technology should meet three signs: (1) It moves easily from centre to periphery and back; (2) Our peripheral reach is enhanced by bringing in more details to the interaction without increasing information overload; and (3) As a result, we are put at home and in a familiar place, connected effortlessly to a myriad of familiar details. One key notion that these descriptions have inspired in the HCI field is that the *cognitive burden*, or *load*, imposed by the technology should be as minimal as possible. This notion has led to concepts such as *ambient displays* [103] and *peripheral interaction* [5], and has also inspired anthropologist and technology hobbyist Amber Case to write her book *Calm Technology: Principles and Patterns for Non-Intrusive Design* [15].

Case's book provides us with the most elaborate descriptions of calm technology since its conception in 1995. Case argues that calm technology allows someone to get to their goal with the lowest mental cost, and one of the first principles presented is that 'technology should require the smallest possible amount of attention'. Indeed, the theme of 'least amount of attention required' is present throughout her book, to the extent that it is almost a sin to do anything else, unless there is a very good reason for it such as in the case of a fire alarm system. Couple this with the requirement that products should work effortlessly – another theme throughout Case's book – and you have a recipe for anxiety for the designer or engineer. Case's principles and suggestions for designing calm technology touch on an immense variety of things, including respecting user privacy, ensuring dependable battery life, designing robots that move naturally, respecting social norms, and designing efficient communication networks for distributed computing. What should the designer do with all this information? It seems that, in her book, calm technology is essentially *the avoiding of frustration and chaos in any product which uses technology*, whatever the 'technology' might be. As a designer, this is not particularly useful – we are simply told to 'design well' and to avoid imposing cognitive load on the user whenever we can. Yet, in our work, we have seen how design frictions can be used to foster mindful behaviour in service of the user, with one of the participants even going so far as to say that the loading screen made him feel 'calm'. Design frictions, as a concept, appears to directly contradict Case's argument that calm technology should demand as little attention as possible. Indeed, our glow to remind function was inspired by calm technology principles in the way that it is unobtrusive, however in using the principle of design frictions, our results appear to disagree with the 'less attention demanded is calm' formula. To dissect why this is, we first need to understand what is meant by cognitive load in the first place.

Cognitive load theory (CLT) considers the constraints of working memory in humans and helps to determine what makes *learning* most effective. John Sweller, an educational psychologist who is best known for introducing and advancing CLT, describes CLT as an *instructional theory*, which is theory about how to best facilitate learning, and is based on our knowledge of human cognition, suggesting which educational technologies are likely to be effective and how to use them [91]. CLT is not a straightforward affair, using understandings in evolutionary psychology and human cognitive architecture to describe the way individuals process, store and embody information as knowledge or skill. Some of those descriptions describe, for example, how the combination of a diagram and spoken

text are more effective than a diagram and short written text, or how multiple sources of information are best considered simultaneously and integrated physically, because it is superior to requiring learners to split their attention between them. These are known as the *cognitive load effects of modality and split-attention*, among others of which there are *worked example, transient, and expertise reversal and element interactivity*, the latter of which sounds fantastic except that we have little confidence in what it is referring to. While it is tempting, diving deeper into cognitive load effects is beyond the scope of this work. In fact, at this point, we are beginning to wonder why the loose use of ‘cognitive load’ as a term can be found scattered across HCI literature and especially in describing calm technology, since it is clear that CLT, and cognitive load, belong originally to the domain of instructional theory rather than that of technology interaction.

If we consider the way ‘cognitive load’ is used loosely as a term in HCI literature, we could say that it refers more simply to *some unpleasant experience which arises due to the processing of too much information*. For example, in user interface design, this could be in the form of a terrible visual hierarchy where the user does not know where to look when presented with many design elements on screen, perhaps making them feel stressed or confused. Case describes calm technology as that which imposes the least cognitive load, yet she alludes un-calm technology to a vast array of unpleasant experiences, including an annoying fire alarm which cannot be turned off, a robot that moves unnaturally, a car rental service which did not communicate properly with emergency roadside assistance, and annoying device notifications. When we look to the roots and real purpose of CLT in investigating how to make learning most effective, we can question why reducing cognitive load, in its aggressively simplified and radically loose form, is a focal point of calm technology. In fact, Weiser and Brown never once mention cognitive load in the very paper [102] which inspired Case, although they do mention terms such as ‘information overload’ and ‘overburdening’. It appears they are as confused as we are, because at the end of their paper, they hint at the discrepancies surrounding information overload:

It seems contradictory to say, in the face of frequent complaints about information overload, that more information could be encalming. It seems almost nonsensical to say that the way to become attuned to more information is to attend to it less. It is these apparently bizarre features that may account for why so few designs properly take into account centre and periphery to achieve an increased sense of *locatedness*. But such designs are crucial.

Weiser and Brown define *locatedness* as our ‘connection to the world around [us]’ without providing any further clarification. Although they say locatedness is the ‘fundamental gift that the periphery gives us’, we speculate that what they are really referring to is the retaining of human agency in the face of technology i.e. we command technology in *our* world, technology does not command us. Their proposition to achieve an ‘increased sense of locatedness’ with calm technology thereby alludes more to being empowered by technology rather than being controlled by it, than it does some literal way of being in a physical location or environment. And yet, they also admit to being confused about what calm technology is in the first place:

We have struggled for some time to understand the design of calm technology, and our thoughts are still incomplete and perhaps even a bit confused. Nonetheless, we believe that calm technology may be the most important design problem of the twenty-first century, and it is time to begin the dialogue.

Calm technology was conceived as an anecdote to a future where technology will be everywhere and, if we are careless with this, it will ‘get in the way’ of our lives. It is an anecdote in opposition to frustration, distraction, and loss of human agency as a result of ill-designed ubiquitous technology. This is a very emotional depiction, and therefore one which deserves an equally subjective appreciation. But if we do not concretize the notion of calm technology, it will remain a vague construct and provide no real value to HCI designers and researchers in *how* they can create calm technology. This is not so much a criticism of Case’s efforts to elaborate on calm technology than it is a proposition to reframe the notion of attention demand, in a way which better serves the HCI community and the users of that what we design. To do this, we make the attempt to construct a calm technology framework.

10.5 Constructing a calm technology framework

In the calm technology narrative as it is known today, there is a painting of attention-seeking technology as the antagonist of the story. Yet, we have seen how, in the other leitmotifs such as mindful design and design frictions, not only can attention demand deliver unpleasant interactions, it can also be directed towards creating positive experiences.

How do we experience attention demand in a positive way? We note here recent work by Hawthorne et al. [40] which proposes a relationship between student well-being and the reduction in extraneous cognitive load – the *functioning effectively* aspect of well-being may lead to a reduction in extraneous load via cognitive regulation. Extraneous load here is one of three categories of cognitive load and relates to cognitive activities which do not directly contribute to learning. They demonstrate that the *feeling good* aspect of well-being may help students learn through positive emotions prior and during the learning activity. We can even draw parallels here to the concept of *flow*, in which the cognitive challenge is at just the right amount such that the person neither finds it too difficult that they feel anxiety nor finds it too easy that they feel bored [25]. Indeed, flow can be seen as a positive emotion since it is described as a ‘happy’ state of mind. Although the relationship between well-being and extraneous load is contained within the domain of learning and instructional theory, the concept can shed light on why participants enjoyed experiencing our loading screen – the positive associations with the Stoic quotes and aesthetics of the app perhaps lend themselves to a reduction in *perceived* attention demand. It was not nearly as demanding as it was enjoyable to pay attention to i.e. it is attention demand disguised as a positive state of mindful interaction.

There are two core components to calm technology as currently understood in literature: periphery versus centre of attention and cognitive load. Weiser and Brown, in their descriptions of calm technology [102], often talk of technology as moving between periphery and centre of attention. In the periphery, the technology almost disappears and is unobtrusive, while at the same time can come to the foreground when we need it. One could think that it would therefore be logical to classify an interaction as either happening in the periphery e.g. Bloom·e’s glow or at the centre of attention e.g. the loading screen. However, we note here the discrepancy between *paying attention* to something in the periphery and paying attention to something at the centre of attention. If something previously in the periphery is now being selectively attended to does that not mean it is at the centre of attention? How do you ‘interact’ with something in the periphery without bringing it to your attention, and is this deliberate or subconscious? This dichotomy, then, between technology being in the periphery versus at the centre of attention as described by Weiser and Brown is confusing. Indeed, cognitive scientists have shown that a better way to view attention is on a spectrum, but even then the identification of selective attention items in working memory as being central, mid-level, or peripheral in nature is

challenging [93]. Here, selective attention refers to the allocating of limited processing capacity to one or a small number of items at the expense of other items. If cognitive scientists struggle with this issue, how is an interaction designer supposed to make sense of it?

We propose, for the sake of clarity, that we think about the *starting point* of the interaction as either manifesting in the periphery or centre of attention, rather than whether it *is* in one of the two. For example, our goal with Bloom·e's glow was for it to manifest in the periphery – the complex phenomenon of the user later bringing it to their full attention is not important in our decision-making process as designers, and we have to simply make assumptions about the way attention is given. We call this the *situated starting point*, and it provides us with our first component of calm technology which honours the original conception concerning technology in the periphery. Here, we are defining where the experience begins, and *how* it is executed can be done in any creative way.

The second component would otherwise be attention demand or cognitive load, but these terms are biased in that they imply that 'demanding' attention or imposing 'load' on cognition is something to avoid. As we have seen, the affectivity is one which is perceived by the user and can differ between use situations. Because of this and the fact that Weiser and Brown never talk of cognitive load, we suggest abolishing the term as a defining aspect of calm technology. Instead, we turn to a perspective in cognitive science in which there is neither good nor evil: System 1 and System 2 modes of thought. Daniel Kahneman, a psychologist and economist, wrote his book *Thinking, Fast and Slow* [53] where he elaborated on the notion of System 1 and System 2 *modes of thought*, terms commonly used in Psychology to describe differences in the way we think and process information. System 1 is described as automatic thinking, while System 2 concerns deliberate and effortful thinking. Kahneman presents his full definitions as follows:

System 1: operates automatically and quickly, with little or no effort and no sense of voluntary control.

System 2: allocates attention to the effortful mental activities that demand it, including complex computations. The operations of System 2 are often associated with the subjective experience of agency, choice, and concentration.

We can position Stoic mindfulness under System 2 modes of thought, where one thinks deliberately and effortfully about their virtues, although as Kahneman explains, it is not informed without System 1 in the background. We can also liken, for lack of a better word, 'mindlessness' to System 1 modes of thought, where we are unaware or do not possess voluntary control of our thoughts or actions. Both Systems have their own abilities, limitations and functions, and neither is good nor evil. Habits, for example, are automatic actions that require little to no effort, and can certainly work in favour of the individual. We propose that these modes of thought replace cognitive load as the second component of calm technology, because it removes the bias that attention demand should always be avoided.

The goal of our framework is to provide a pragmatic perspective in thinking about the design and development of calm technology. Rather than work towards the arbitrary goal of things ‘working effortlessly’, we propose that designers become *intentional* with the experiences they wish to design. We do this by considering calm technology as a *range of positive experiences* mapped against the two components of situated starting point (‘periphery’ versus ‘centre of attention’) and mode of thought (‘System 1’ and ‘System 2’). Of course, we can never know exactly what and how the user is thinking, but we can at the very least deliberate which mode of thought should be dedicated to which interaction experience. By ‘experience’ we are referring to (any aspect of) a product feature, function, event, or action. Our framework for calm technology is presented in a matrix comprising both components, shown in Figure 33.

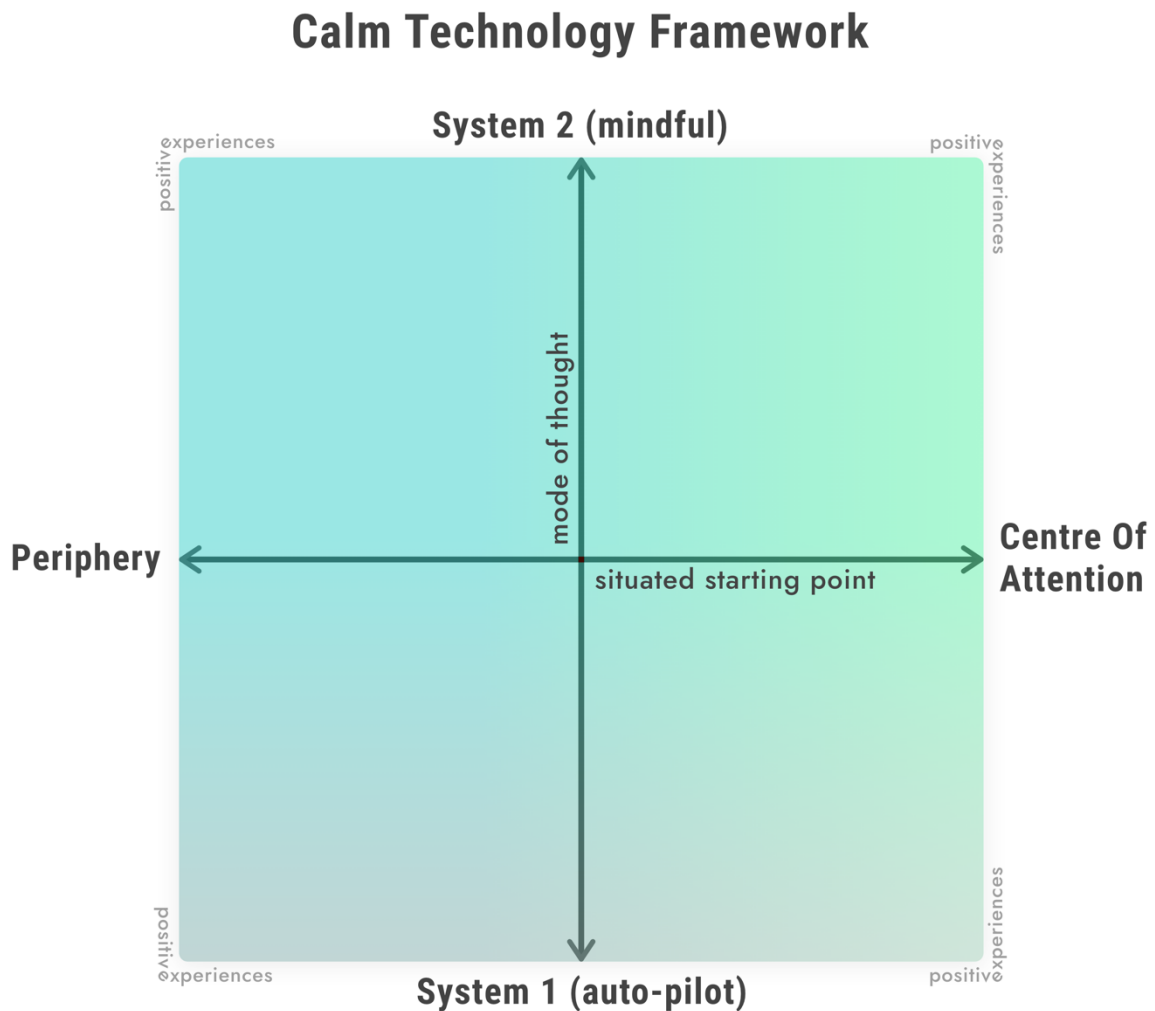


Figure 33. The Calm Technology framework as a range of positive experiences; the two fundamental components are situated starting point and mode of thought

In our framework, interactions can be encalming in any of the four quadrants, while all interactions must be of positive affect. Aspects of an interaction can be made implicit (System 1) if it does not require full attention, while other aspects can be made more explicit (System 2) if deemed necessary or beneficial to the user experience. Experiences can manifest in the periphery or at the centre of attention. In this framework, calm technology is found in the way that designers are *deliberate* about how a user interacts with technology. It does not matter if cognitive effort is imposed, as long as the designer has a good reason for it *and* seeks to create a positive experience. Arguably, this can be exploited, but so too can ‘good design’ be used for nefarious purposes. We are not here to say when attention can or should be demanded, but rather to prompt the designer to make meaningful choices about when to demand full attention and when not to, and whether the interaction starts in the periphery or at the centre of attention. In doing so, we can strive to create positive experiences that are fundamentally encalming, while the user’s own agency remains at the centre of discussion.

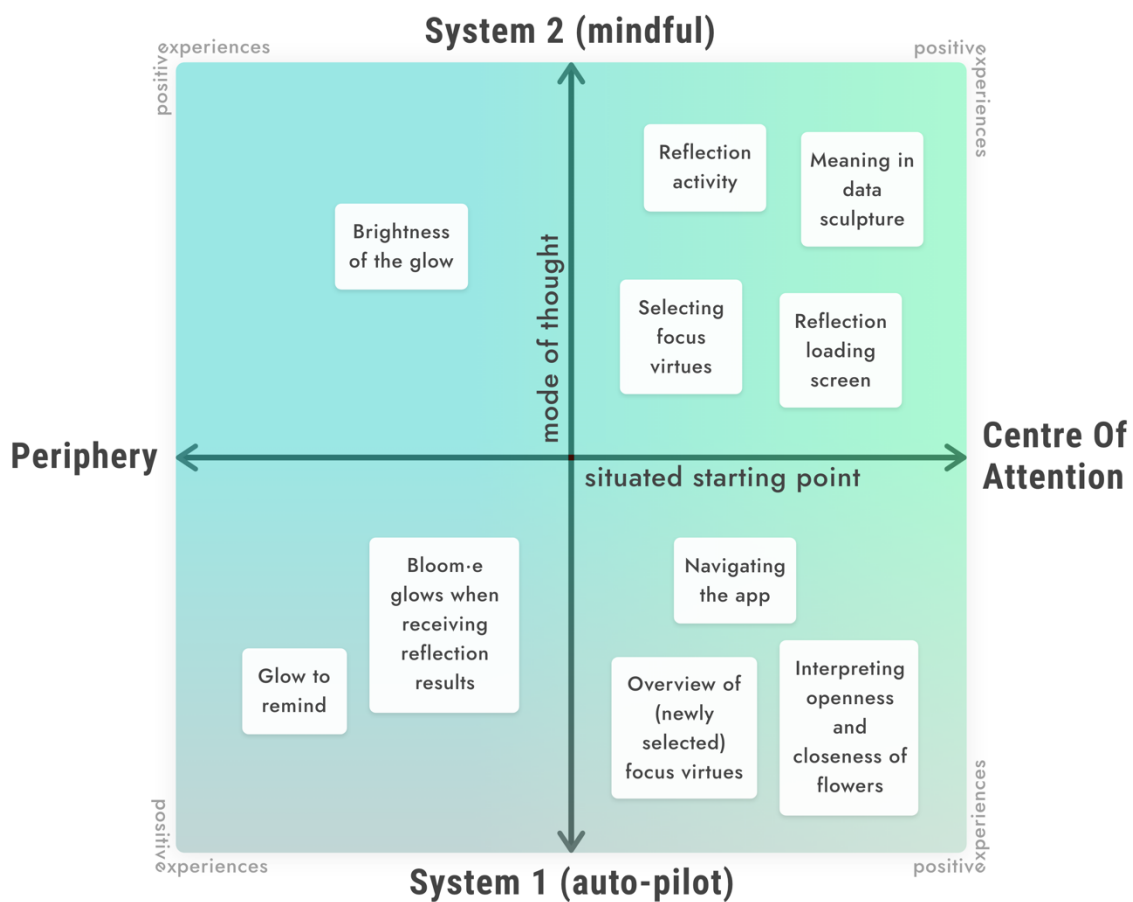


Figure 34. Core experiences with Bloom·e mapped onto the calm technology framework

To illustrate how one can use this framework, we map some of the core experiences with Bloom·e onto it (Figure 34). For example, the glow function manifests in the periphery and is an intuitive reminder to reflect (the opposite of this would be a fire alarm that is heard in the periphery but demands full attention). If the user consciously observes the brightness of the glow, they might be able to think about how far or close the scheduled reflection time is approaching. Another example would be setting new focus virtues, which uses an intuitive interface to, at a glance, understand which virtues are being removed, added, or remain the same (section 7.5) – the user does not have to think hard about it. But selecting focus virtues requires deliberate thinking and saving the selection requires pressing ‘Confirm’

in the pop-up dialogue. Similarly, interpreting the openness and closeness of flowers is automatic (albeit that we could improve the resolution) however interpreting what it means in Bloom·e as a data sculpture requires effort. When Bloom·e receives reflection results, it also glows in the periphery, automatically signalling to the user that the flowers are about to move.

10.6 Future work

There are several potential directions for future work. Because our research deals with a well-being intervention and design theory, we make suggestions related to these two aspects.

Improvements to Bloom·e

One of the issues noted with the physical artefact was that the flowers moved in too vague of a manner – it was not always easy to spot which flower was moving, and the ‘step’ resolution of the bloom was not always clear enough, making it hard to measure its magnitude. This can be improved in further iterations by using smoother movements and, for example, installing LEDs in each flower to draw the user’s attention when transforming.

We developed the smartphone app for one specific device model in order to ensure compatibility and reliable performance – this meant that we missed the opportunity to observe how Bloom·e would be experienced from the user’s own smartphone and its associated contexts. Using a dedicated phone meant the participant had no reason to take the device with them outside of the house or far from vicinity of the artefact, which would otherwise be potential opportunities for gathering rich data about the app’s use in daily life. We also left out the morning and weekly reflections. These activities can be implemented and deployed to investigate more elaborate accounts of Stoic practice where the user engages in more than one type of activity.

Other directions to consider include refining the way virtues are defined and tracked in the app. A stronger focus on actionable virtues over abstract ones can provide more structure for the user. Alternatively, different types of virtues can be tracked in different ways – those that are easily enacted, those that act more as moral compasses, and so forth. Making the artefact more robust and portable would also offer more opportunities for the user to embed it in their daily lives and routines.

Bloom·e as a ludic data sculpture

The results of our home studies showed promising potential in the appeal of Bloom·e as a well-being intervention. However, the appeal of the physical artefact was limited, with mixed responses in whether or not the participant felt the artefact was necessary. The participant in favour of the artefact felt that it welcomed them and immersed them in the experience. Our results showed that the artefact’s slow technology and data sculpture characteristics allowed participants to interpret meaning about virtue enactment in their own way. Participants also speculated being able to get new insights about themselves by exploring the data during the weekly reflections, through reflecting on different levels of granularity. The initial concept with the weekly reflection (section 7.3) was indeed to facilitate deeper reflections about virtue enactment through time, by supporting in the ludic exploration of data embodied in Bloom·e’s flowers. This would require consideration into how to make clear which flower is linked to which virtue and how to facilitate this understanding during the reflection activity, but we believe that this would be a strong direction to take in further development of the intervention.

Bloom·e for behaviour change

One of the participants expressed having a stressful week and therefore did not engage as deeply with Bloom·e as they otherwise would have (this was implied by the participant). Although the highly motivated participants had a lot to gain from using Bloom·e, there may be opportunities to design Bloom·e for behaviour change. Here, Bloom·e could play a role in motivating those who lack the will or mood to reflect. As one of the participants mentioned, a ‘transitioning’ into the reflection would be of added value. This could be useful for individuals who are experiencing stress or who are not in the mood to reflect. Bloom·e’s affordance can be used in a myriad of ways, such as breathing exercises with the glow function, or aesthetically pleasing ‘animations’ on the flowers to attract and calm the user before starting a reflection.

We can also look into what would happen when the user does not complete their reflection activities. We previously stated that Bloom·e would remain in a fixed position – but more persuasive tactics could be used as motivators. For example, the flowers could dwindle over time if not being interacted with, and when the user picks up their reflections again they can ‘bounce’ back to the previously saved state (section 7.3). In any case, care must be given such that these persuasive tactics do not give the impression that the artefact is being judgemental, and that they function in the interest of the user instead of the technology itself.

Pure self-help versus guided self-help

We previously mentioned the fact that the researcher does not consider themselves an expert in Stoicism or mindfulness, even though their interest in these topics drove them to pursue this work. Additionally, there is the lack of expertise in health-related studies, (clinical) psychology or personal development coaching. For further analysis of Bloom·e as a well-being intervention, it would be worth joining forces with experienced researchers in the areas of mindfulness or Positive Psychology. The involvement of health professionals or personal development coaches may also help to explore Bloom·e’s potential in contexts where teachers are involved, especially when some research suggests that guided self-help is more effective than pure self-help [16]. We approached this work from the perspective of a designer and engineer exploring calm technology, but stronger links to positive psychology literature, where topics such as well-being and resilience are heavily discussed, are also highly encouraged, if not only for the intervention to be better informed if it is to stand on its own as a pure self-help product. Comparing the effectiveness of both formats would also be worth looking into.

Measuring well-being

We did not measure well-being in our studies since the experiment duration of seven days was too short to anticipate differences, and we did not want to influence the participant’s way of thinking about the intervention. However, it would be interesting to measure well-being before and after a person uses our intervention so that we can analyse its effects in a quantitative way, similar to the way the FFMQ is used in mindfulness-based clinical therapy interventions to measure a ‘before’ and ‘after’. One could say Bloom·e falls under the eudaimonic well-being construct since Stoicism is about living towards a higher purpose. There are many existing measures for eudaimonic living, but at the same time, the virtue construct appears to be largely absent in those measures [79]. It would be worth debating which measure, or combination of measures, might be most suitable. In addition, the quality

of Bloom·e as supporting of multiple perspectives of virtuous living may introduce further challenges in deciding which measure(s) to use.

Longer-term studies

It is worth deploying the intervention over a longer period and to facilitate more activities such as the weekly reflection. There may be effects only observable after prolonged engagement with Bloom·e as opposed to the short duration of our home studies. Additionally, other aspects of the intervention can be observed such as commitment over time, whether the physical artefact encourages more engagement over the app alone, or the retention of effects post-intervention. Designing self-help interventions with engagement in mind is important to consider, especially in pure-self help formats where attrition is found to be higher [16]. Participants did mention how the physical artefact could help remind them to reflect, so there may be potential in the artefact supporting engagement in Stoic practice over time.

Sensory experiences with Bloom·e

Participants mentioned several aesthetic qualities of the Bloom·e artefact. For example, one participant mentioned wanting to put Bloom·e on their lap to become more immersed in the activity, or to have Bloom·e dance to music they are listening to. Another participant would touch Bloom·e when they were distracted or bored. These responses show that more sensory experiences with Bloom·e may enrich the user experience. As the prototype stands now, it is not designed to be held closely or touched and is quite fragile. The artefact is also large, giving it constraints as to where it can be placed. How would participants use the intervention if the artefact was smaller and less fragile? Exploring sensory experiences with Bloom·e could require a complete reimagining of its physical form, but would be an interesting avenue to pursue. We can think of more radical forms such as removing the plant-like image altogether, using a textile plushie, or building an art installation on a wall. There are endless possibilities for designing ways to embody virtue enactment as we have done in Bloom·e's flowers (opening and closing) – the design space to embody this metaphor is expansive.

Diversity of participants

At the beginning of our home studies, we tried to establish a baseline of each participant (section 8.7), to better understand the individuals using the intervention but also to consider how different types of individuals might experience such an intervention. Participants were largely homogenous and did not sit on any extremes of our FFMQ, ATI, and AFS scales. The participants in our home studies could appreciate the artefact's design, but we could attribute this to their affinity for technology interaction. They also had some interest in virtuous living. It would be worth exploring how other individuals would experience Bloom·e, such as those who do not at all have an affinity for technology interaction or those who are not already interested in virtuous living. We can also investigate how a mindfulness veteran or Stoic practitioner would experience Bloom·e. In addition to recruiting a more diverse range of participants, it would be useful to improve the way each participant's baseline is established, such as using a eudaimonic well-being measure at the beginning of the study or improving our AFS scale to better gauge their affinity for Stoicism (or virtuous living). Establishing more robust participant baselines would help to provide insight into the effectiveness of such an intervention for specific groups of people, which in turn would contribute to greater validity and reliability of investigations into the effects of mindfulness interventions on outcomes, a current methodological limitation in the literature [24].

Controlled studies

Our home studies provided a starting point for observing the effect and appeal of Bloom·e as a well-being intervention. To explicate the effect of specific design objects on the user experience, such as the loading screen or the physical artefact, controlled studies can be executed where, for example, one group experiences the loading screen or the artefact and the other does not. The role of the smartphone app or physical artefact in long term retention and commitment is also worth investigating, as two out of three participants mentioned only needing the app while one participant said it helped to motivate her and immerse her in the experience.

Further explore peripheral cues

Our use of the periphery was rather simple, where Bloom·e glows to remind the user of their reflection. Yet we can think of other means to communicate information in the periphery, such as Bloom·e glowing in a different colour for a different type of reflection, or pulsing to more strongly catch the user's attention for a specific occasion. The flowers could also move in certain ways to convey information. It would also be interesting to look into the more simple effect of the artefact's presence as a contextual or peripheral cue, to support habit-forming [66] in relation to Stoic mindfulness or reflection activities.

Further development of the Calm Technology Framework

Our proposed framework is nascent, meaning it sets up a research agenda for further refinement [108]. It is true that this framework was derived from a case study to do with the design of a well-being intervention. The applicability of our framework in other domains or situations, such as in the design of computer software, is therefore questionable. However, unlike Case's strategy of discussing multiple layers of technology design, we hope that our focus on the two constructs of situated starting point and mode of thought offers a concise framework that can be applied in multiple areas of design. The applicability of the framework as a design perspective in other areas is worth scrutinizing, if only to refine the meaning of calm technology or to further develop the framework with new insights.

11 Conclusion

We began this work from the philosophical perspective that pervasive technology leads to more moments of mindlessness than mindfulness, based on the notion that technology should work efficiently and automatically. This trend was perhaps catapulted by Mark Weiser's vision of ubiquitous technology in 1992, where he described how technology will be so seamlessly embedded in our lives that we will use it "without thinking" [101]. Our motivation thus became to investigate how we can avoid contributing to this trend, by designing for mindfulness rather than mindlessness.

Conclusion

To investigate the problem, we first deconstructed the concept of mindfulness as found in Buddhism, clinical psychology, HCI literature and Stoicism. This was followed by a review of several related interaction and design leitmotifs, with calm technology as our starting point. This led us to our research agenda, where we posited that living mindfully is a capability for well-being worth fostering in the 21st century and beyond, especially as we near the ubiquitous technology vision. This brought us to our research questions, namely how a pervasive technology artefact can support more moments of mindfulness, and how the design principles from the literature can be used to design the pervasive artefact such that it respected the cognitive load of the user.

As part of a case study, we sought to develop a well-being intervention. We turned to the philosophy of Stoicism to understand the concept of Stoic mindfulness, which differs from Western science conceptions of mindfulness in that the object to pay attention to are the virtues that one holds close, as opposed to the awareness that emerges from paying attention to the present non-judgementally as it unfolds. We then introduced our pervasive technology artefact, Bloom·e, as one component of our intervention. We framed Bloom·e under slow technology principles and, in the interest of supporting a guided reflection routine, a smartphone application was needed to interface with Bloom·e. The smartphone app became the second component of our intervention. Together, they were meant to support the user in living virtuously.

To contextualize Bloom·e, we deployed the intervention in three home studies of seven-days each. The home studies were inspired by context mapping techniques, in which the designed artefact serves as a probe to gather rich insights about a user's context, dreams, and aspirations. We used a combination of questionnaires and semi-structured interviews to gather qualitative data about how each participant experienced our intervention. The home studies, although only providing initial insights and a starting point for further work, showed promising results, with two of the participants expressing that they gained new insights about themselves in a way which supported their pursuit of virtue. Stronger links to Psychology literature are encouraged in further development of our mindfulness intervention. Some other insights included the participant-unique ways in which meaning was attributed to the physical artefact and to virtuous living in general, as well as the effectiveness of Bloom·e's glow as a peripheral reminder to reflect. We also observed how the 'forced' loading screen was received positively by participants in the way that it placed them in a calm or wise state of mind prior to reflecting, however we did not test for the absence of it. We also described some of the challenges we encountered in attempting to develop an exemplar of 'calm' technology, particularly due to the current arbitrary view associated with it, which is that technology should simply work effortlessly.

Bloom·e embodies the enactment of virtues and transforms whenever the user reflects. As an abstract artefact with no fixed beginning and end, Bloom·e seems to show most potential in the way that it can behave as a non-linear measure of well-being, thereby supporting more strongly the habituation of Stoic mindfulness in that it does not seek to have the user reach a 'high-score', but rather encourages them to reflect on the ways in which their goals and priorities – with regards to their virtues – change over time. Participants speculated that they could use the artefact to explore data about their virtues in a more intuitive way and gain more insights during the weekly reflections. We therefore posit that such an artefact would provide most value as an ambient data sculpture, to let its user engage in ludic exploration such that they can reflect on themselves and their virtues when interpreting the design expression of the Bloom·e artefact. The smartphone app showed strong value in the way that it guided the process of reflecting, providing a way to interface with the artefact, and also supporting, through

Conclusion

design frictions and its aesthetics, a calm, friendly and mindful attitude towards the reflection activity. Whilst two of the participants expressed only needing the smartphone app to continue with Stoic reflection, one participant saw appeal in the way that the physical artefact would continue to remind her to reflect, as well as act as a companion which motivates her, acknowledges her thoughts and immerses her in the activity. The positive emotions associated with the physical artefact across all participants show how it can enhance the user experience for the better, but further deliberation is needed to give the artefact a stronger role through its use as an ambient data sculpture.

The discussion of our results also led to a critical analysis of calm technology, where the need to reframe attention demand in HCI was expressed. By dissecting attention demand and early descriptions of calm technology, we constructed a calm technology framework which consists of two core components: situated starting point and mode of thought. Situated starting point concerns whether an interaction begins in the periphery or at the centre of attention, while mode of thought considers whether System 1 (auto-pilot) or System 2 (mindful) modes of thinking are used. A number of future directions are proposed, including further exploration of peripheral interactions with Bloom·e, introducing well-being measures in intervention studies, refining Bloom·e as a ludic data sculpture, and investigating the applicability of our calm technology framework in other domains.

Calm technology began as a narrative which painted the ideal vision of ubiquitous technology, one where we are in control and empowered. As a story, an antagonist was created: attention-seeking technology. Like any good story, emotions are evoked in the reader and an aversion to the antagonist was created. But we have seen with the other leitmotifs, such as mindful design and design frictions, that attention does not need to be the antagonist. As characters evolve in stories, so too can the antagonist become the protagonist. We have shown in our work the need to reframe attention demand as neither good nor evil, and in a way which better serves the HCI community in designing calm technology.

One of the challenges in research through design approaches is that the designed artefact deals with an *ultimate particular* (design practice) as opposed to a *unifying whole* (goal of theory) [108]. With a motivation to bring our insights back into design theory and to demystify the meaning of calm technology, we presented a design framework which honours the roots of the original narrative while reshaping the way we think about attention demand. We propose, for the designer, that calm technology is not found in the lessening of cognitive load. Rather, technology can be calm in the way that the designer is *deliberate* about creating positive experiences, whether users begin interacting with it in the periphery or at the centre of attention, or whether it demands their full attention or only their intuitive thinking. Although we have not yet validated our framework in practice, we hope that it provides a starting point for HCI researchers and designers to bring forward concrete manifestations of calm technology. Weiser and Brown initiated the dialogue – we must now work towards refining it in practice, such that we can create a world of positive experiences in the ever-nearing future of ubiquitous technology.

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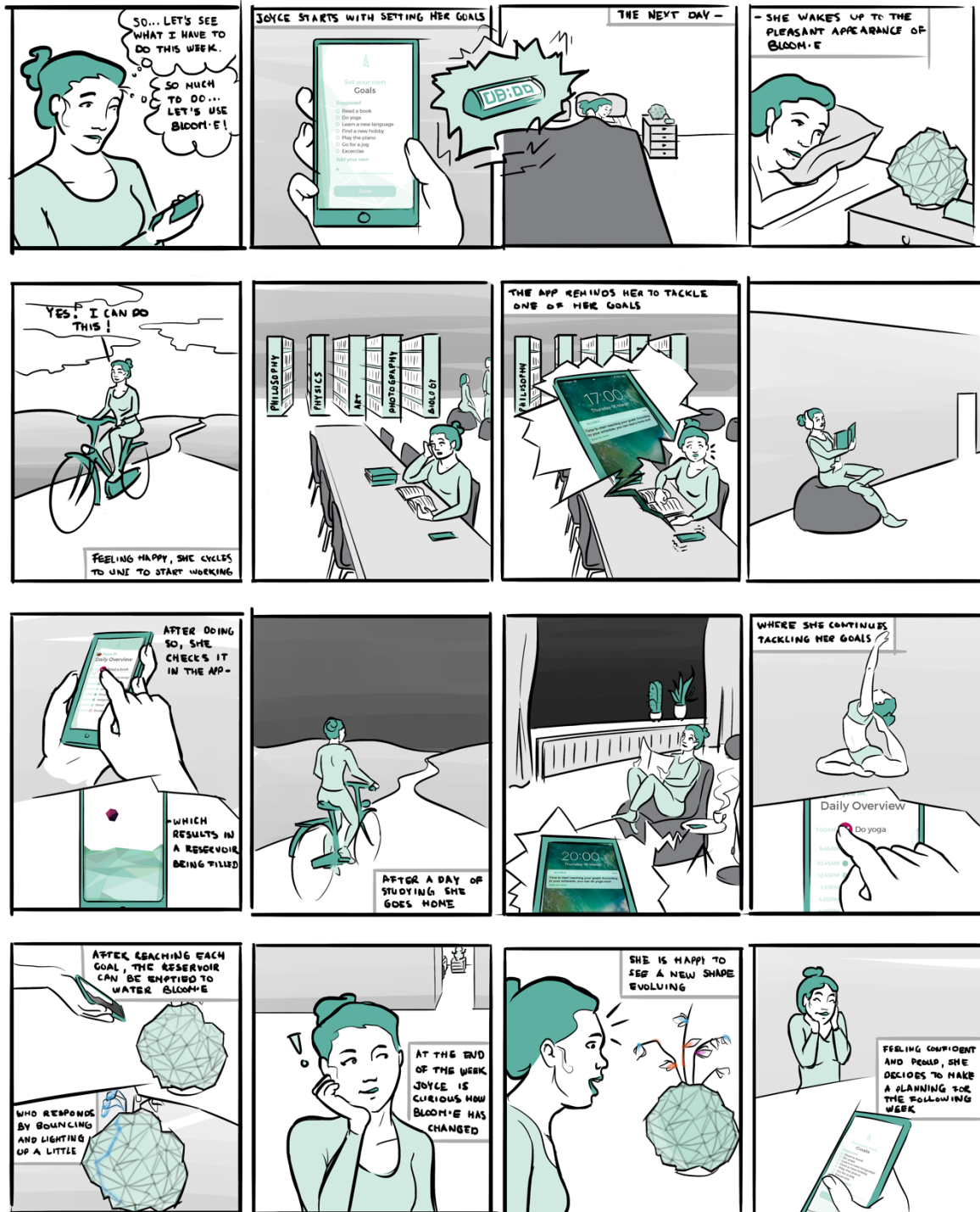
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Appendix A. Storyboard of Bloom·e's original concept



Appendix B. Bloom·e technical breakdown

Materials

Bloom·e's entire bottom vase (Figure 35) was 3D modelled and manufactured using selective laser sintering (SLS) techniques. On the outside of the vase, laser-cut semi-opaque plexi-glass sheets were glued to its surface.

The flowers and its components were similarly manufactured using SLS techniques. To achieve a mint-green finish, the parts were soaked in hot water mixed with clothing dye.

The stems are made of copper and were deformed by hand to take the appropriate shape. It is surrounded by cabling which provides power to the servos in each flower, around which matte-black shrink tube (12mm-4mm, non adhesive) is used to hold everything together.

Electronic components

Inside the bottom vase, lies a cavity in which the electronics reside. The components used as an Arduino Nano Every and Arduino Nano 33 IoT. The 33 IoT is the master and the Every is the slave in an I2C communication protocol. The 33 IoT is the device which receives incoming data from Bloom·e and controls the servos. The Every solely commands the LED strips – the 33 IoT tells it to begin a light animation when needed.

The servos are of the model AFRC Nano servo D1602, which are digital servos. The LED strips used are Mini Skinny Neopixels. For the full circuit design, see Figure 36 and Figure 37.

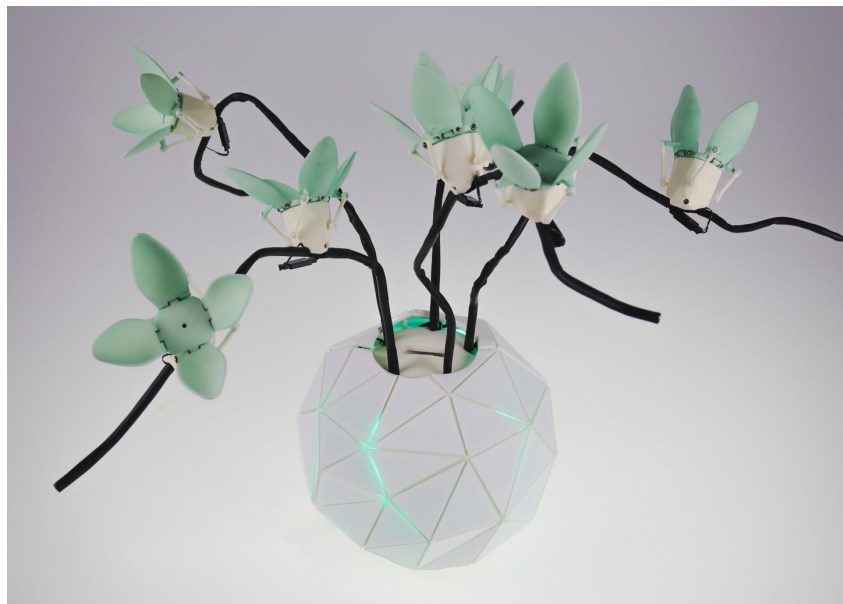


Figure 35. Photo of Bloom·e

Bloom·e's circuit design

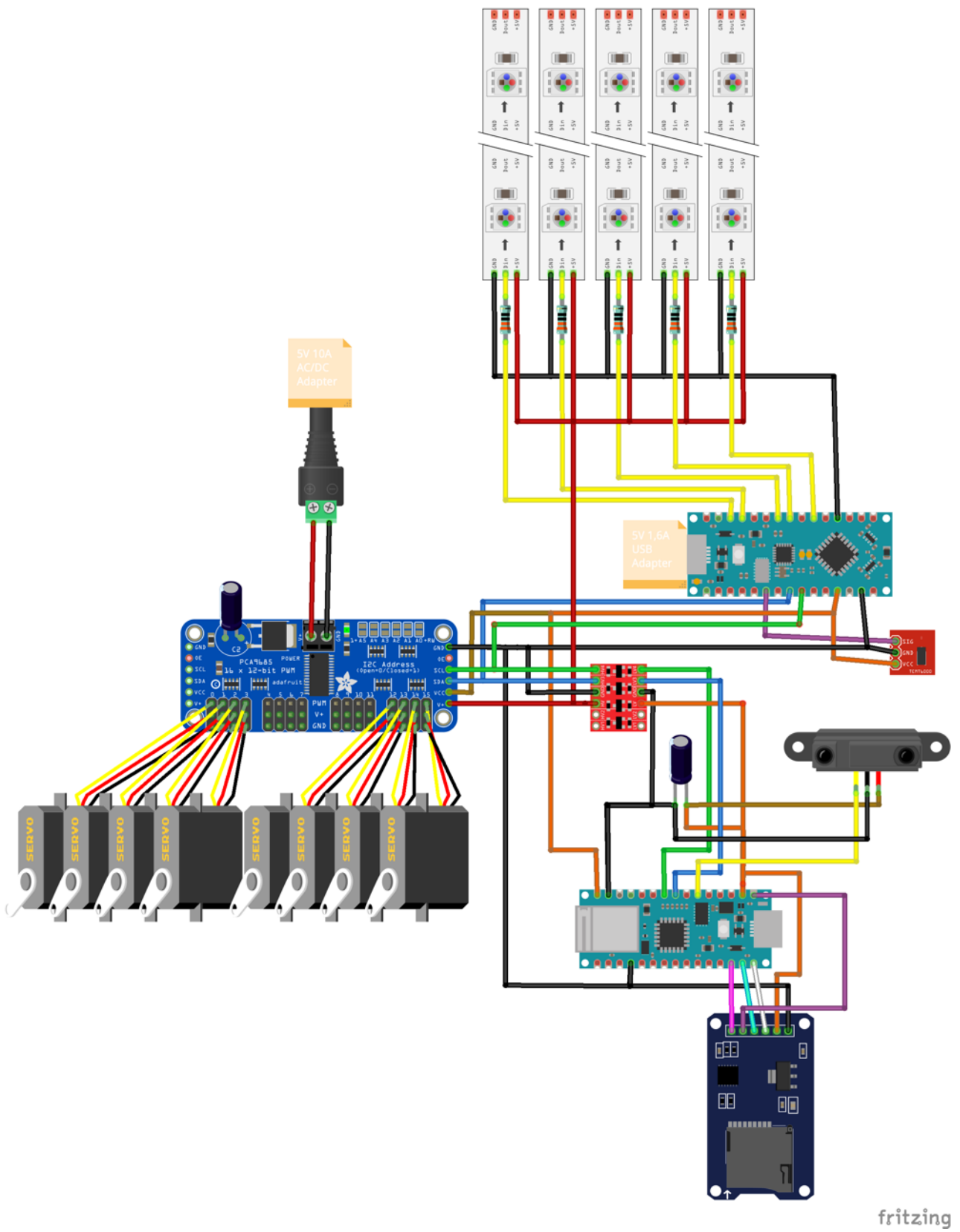


Figure 36. Fritzing diagram of Bloom·e's circuit

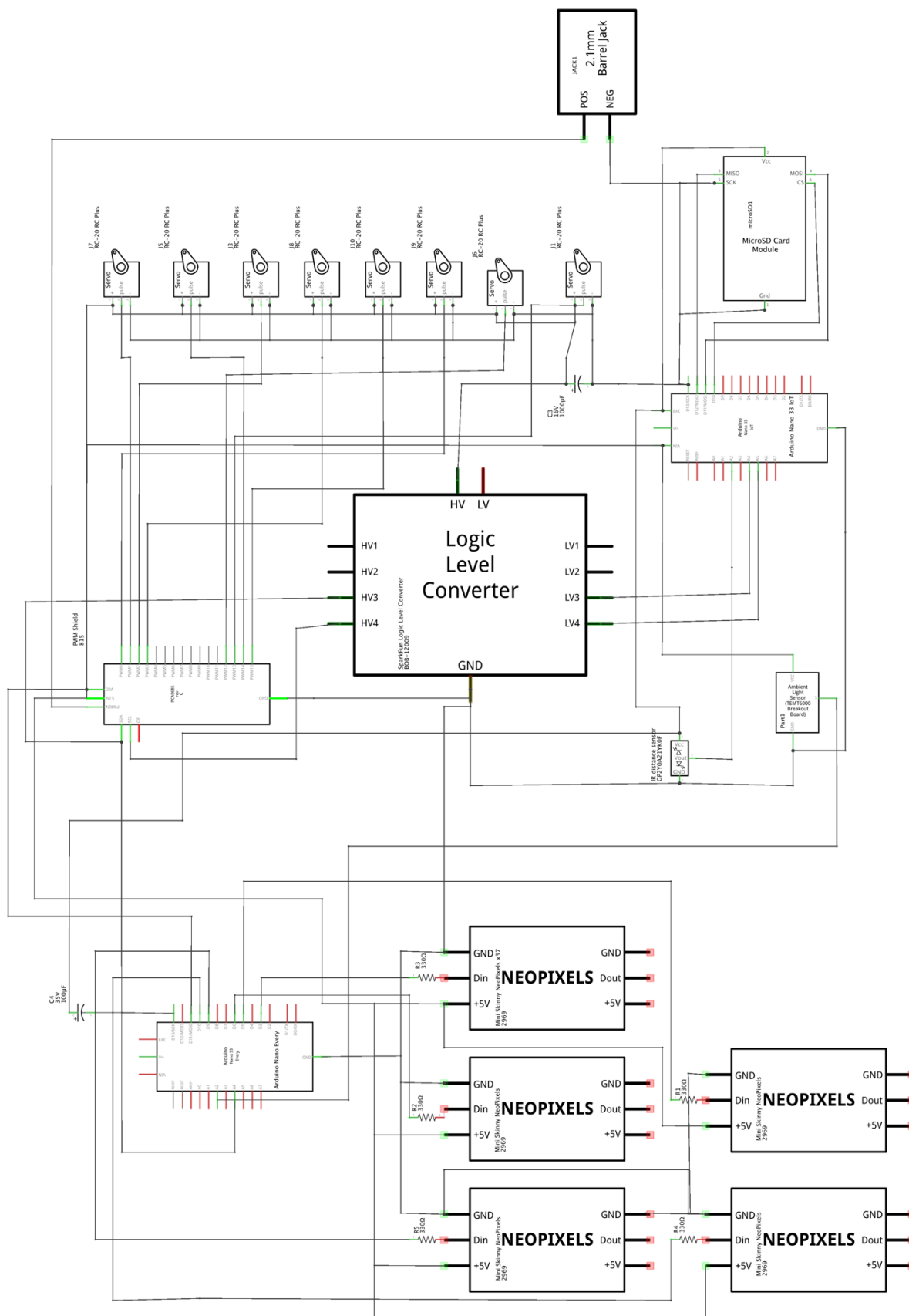


Figure 37. Schematic of Bloom-e's circuit

Appendix C. Discarded user scenario

Not using Bloom·e

In this scenario, we consider what happens when the user does not carry out their reflections. Here Bloom·e tries to, in a subtle way and through its presence in the periphery, motivate the user to keep up their reflections. At the same time, Bloom·e does not ‘punish’ the user, but rather when they start performing the reflections again Bloom·e picks up its appearance from the last time. Our scenario goes as follows:

Robin, a first year Master student at the University of Twente, has been using Bloom·e for nearly one week. For the last couple of days, however, Robin skipped a number of reflection sessions for one reason or another.

At 21:00 the next day - the recurring reflection moment Robin has scheduled in the app - Robin notices in his periphery that Bloom·e is glowing in a different hue instead of the one he is used to seeing. He turns to look at Bloom·e, and wonders what it could mean; the colour seems neither positive nor negative.

The next day, the same event occurs. Out of curiosity, Robin approaches Bloom·e and notices that the flowers have dwindled, even though he remembers them being larger. He thinks about the fact that he has not reflected on his virtues a number of times now, and begins to wonder about whether he has continued to enact his virtues or not. He decides to begin a reflection session.

Upon completing the session, he notices the flowers grow to the size they were previously. He feels good about it and decides to try to keep it going, so that they can bloom even further.

Appendix D. Unimplemented reflections

Morning reflection

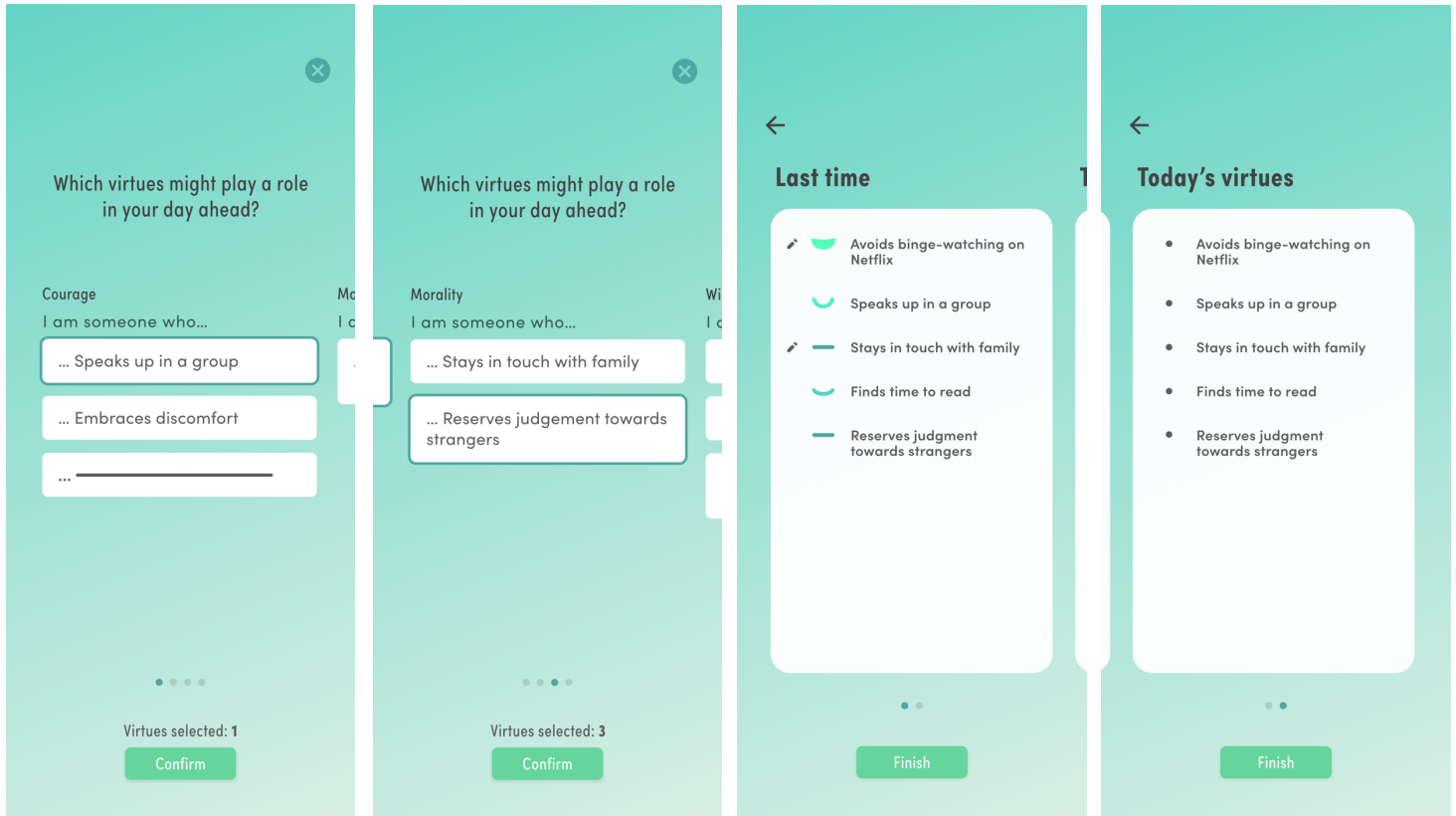


Figure 38. Main screens from the morning reflection

During the morning reflection (Figure 38), the user makes a choice of virtues which they think will be relevant that day or which they would like to consider. They do this in a gallery-style interface, where they can swipe between each category and tap on the relevant virtues in each to make a selection. When they confirm their choice, they are shown a list of ‘Today’s virtues’. Also a gallery-style interface, the user can swipe to the right to reveal the last saved information about those virtues – their ratings and any note-to-selfs. This way, they can recap how things went last time and reflect on how they would like to make improvements or change this time round. The goal here is to prepare oneself to be mindful throughout the day, given the results of the reflection.

Weekly reflection

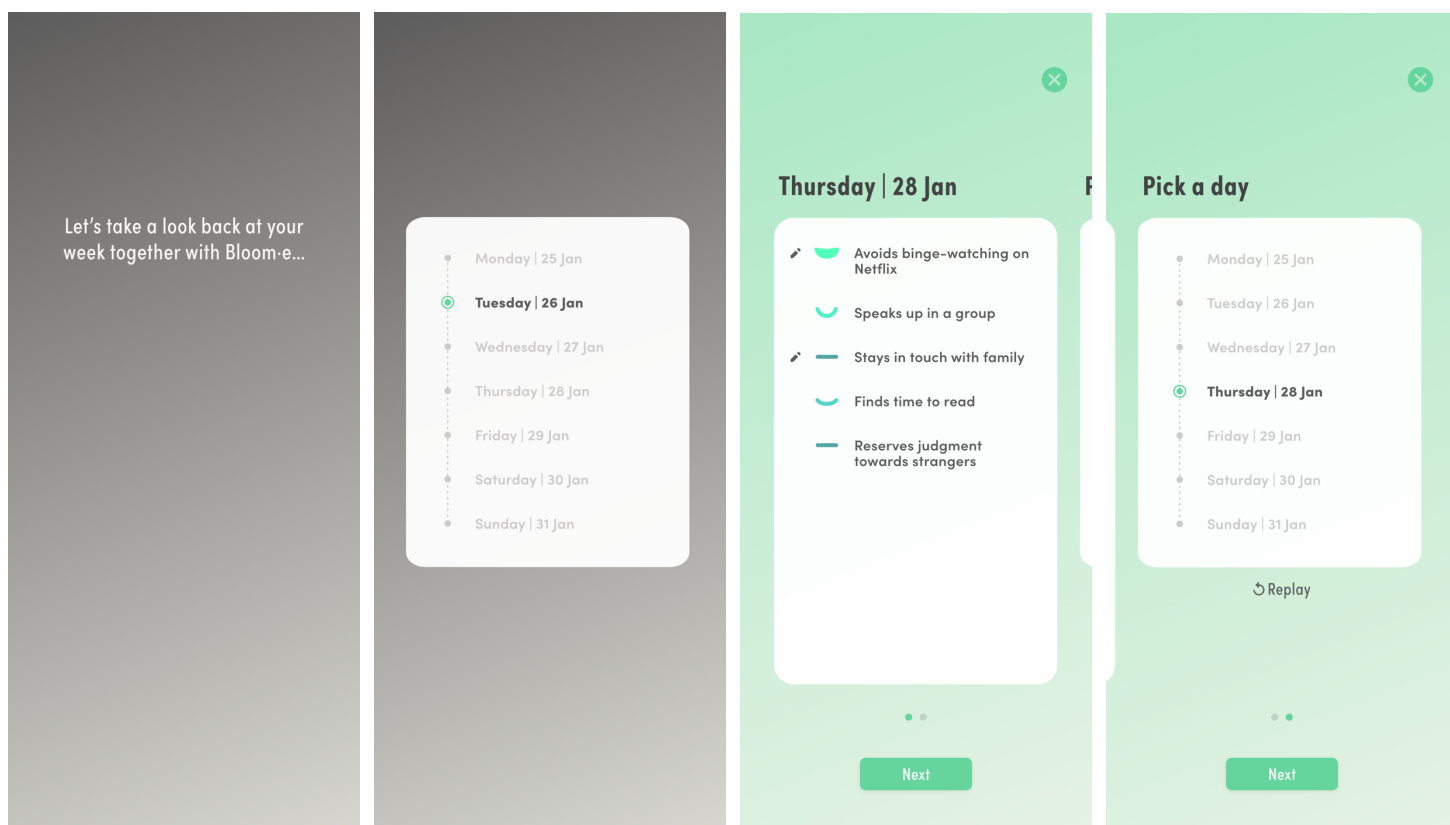


Figure 39. Main screens from the morning reflection

The goal of the weekly reflection is to engage in ludic exploration of one's virtues as recorded throughout the week. First, the app plays a recap of the past week (Figure 39), moving from day to day while transforming Bloom·e's appearance, akin to a time-lapse video. After playing back the recap, the app presents a two-screen gallery view, whereby the user is able to select a day on one card, while other updates with the data saved on that day, including the rating assigned to each virtue and any note to self. Additionally, Bloom·e transforms in appearance for every day the user selects, to reflect the data shown on the app. And by tapping on a virtue, its corresponding flower on Bloom·e twitches. By exploring this data, the user engages in reflection about the patterns and connections in order to gain new insights about themselves.

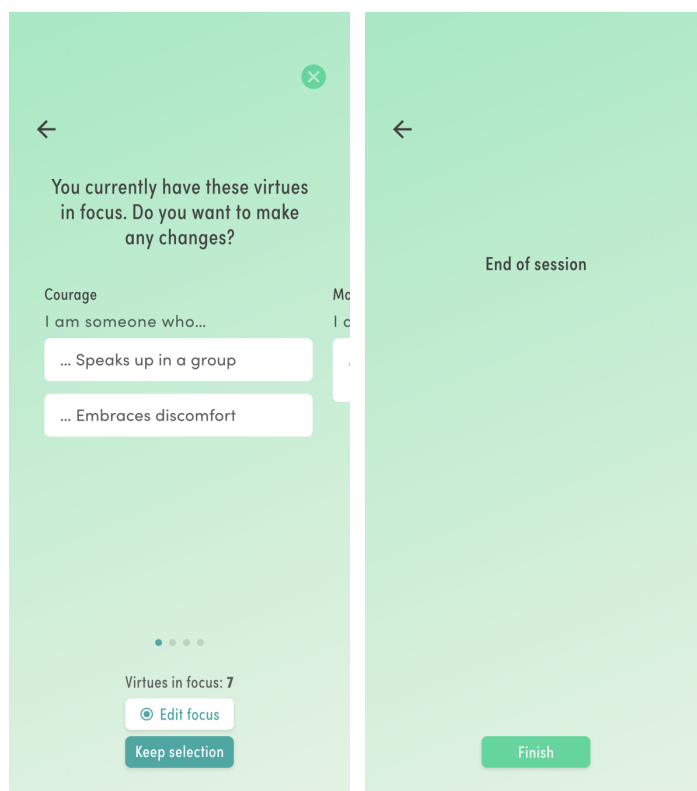


Figure 40. Ability to adjust focus virtues at the end of the weekly reflection

Appendix E. Smartphone app – technical specifications

Device model

The mobile phone used in the home studies and which for which the app is developed and optimized is **moto g 5G plus**. The Android version is **10**.

Software

The app was developed in Flutter (flutter.dev), a cross-platform UI toolkit developed by Google.

Pubspec.yaml configuration

```
version: 1.0.0+1

environment:
  sdk: ">=2.7.0 <3.0.0"

dependencies:
  flutter:
    sdk: flutter
  adobe_xd: ^1.1.0+1
  collection: any
  cupertino_icons: ^1.0.0
  flutter_icons: ^1.1.0
  flutter_svg: ^0.19.3
  google_fonts: ^1.1.2
  intl: ^0.15.0
  moor: ^3.0.0
  moor_flutter: ^3.1.0
  path: ^1.8.0
  path_provider: ^2.0.1
  provider: ^4.3.3
  shared_preferences: ^2.0.5
  timer_builder: ^2.0.0
  visibility_detector: ^0.1.5
  weekday_selector: ^1.0.0
  fullscreen: ^1.0.3
  carousel_slider: ^3.0.0
  flutter_blue: ^0.7.3
  flutter_spinkit: ^5.0.0

dev_dependencies:
  flutter_test:
    sdk: flutter
  build_runner: ^1.11.1
  moor_generator: ^3.4.1
```

Appendix F. Pre-experiment questionnaire

Thank you for participating in this experiment. Please fill in this survey before you start.

Section A:

A1. Gender

Male

Female

Other

Other

A2. Age

A3. Current occupation

Bachelor student

Master student

Graduate

Employed

Self-employed

Unemployed

I prefer not to say

Other

Other

Section B:

B1. What was your motivation to participate in this experiment? Is there anything you hope to get out of participating?

B2. You have chosen a location to install the Bluetooth object.

Please describe this location (e.g. which room it is in, what else is nearby)

Why did you choose this location?

Section C:

C1. The Bluetooth object is currently being, or has already been, installed in your home. What are your (initial) thoughts about the Bluetooth object?

Section D:

D1. (Optional) Do you have any concerns about participating in this research study?

Section E:

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

E1.

	never or very rarely true	rarely true	sometimes true	often true	very often or always true
When I'm walking, I deliberately notice the sensations of my body moving.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'm good at finding words to describe my feelings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I criticize myself for having irrational or inappropriate emotions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I perceive my feelings and emotions without having to react to them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I do things, my mind wanders off and I'm easily distracted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I take a shower or bath, I stay alert to the sensations of water on my body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can easily put my beliefs, opinions, and expectations into words.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I watch my feelings without getting lost in them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I tell myself I shouldn't be feeling the way I'm feeling.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E2.

	never or very rarely true	rarely true	sometimes true	often true	very often or always true
I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It's hard for me to find the words to describe what I'm thinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am easily distracted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I pay attention to sensations, such as the wind in my hair or sun on my face.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have trouble thinking of the right words to express how I feel about things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I make judgments about whether my thoughts are good or bad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find it difficult to stay focused on what's happening in the present.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	never or very rarely true	rarely true	sometimes true	often true	very often or always true
I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E3.

	never or very rarely true	rarely true	sometimes true	often true	very often or always true
In difficult situations, I can pause without immediately reacting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It seems I am "running on automatic" without much awareness of what I'm doing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have distressing thoughts or images, I feel calm soon after.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I tell myself that I shouldn't be thinking the way I'm thinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I notice the smells and aromas of things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Even when I'm feeling terribly upset, I can find a way to put it into words.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I rush through activities without being really attentive to them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have distressing thoughts or images I am able just to notice them without reacting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think some of my emotions are bad or inappropriate and I shouldn't feel them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E4.

	never or very rarely true	rarely true	sometimes true	often true	very often or always true
I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My natural tendency is to put my experiences into words.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have distressing thoughts or images, I just notice them and let them go.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I do jobs or tasks automatically without being aware of what I'm doing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I pay attention to how my emotions affect my thoughts and behavior.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can usually describe how I feel at the moment in considerable detail.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find myself doing things without paying attention.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I disapprove of myself when I have irrational ideas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section F:

F1. The following questions ask about your interaction with technical systems. The term ‘technical systems’ refers to apps and other software applications, as well as entire digital devices (e.g. mobile phone, computer, TV, car navigation).

Please indicate the degree to which you agree/disagree with the following statements.

	completely disagree	largely disagree	slightly disagree	slightly agree	largely agree	completely agree
I like to occupy myself in greater detail with technical systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like testing the functions of new technical systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I predominantly deal with technical systems because I have to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have a new technical system in front of me, I try it out intensively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I enjoy spending time becoming acquainted with a new technical system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is enough for me that a technical system works; I don't care how or why.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I try to understand how a technical system exactly works.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is enough for me to know the basic functions of a technical system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I try to make full use of the capabilities of a technical system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section G:

G1. Please indicate the degree to which you agree/disagree with the following statements.

	completely disagree	largely disagree	slightly disagree	I don't know what this means	slightly agree	largely agree	completely agree
I try to practice Stoicism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know what Stoicism is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I try to live by my virtues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't know what my virtues are	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I consider virtues an important part of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't know the kind of person I want to be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	completely disagree	largely disagree	slightly disagree	I don't know what this means	slightly agree	largely agree	completely agree
I don't think about my virtues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you, your responses have been recorded.

With the Bluetooth object installed, you can begin the experiment by launching the Bloom-e app on the smartphone and following the instructions.

Appendix G. Mid-way questionnaire

You have been using Bloom-e for a couple of days - please fill in this survey to let us know how things have been going.

Section A:

A1. Please indicate the degree to which you agree/disagree with the following statement:

completely largely slightly slightly largely completely
disagree disagree disagree agree agree agree

I found the initial set-up process in the app easy to follow

A2. Why did you/did you not find the initial set-up in the app easy to follow?

A3. Please indicate the degree to which you agree/disagree with the following statement:

completely largely slightly slightly largely completely
disagree disagree disagree agree agree agree

I found the initial set-up process in the app helpful

A4. Why did you/did you not find the initial set-up in the app helpful?

Section B: Your most recent reflection

For the following questions, please think about your most recent reflection.

B1.

Think about what you were doing before you decided to carry out your most recent reflection.

Please describe the scenario by including as many details as possible about the following:

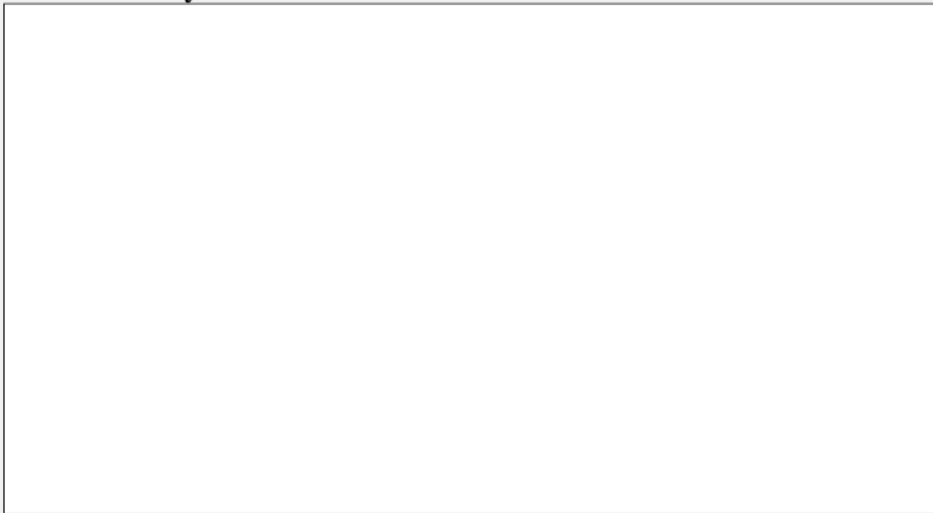
-The activity/task you were engaged in

-The people you were with, if any

-The time of day

-Your thoughts and emotions

-What/who prompted you to decide to start the reflection-Where you went and what you did in order to start the reflection



B2.

Think about your most recent reflection.

Please describe what happened by including as many details as possible about the following:

- What happened from beginning to end**
- Your thoughts and emotions throughout the process-What happened in your surroundings, if any**

Section C:

C1. How do you feel about your experience using Bloom-e so far?

	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

Thank you, your responses have been recorded.

Appendix H. Post-experiment questionnaire

Thank you for experiencing Bloom-e. Before we have the final interview, please fill in this survey.

Section A:

A1. Did your experience with Bloom-e match or not match your expectations? Why/why not?

Section B:

B1. Do you feel you gained anything from using Bloom-e? Please explain why/why not.

Section C:

- C1. Which words would you use to describe the **Bluetooth artefact**, its appearance and the way it behaves?

Please fill in as many words as you can. *If you can not think of any more words, you can type 'n/a' in the empty boxes.*

Word 1	<input type="text"/>
Word 2	<input type="text"/>
Word 3	<input type="text"/>
Word 4	<input type="text"/>
Word 5	<input type="text"/>
Word 6	<input type="text"/>
Word 7	<input type="text"/>
Word 8	<input type="text"/>
Word 9	<input type="text"/>
Word 10	<input type="text"/>
Word 11	<input type="text"/>
Word 12	<input type="text"/>
Word 13	<input type="text"/>
Word 14	<input type="text"/>
Word 15	<input type="text"/>

Section D:

- D1. Which words would you use to describe the **smartphone app**, its user interface and functionality?

Please fill in as many words as you can. *If you can not think of any more words, you can type 'n/a' in the empty boxes.*

Word 1	<input type="text"/>
Word 2	<input type="text"/>
Word 3	<input type="text"/>

Word 4	<input type="text"/>
Word 5	<input type="text"/>
Word 6	<input type="text"/>
Word 7	<input type="text"/>
Word 8	<input type="text"/>
Word 9	<input type="text"/>
Word 10	<input type="text"/>
Word 11	<input type="text"/>
Word 12	<input type="text"/>
Word 13	<input type="text"/>
Word 14	<input type="text"/>
Word 15	<input type="text"/>

Section E:

E1. Do you have any other comments you would like to share?

Thank you, your responses have been recorded. See you at the interview!

Appendix I. Semi-structured interview – all questions

<date>

<participant no.>

INTRODUCTION

CONTEXT MAPPING: OVERALL EXPERIENCE

- How do you feel overall about the experience?
- What did you hope to get out of participating?
 - Do you feel you gained anything from this experience?
 - Did you encounter any frustrations or pain points?
 - Did you feel like you were missing anything?
- <participant-specific questions (aspects from beginning and mid-way surveys)>

CONTEXT MAPPING: ACTIVE ROLE BLOOM·E

- What did you think about the reflection activity itself?
- How about the way the app guided you through the process? Do you think the app interface played a role in your attitude toward the reflections?
 - What did you think about the way you rate your virtues?
- Do you feel the physical artefact contributed to your daily reflections in any way? How/in what way?
- What did you think about the way the artefact responded to your results? Did it contribute to the experience?
- Bloom·e currently doesn't support morning and weekly reflections - would you be interested in these sessions? Why/why not?
 - Is there anything you would like to be able to do in those sessions?
- <participant-specific questions (aspects from beginning and mid-way surveys)>

CONTEXT MAPPING: PASSIVE ROLE BLOOM·E

- Could you explain your reason for the chosen location? What made it suitable?
 - Do you think it remained the most suitable location? Or did you want to move it?
 - If you did not have to worry about the fragility of the artefact, would you pick the same spot?
- What did you think of the glow behavior?
 - As a reminder to start a [reflection](#)?
 - How did it make you feel seeing the glow before starting a reflection?
 - How about the glows during the reflections? What did you think about them?
- Did you interact with the physical artefact in any way during the day (outside of your reflections)?
 - Did the artefact catch your attention in any way during the day?
 - Did you look or glance at the artefact at any point? What did that make you think about/how did it make you feel?
 - Did the artefact's presence have an influence on what you were thinking about or how you felt?
- Did you use the **app** outside of your reflection activities? For what purpose?
 - If you edited your focus virtues, did you do this near the artefact or in any location in the house?
- <participant-specific questions (aspects from beginning and mid-way surveys)>

<date>

<participant no.>

(STOIC) MINDFULNESS

- What do you think about Stoicism itself? Did your understanding of Stoicism change during this period?
- Do you think Bloom·e played a role in how you practiced/learned about Stoicism?
How does this compare to any of your prior experience with Stoicism, whether learning it or practicing it?

THE BLOOM·E ARTEFACT

- How did you feel about your virtues being represented in the flowers?
How did you interpret the appearance of the flowers in relation to your virtues?
What did it make you think about?
How did it make you feel about your virtues?
Did you interpret the flowers only during the reflections or also during the day?
Did you use the twitch function? When & why?
- Did the artefact's appearance or presence play a role during your reflections? In what way?

THE BLOOM·E APP

- What did you think of the app?
- What did you think about the quote on the loading screen?
How did you feel about the loading screen in general?
- What about the pacing of the reflections?
The fading in & out?
- How about the function to edit your focus virtues? Was that process clear?
- How do you feel about the way the artefact and the app worked together?
Did you encounter any technical problems with the artefact or the app?
- Would you use the Bloom·e app on its own?

CONCLUDING QUESTIONS

- If I may ask, do you engage in any other types of self-reflection? How does Bloom·e compare?
- Would you see yourself using Bloom·e in the longer term? Do you think there would be value in using the app or the artefact in the longer term?
- Would you see yourself practicing Stoicism in the longer term? Without Bloom·e?

CLOSING

Appendix J. Consent form for home studies

Consent Form

Title Research: Stoic Reflection With Bluetooth Object

Researchers: [Redacted]

I hereby declare to be well informed about the goal, method and workload of this research. My questions are satisfactorily answered and I had enough time to make a decision about participating.

I know that data and results of this research will be anonymized and treated trustworthy. Personal data will not be given to third parties without my permission. I know that anonymized results may be used for academic publications or scientific purposes.

I voluntarily agree with participating in this research study for a period of 7 days. I give permission to the researcher to deliver and pick up the materials at my home address, at the beginning and end of the experiment period during the agreed upon appointments. I give permission to the researcher to send a reminder for the mid-way questionnaire, via text message to the phone number that I provide below. I know that I can contact the researcher via e-mail or phone in case of any issues encountered during the experiment.

I retain the right to withdraw my consent to participate at any time without giving any reason. If I withdraw during the 7-day period, I give permission for the researcher to collect the research materials during an appointment and within a reasonable timeframe.

When I want more information about this research, now or in the future, I can contact the researcher:

[Redacted]

For complaints about the content or execution of this research the ethical committee of the faculty EEMCS can be contacted:

Or the principal supervisor of this research:

[Redacted]

[Redacted]

Name participant: _____ **Date:** _____

Phone number participant: _____ **Signature participant:**

Send mid-way questionnaire reminder via (please mark one choice):

- SMS
- WhatsApp
- Telegram

Appendix K. Participant checklist for reference during home studies

Quick Participant Checklist

Stoic Reflection With Bluetooth Object

During the 7-day experiment period, you will be using the *Bloom·e* smartphone application to interact with the Bluetooth object. You can use the checklist below as a quick reference for what you need to do during this period.

Note: please do not adjust any Bluetooth settings on the smartphone for the entire duration of this experiment.

At the start (< 45 min)

- Read and sign participant consent form
- Fill in first questionnaire before starting experiment (link in e-mail)
- Launch the *Bloom·e* smartphone application
- Complete the *Bloom·e* onboarding tutorial

During (usually takes 5-15 min per day on average, but this is up to you)

- Carry out daily reflections in the app
- Fill in mid-way questionnaire on the 4th day (link will be sent via e-mail and a reminder via text message)

At the end (< 90 min)

- Fill in final questionnaire before the closing interview (link in e-mail)
- Closing interview (online)
- Reset the app (after the interview)
- Researcher picks up materials

Appendix L. Information brochure for home studies

During the 7-day period, you will interact with the Bluetooth object once per day for each daily activity. The daily activity usually takes 5-15 minutes on average. On the 4th day, you will also fill in a mid-way questionnaire which will be sent to you via e-mail, accompanied by a reminder via text message.

During the 7-day period, you can stop with participation at any time, without any consequences. In case of any issues with the technology, you can contact the researcher for assistance and optionally arrange for an appointment to address any urgent issues. If you would like to end the experiment within the 7-day period, you can inform the researcher by phone or e-mail and arrange for an appointment to pick up the research materials.

At the end of the experiment, the researcher will ask you to fill in a final questionnaire before holding an online video call interview. The interview's audio will be recorded for further analysis by the researcher. The audio recording will not be shared with anyone outside of the research project and will be deleted at the end of this study on 31 September 2021. Any information collected from this experiment will be anonymized.

Quotes may be used from the interview and mentioned anonymously in the report. The data entered in the smartphone app will not be used or processed in any way – you will be able to reset the app at the end of the experiment yourself in order to delete all entered data or you can let the researcher do it when picking up the materials.

If you'd still like to participate after reading this document, you can make two appointments with the researcher: (1) to bring the materials to your address in order to begin the experiment and (2) to collect the materials at the end of the 7-day period. By making these appointments with the researcher, you are implying your consent to participate in the study. A printed copy of the consent form will be brought to the first appointment where you can sign it. If you have any questions left, you can ask the researcher at any time.

As part of the University of Twente we are obliged to comply with the General Data Protection Regulation (GDPR, or AVG in Dutch). For this we take measures with regard to the processing and inspection of personally identifiable data, such as the consent form.

*****Consent form on the next page*****

Appendix M. Pre-experiment questionnaire: responses

Participant 1 (Dan) – Responses to the pre-experiment questionnaire

PARTICIPANT 1 (DAN)						
Q0. Gender	Q02. Age	Q03. Current_occupation				
Male	25	Master student				
Q1. What was your motivation to participate in this experiment? Is there anything you hope to get out of participating?						
I hope to learn something new about Stoic philosophy, and how this learning can occur mediated by computer technology. I also want to take this chance to do some more deep reflection about myself.						
Q3[SQ001]. You have chosen a location to install the Bluetooth object. [Please describe this location (e.g., which room it is in, what else is nearby)]						
It is in the corner of my office room, on the floor, in a somewhat isolated part of the house.						
Q3[SQ002]. You have chosen a location to install the Bluetooth object. [Why did you choose this location?]						
I intent to have my face towards the wall, so that when I use the artifact I would have some sense of isolation and not be distracted through motion that I can observe visually. Also, I chose this corner to avoid any chance of the artifact tipping over or getting wet.						
Q4. The Bluetooth object is currently being, or has already been, installed in your home. What are your (initial) thoughts about the Bluetooth object?						
I wonder how it will help me reflect.						
Q5. (Optional) Do you have any concerns about participating in this research study?						
For me, reflecting sometimes brings me into a downward spiral. But this is a necessary step for some topics that needs time for reflection.						
Five-Facet Mindfulness Questionnaire (FFMQ)						
Question	Response	Associated score	Facet/Reversed?	Reverse-corrected	Observing (O)	Mean score (out of 5)
FFMQ1[SQ001] When I'm walking, I deliberately notice the sensations of my body moving.	A1	1	O	1	20	2,5
FFMQ1[SQ002] I'm good at finding words to describe my feelings.	A4	4	D	4	Describing (D)	4
FFMQ1[SQ003] I criticize myself for having irrational or inappropriate emotions.	A4	4	NJ/R	2		
FFMQ1[SQ004] I perceive my feelings and emotions without having to react to them.	A3	3	N	3	32	4
FFMQ1[SQ005] When I do things, my mind wanders off and I'm easily distracted.	A3	3	A/R	3	Acting with awareness (A)	3,1
FFMQ1[SQ006] When I take a shower or bath, I stay alert to the sensations of water on my body.	A1	1	O	1		
FFMQ1[SQ007] I can easily put my beliefs, opinions, and expectations into words.	A4	4	D	4	25	3,1
FFMQ1[SQ008] I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	A3	3	A/R	3	Nonjudging of inner experience (NJ)	2,4
FFMQ1[SQ009] I watch my feelings without getting lost in them.	A3	3	N	3		
FFMQ1[SQ010] I tell myself I shouldn't be feeling the way I'm feeling.	A4	4	NJ/R	2	19	2,4
FFMQ2[SQ011] I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	A2	2	O	2	Nonreactivity of inner experience (N)	2,7
FFMQ2[SQ012] It's hard for me to find the words to describe what I'm thinking.	A1	1	D/R	5		
FFMQ2[SQ013] I am easily distracted.	A3	3	A/R	3	19	2,7
FFMQ2[SQ014] I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	A3	3	NJ/R	3	Total FFMQ	2,9
FFMQ2[SQ015] I pay attention to sensations, such as the wind in my hair or sun on my face.	A3	3	O	3		
FFMQ2[SQ016] I have trouble thinking of the right words to express how I feel about things	A2	2	D/R	4	115	2,9
FFMQ2[SQ017] I make judgments about whether my thoughts are good or bad.	A4	4	NJ/R	2	5-point scale	Associated score
FFMQ2[SQ018] I find it difficult to stay focused on what's happening in the present.	A4	4	A/R	2		
FFMQ2[SQ019] When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	A2	2	N	2	never or very rarely true	1
FFMQ2[SQ020] I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	A2	2	O	2	rarely true	2
FFMQ3[SQ021] In difficult situations, I can pause without immediately reacting.	A2	2	N	2	sometimes true	3
FFMQ3[SQ022] When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.	A2	2	D/R	4	often true	4
FFMQ3[SQ023] It seems I am "running on automatic" without much awareness of what I'm doing.	A2	2	A/R	4	very often or always true	5
FFMQ3[SQ024] When I have distressing thoughts or images, I feel calm soon after.	A3	3	N	3		
FFMQ3[SQ025] I tell myself that I shouldn't be thinking the way I'm thinking.	A3	3	NJ/R	3		
FFMQ3[SQ026] I notice the smells and aromas of things.	A4	4	O	4		
FFMQ3[SQ027] Even when I'm feeling terribly upset, I can find a way to put it into words.	A5	5	D	5		
FFMQ3[SQ028] I rush through activities without being really attentive to them.	A3	3	A/R	3		
FFMQ3[SQ029] When I have distressing thoughts or images I am able just to notice them without reacting.	A3	3	N	3		
FFMQ3[SQ030] I think some of my emotions are bad or inappropriate and I shouldn't feel them.	A4	4	NJ/R	2		
FFMQ4[SQ031] I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	A3	3	O	3		
FFMQ4[SQ032] My natural tendency is to put my experiences into words.	A3	3	D	3		
FFMQ4[SQ033] When I have distressing thoughts or images, I just notice them and let them go.	A3	3	N	3		
FFMQ4[SQ034] I do jobs or tasks automatically without being aware of what I'm doing.	A2	2	A/R	4		
FFMQ4[SQ035] When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.	A4	4	NJ/R	2		
FFMQ4[SQ036] I pay attention to how my emotions affect my thoughts and behavior.	A4	4	O	4		
FFMQ4[SQ037] I can usually describe how I feel at the moment in considerable detail.	A3	3	D	3		
FFMQ4[SQ038] I find myself doing things without paying attention.	A3	3	A/R	3		
FFMQ4[SQ039] I disapprove of myself when I have irrational ideas.	A3	3	NJ/R	3		

Affinity for Technology Interaction (ATI)						
Question	Response	Associated score	Reversed?	Reverse-corrected		Mean score ATI (out of 6)
ATI[A1] I like to occupy myself in greater detail with technical systems.	A4	4		4		4
ATI[A2] I like testing the functions of new technical systems.	A5	5		5		
ATI[A3] I predominantly deal with technical systems because I have to.	A2	2	R	5		6-point scale
ATI[A4] When I have a new technical system in front of me, I try it out intensively.	A4	4		4		completely disagree
ATI[A5] I enjoy spending time becoming acquainted with a new technical system.	A3	3		3		largely disagree
ATI[A6] It is enough for me that a technical system works; I don't care how or why.	A4	4	R	3		slightly disagree
ATI[A7] I try to understand how a technical system exactly works.	A5	5		5		slightly agree
ATI[A8] It is enough for me to know the basic functions of a technical system.	A4	4	R	3		largely agree
ATI[A9] I try to make full use of the capabilities of a technical system.	A4	4		4		completely agree
Affinity for Stoicism (AFS)						
Question	Response	Associated score	Reversed?	Reverse-corrected		Mean score AFS (out of 6)
B1[SQ001] I try to practice Stoicism	A3	3		3		4,7
B1[SQ002] I know what Stoicism is	A4	4		4		
B1[SQ003] I try to live by my virtues	A5	5		5		6-point scale
B1[SQ004] I don't know what my virtues are	A2	2	R	5		completely disagree
B1[SQ005] I consider virtues an important part of life	A6	6		6		largely disagree
B1[SQ006] I don't know the kind of person I want to be	A2	2	R	5		slightly disagree
B1[SQ009] I don't think about my virtues	A2	2	R	5		slightly agree
						largely agree
						completely agree

Participant 2 (Jen) – Responses to the pre-experiment questionnaire

Affinity for Technology Interaction (ATI)								
Question	Response	Associated score	Reversed?	Reverse-Corrected	Mean score ATI (out of 6)			
ATI[A1] I like to occupy myself in greater detail with technical systems.	A2	2		2	4,8			
ATI[A2] I like testing the functions of new technical systems.	A6	6		6				
ATI[A3] I predominantly deal with technical systems because I have to.	A1	1	R	6	6-point scale completely disagree largely disagree slightly disagree slightly agree largely agree completely agree	Associated score 1 2 3 4 5 6		
ATI[A4] When I have a new technical system in front of me, I try it out intensively.	A5	5		5				
ATI[A5] I enjoy spending time becoming acquainted with a new technical system.	A5	5		5				
ATI[A6] It is enough for me that a technical system works; I don't care how or why.	A2	2	R	5				
ATI[A7] I try to understand how a technical system exactly works.	A5	5		5				
ATI[A8] It is enough for me to know the basic functions of a technical system.	A3	3	R	4				
ATI[A9] I try to make full use of the capabilities of a technical system.	A5	5		5				
Affinity for Stoicism (AFS)							Mean score AFS (out of 6)	
							4,6	
Question	Response	Associated score	Reversed?	Reverse-Corrected				
B1[SQ001] I try to practice Stoicism	A4	4		4				
B1[SQ002] I know what Stoicism is	A4	4		4				
B1[SQ003] I try to live by my virtues	A5	5		5	6-point scale completely disagree largely disagree slightly disagree slightly agree largely agree completely agree	Associated score 1 2 3 4 5 6		
B1[SQ004] I don't know what my virtues are	A2	2	R	5				
B1[SQ005] I consider virtues an important part of life	A5	5		5				
B1[SQ006] I don't know the kind of person I want to be	A2	2	R	5				
B1[SQ009] I don't think about my virtues	A3	3	R	4				
FFMQ1[SQ002] I'm good at finding words to describe my feelings.	A4	4	D	4	Describing (D) 31 3,9			
FFMQ1[SQ003] I criticize myself for having irrational or inappropriate emotions.	A1	1	NJ/R	5				
FFMQ1[SQ004] I perceive my feelings and emotions without having to react to them.	A3	3	N	3	Acting with awareness (A) 33 4,1			
FFMQ1[SQ005] When I do things, my mind wanders off and I'm easily distracted.	A2	2	A/R	4				
FFMQ1[SQ006] When I take a shower or bath, I stay alert to the sensations of water on my body.	A3	3	O	3	Nonjudging of inner experience (NJ) 35 4,4			
FFMQ1[SQ007] I can easily put my beliefs, opinions, and expectations into words.	A4	4	D	4				
FFMQ1[SQ008] I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	A2	2	A/R	4	Nonreactivity of inner experience (N) 20 2,9			
FFMQ1[SQ009] I watch my feelings without getting lost in them.	A3	3	N	3				
FFMQ1[SQ010] I tell myself I shouldn't be feeling the way I'm feeling.	A2	2	NJ/R	4	Total FFMQ 149 3,8			
FFMQ2[SQ011] I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	A3	3	O	3				
FFMQ2[SQ012] It's hard for me to find the words to describe what I'm thinking.	A2	2	D/R	4	5-point scale never or very rarely true rarely true sometimes true often true very often or always true	Associated score 1 2 3 4 5		
FFMQ2[SQ013] I am easily distracted.	A3	3	A/R	3				
FFMQ2[SQ014] I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	A2	2	NJ/R	4				
FFMQ2[SQ015] I pay attention to sensations, such as the wind in my hair or sun on my face.	A3	3	O	3				
FFMQ2[SQ016] I have trouble thinking of the right words to express how I feel about things	A2	2	D/R	4				
FFMQ2[SQ017] I make judgments about whether my thoughts are good or bad.	A1	1	NJ/R	5				
FFMQ2[SQ018] I find it difficult to stay focused on what's happening in the present.	A3	3	A/R	3				
FFMQ2[SQ019] When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	A3	3	N	3				
FFMQ2[SQ020] I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	A3	3	O	3				
FFMQ3[SQ021] In difficult situations, I can pause without immediately reacting.	A4	4	N	4				
FFMQ3[SQ022] When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.	A2	2	D/R	4				
FFMQ3[SQ023] It seems I am "running on automatic" without much awareness of what I'm doing.	A1	1	A/R	5				
FFMQ3[SQ024] When I have distressing thoughts or images, I feel calm soon after.	A2	2	N	2				
FFMQ3[SQ025] I tell myself that I shouldn't be thinking the way I'm thinking.	A2	2	NJ/R	4				
FFMQ3[SQ026] I notice the smells and aromas of things.	A5	5	O	5				
FFMQ3[SQ027] Even when I'm feeling terribly upset, I can find a way to put it into words.	A4	4	D	4				
FFMQ3[SQ028] I rush through activities without being really attentive to them.	A1	1	A/R	5				
FFMQ3[SQ029] When I have distressing thoughts or images I am able just to notice them without reacting.	A4	4	N	4				
FFMQ3[SQ030] I think some of my emotions are bad or inappropriate and I shouldn't feel them.	A1	1	NJ/R	5				
FFMQ4[SQ031] I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	A5	5	O	5				
FFMQ4[SQ032] My natural tendency is to put my experiences into words.	A3	3	D	3				
FFMQ4[SQ033] When I have distressing thoughts or images, I just notice them and let them go.	A1	1	N	1				
FFMQ4[SQ034] I do jobs or tasks automatically without being aware of what I'm doing.	A2	2	A/R	4				
FFMQ4[SQ035] When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.	A1	1	NJ/R	5				
FFMQ4[SQ036] I pay attention to how my emotions affect my thoughts and behavior.	A5	5	O	5				
FFMQ4[SQ037] I can usually describe how I feel at the moment in considerable detail.	A4	4	D	4				
FFMQ4[SQ038] I find myself doing things without paying attention.	A1	1	A/R	5				
FFMQ4[SQ039] I disapprove of myself when I have irrational ideas.	A3	3	NJ/R	3				

Participant 3 (Mia) – Responses to pre-experiment questionnaire

PARTICIPANT 3 (MIA)						
Q0. Gender	Q02. Age Q03. Current_occupation					
Female	24 Graduate					
Q1. What was your motivation to participate in this experiment? Is there anything you hope to get out of participating?						
This experiment captures my interest in learning more about (or even practicing, to some extent) Stoicism, and reflecting on my values and virtues.						
Q3[SQ001]. You have chosen a location to install the Bluetooth object. [Please describe this location (e.g. which room it is in, what else is nearby)]						
The object is placed on my desk, in my student room. Next to in there are some decoration and general office supplies, but the desk is big and not crowded						
Q3[SQ002]. You have chosen a location to install the Bluetooth object. [Why did you choose this location?]						
I chose this location, because my desk is kind of in a central place in my room; and also it seemed as the only suitable spot						
Q4. The Bluetooth object is currently being, or has already been, installed in your home. What are your (initial) thoughts about the Bluetooth object?						
The Bluetooth object is being installed in the moment I fill in this survey. My initial impression is that it will have an unique design based on the few components I have seen. I think it will look						
Q5. (Optional) Do you have any concerns about participating in this research study?						
Not really; I think the "worst" that could happen is to learn something new about myself that I might not necessarily like, or have been in denial						
Five-Facet Mindfulness Questionnaire (FFMQ)						
Question	Response	Associated score	Facet/ Reversed?	Reverse-Corrected		Mean score (out of 5)
FFMQ1[SQ001] When I'm walking, I deliberately notice the sensations of my body moving.	A4	4	O	4	Observing (O)	33 4,1
FFMQ1[SQ002] I'm good at finding words to describe my feelings.	A2	2	D	2	Describing (D)	22 2,8
FFMQ1[SQ003] I criticize myself for having irrational or inappropriate emotions.	A3	3	NJ/R	3		
FFMQ1[SQ004] I perceive my feelings and emotions without having to react to them.	A2	2	N	2	Acting with awareness (A)	27 3,4
FFMQ1[SQ005] When I do things, my mind wanders off and I'm easily distracted.	A4	4	A/R	2		
FFMQ1[SQ006] When I take a shower or bath, I stay alert to the sensations of water on my body.	A3	3	O	3	Nonjudging of inner experience (NJ)	26 3,3
FFMQ1[SQ007] I can easily put my beliefs, opinions, and expectations into words.	A3	3	D	3		
FFMQ1[SQ008] I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	A3	3	A/R	3	Nonreactivity of inner experience (N)	19 2,7
FFMQ1[SQ009] I watch my feelings without getting lost in them.	A3	3	N	3		
FFMQ1[SQ010] I tell myself I shouldn't be feeling the way I'm feeling.	A3	3	NJ/R	3	Total FFMQ	127 3,3
FFMQ2[SQ011] I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	A5	5	O	5		
FFMQ2[SQ012] It's hard for me to find the words to describe what I'm thinking.	A3	3	D/R	3	5-point scale	never or very rarely true 1
FFMQ2[SQ013] I am easily distracted.	A4	4	A/R	2		
FFMQ2[SQ014] I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	A3	3	NJ/R	3	sometimes true 3	
FFMQ2[SQ015] I pay attention to sensations, such as the wind in my hair or sun on my face.	A4	4	O	4	often true 4	
FFMQ2[SQ016] I have trouble thinking of the right words to express how I feel about things	A3	3	D/R	3	very often or always true 5	
FFMQ2[SQ017] I make judgments about whether my thoughts are good or bad.	A3	3	NJ/R	3		
FFMQ2[SQ018] I find it difficult to stay focused on what's happening in the present.	A2	2	A/R	4		
FFMQ2[SQ019] When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	A3	3	N	3		
FFMQ2[SQ020] I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	A4	4	O	4		
FFMQ3[SQ021] In difficult situations, I can pause without immediately reacting.	A3	3	N	3		
FFMQ3[SQ022] When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.	A2	2	D/R	4		
FFMQ3[SQ023] It seems I am "running on automatic" without much awareness of what I'm doing.	A2	2	A/R	4		
FFMQ3[SQ024] When I have distressing thoughts or images, I feel calm soon after.	A3	3	N	3		
FFMQ3[SQ025] I tell myself that I shouldn't be thinking the way I'm thinking.	A2	2	NJ/R	4		
FFMQ3[SQ026] I notice the smells and aromas of things.	A5	5	O	5		
FFMQ3[SQ027] Even when I'm feeling terribly upset, I can find a way to put it into words.	A3	3	D	3		
FFMQ3[SQ028] I rush through activities without being really attentive to them.	A2	2	A/R	4		
FFMQ3[SQ029] When I have distressing thoughts or images I am able just to notice them without reacting.	A3	3	N	3		
FFMQ3[SQ030] I think some of my emotions are bad or inappropriate and I shouldn't feel them.	A3	3	NJ/R	3		
FFMQ4[SQ031] I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	A5	5	O	5		
FFMQ4[SQ032] My natural tendency is to put my experiences into words.	A2	2	D	2		
FFMQ4[SQ033] When I have distressing thoughts or images, I just notice them and let them go.	A2	2	N	2		
FFMQ4[SQ034] I do jobs or tasks automatically without being aware of what I'm doing.	A2	2	A/R	4		
FFMQ4[SQ035] When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.	A3	3	NJ/R	3		
FFMQ4[SQ036] I pay attention to how my emotions affect my thoughts and behavior.	A3	3	O	3		
FFMQ4[SQ037] I can usually describe how I feel at the moment in considerable detail.	A2	2	D	2		
FFMQ4[SQ038] I find myself doing things without paying attention.	A2	2	A/R	4		
FFMQ4[SQ039] I disapprove of myself when I have irrational ideas.	A2	2	NJ/R	4		

Affinity for Technology Interaction (ATI)						
Question	Response	Associated score	Reversed?	Reverse-corrected		Mean score ATI (out of 6)
ATI[A1] I like to occupy myself in greater detail with technical systems.	A4	4		4		4
ATI[A2] I like testing the functions of new technical systems.	A6	6		6		
ATI[A3] I predominantly deal with technical systems because I have to.	A6	6	R	1		
ATI[A4] When I have a new technical system in front of me, I try it out intensively.	A4	4		4		
ATI[A5] I enjoy spending time becoming acquainted with a new technical system.	A5	5		5		
ATI[A6] It is enough for me that a technical system works; I don't care how or why.	A3	3	R	4		
ATI[A7] I try to understand how a technical system exactly works.	A4	4		4		
ATI[A8] It is enough for me to know the basic functions of a technical system.	A3	3	R	4		
ATI[A9] I try to make full use of the capabilities of a technical system.	A4	4		4		
						6-point scale
						completely disagree
						largely disagree
						slightly disagree
						slightly agree
						largely agree
						completely agree
						Associated score
						1
						2
						3
						4
						5
						6
Affinity for Stoicism (AFS)						
Question	Response	Associated score	Reversed?	Reverse-Corrected		Mean score AFS (out of 6)
B1[SQ001] I try to practice Stoicism	A4	4		4		4,4
B1[SQ002] I know what Stoicism is	A4	4		4		
B1[SQ003] I try to live by my virtues	A5	5		5		
B1[SQ004] I don't know what my virtues are	A2	2	R	5		
B1[SQ005] I consider virtues an important part of life	A4	4		4		
B1[SQ006] I don't know the kind of person I want to be	A2	2	R	5		
B1[SQ009] I don't think about my virtues	A3	3	R	4		
						6-point scale
						completely disagree
						largely disagree
						slightly disagree
						slightly agree
						largely agree
						completely agree
						Associated score
						1
						2
						3
						4
						5
						6

Appendix N. Mid-way questionnaire: responses

Participant 1 (Dan) – Responses to mid-way questionnaire

PARTICIPANT 1 (DAN)
I found the initial set-up process in the app easy to follow
5 (largely agree)
Why did you/did you not find the initial set-up in the app easy to follow?
It was clear, apart from the end where I was not certain whether I should already start a reflection session. Also the morning session looked like a guided process as well because of the available button to start the session, while it was not possible to actually click it. I was a little confused by it.
I found the initial set-up process in the app helpful
5 (largely agree)
Why did you/did you not find the initial set-up in the app helpful?
It helped me understand what was meant by virtues and it has a process in place to get to defining some virtues.
Think about what you were doing before you decided to carry out your most recent reflection. Please describe the scenario by including as many details as possible about the following:- The activity/task you were engaged in- The people you were with, if any- The time of day- Your thoughts and emotions- What/who prompted you to decide to start the reflection- Where you went and what you did in order to start the reflection
It was evening at around 21:30 and was actually relaxing. I was reading my book and then decided to do a reflection which I have been doing at the end of the days. I was alone doing the reflection. Nothing really prompted me to do the reflection, as I started doing it in a standard way at around the same time. I went to the place of the artifact, sat in front of it with a beanbag.
Think about your most recent reflection. Please describe what happened by including as many details as possible about the following:- What happened from beginning to end- Your thoughts and emotions throughout the process- What happened in your surroundings, if any
From the beginning I opened the app and started to do the reflection. While having my focused virtues for the day coming by one by one, I have to judge my own behavior and performance of that day to see whether I did a good job on them or not. With each I would see if there were things that I did that day that respected the corresponding virtue. I would see if there were scenarios that day that signalled that I did live up to the virtue on that day and would judge my performance as positive. There was nothing in my surroundings and I was focused on watching the phone, and seeing the response of the artifact.
How do you feel about your experience using Bloom-e so far?
4 (smiley)
I like that it gave me a process to reflect on my day through my defined virtues. I have noticed a boost in confidence about myself because of making certain progress to live up to the virtue, or that during the day when I get into a stressed situation, I was sometimes able to act through the virtue.

Participant 2 (Jen) – Responses to mid-way questionnaire

PARTICIPANT 2 (JEN)
<p>I found the initial set-up process in the app easy to follow</p> <p>5 (largely agree)</p>
<p>Why did you/did you not find the initial set-up in the app easy to follow?</p> <p>I found the level of detail in the explanation to be well balanced, easy to understand, friendly tone and enough to understand what the app is about. I found the user interface to be soothing and the design of it is simple and concise with the right signifiers that are representative of the possibilities of use within the interface.</p>
<p>I found the initial set-up process in the app helpful</p> <p>5 (largely agree)</p>
<p>Why did you/did you not find the initial set-up in the app helpful?</p> <p>I really appreciated the way I was walked through the process. The first exercise was a good introduction to the purpose of the app. The examples that were given to define the virtues were simple and the explanation of the virtues categories were also helpful to start defining my own.</p> <p>I would have appreciated to have some sort of definition of what stoicism is about and what virtues are in a little bit more details. Maybe some sort of extra option where I can go to know more about the philosophy, and not necessarily present it extensively during the set-up process for simplicity reasons. Additionally, I found it slightly hard to specify the level of granularity of what I can define as virtue. For instance, there is a difference in abstraction between "I am someone who is productive" vs "I am someone who has the courage to choose to strive for good" or "I am someone who is aware that not matter how much I know, it will always be insignificant compared to how much I don't know". I have no idea whether this is up to the person or whether there is a way to narrow down this freedom space in defining what one's virtues are and try to force people to narrow them down to something that is precise enough to be helpful to them. As an example, most entrepreneurs struggle to articulate their value proposition in a way that is concise enough for them to get focused, and most incubators try to force them to think through it because it is truly helpful to have your goals, virtues, whatever you re working towards, articulated in a precise manner for yourself. On the other hand, I can understand that this might not be the purpose of the app and that the app is more of a companion that holds your virtues and helps you reflect upon them no matter how well defined they are. I just think that it is one of those things that can make the app very successful because the more your virtues are precise the better the chances that you would work in their direction effectively.</p>
<p>Think about what you were doing before you decided to carry out your most recent reflection. Please describe the scenario by including as many details as possible about the following:-The activity/task you were engaged in- The people you were with, if any-The time of day-Your thoughts and emotions- What/who prompted you to decide to start the reflection-Where you went and what you did in order to start the reflection_</p> <p>It was during the evening around 7:30 pm. The same day, I had received what remained of the stuff that I had left in Stockholm where I lived before moving to Enschede. I was engaged in putting things out of my luggage; my books, my notebooks, my clothes, a few pictures...and I stumbled upon drawings that are 10 years old and that I forgot I had kept with me. I first felt nostalgic about a time I used to draw a lot. I felt the joy associated with it, and a huge desire to start drawing again after so many years. I have been feeling that fire within to do it so many times in the past but it has always been hard for me to act upon it for a few reasons. Then it did not take long before I started retrieving all the memories that were associated with the time during which I was drawing so much, which was a pretty traumatic phase of my childhood/teenagehood but also a time during which I was the most creative in my life, when my mind was way more fun and colourful than the outside world. It reminded me of what drawing and painting meant to me. I remembered the time when I was thinking that life would never be boring as long as I had all my mind, when I knew that I could just look within my mind for colours when the surrounding was grey. It reminded me of the kid I was, always excited about everything and would create excitement where there was none. I could recall the feeling I had before every drawing. One thought I had is that I never had the chance to have any art classes, and I never really consciously tried to draw, It was always a burst of emotions that would possess me. It was my way of letting my shadow, with all the repressed emotions, express itself. I remembered what it felt like, I would be going through a powerful emotional state usually due to some unpleasant event, and as a way to cope with it I would just wander in my mind, I would unconsciously create a colourful scene, so intense in colours that it always looks like out of this world. So intense in beauty that I would feel a strong desire to put it out there to have it in my surrounding environment. I would then move to a more conscious state of my surrounding, I would look at my environment and I would feel a strong desire to transform my surrounding in a way to get it as close as possible to the representation of the magical scenery I have in mind. The closer it gets, the more peaceful I feel. When I am in the process of drawing, it is like I am guided by something out of my conscious abilities, I do not calculate my strokes, I let the energy within speak through them. I would go through some sort of energy transformation, taking all the negative emotional energy that I had within and transforming it into a colourful piece that I can visualise. I would strongly feel what I would call a "sweet pain" during this transitional process. It reminded me of how much I miss having that in my life especially when I go through stressful moments.</p>

All these realisations reminded me of something that I had forgotten for so long, that I always had a special relationship with colours and numbers, that doing mathematics always had the same soothing effect than drawing to me. I remembered the times I would take my frustration out on doing so much math just for fun. It was weird to think about it. I thought about the fact that to this day, my mind would always associate specific colours to specific numbers, and associates colours and numbers to genders and personalities, and that patterns would always appear in my drawings depending on what I would need to express. These associations always made numbers fun to deal with. For instance, I would always unconsciously visualise number 4 in a bright yellow colour and it would always be a female with specific personality characteristics; arrogant, drawn by superficial things in life, not so knowledgeable, lacking self-awareness etc... The interaction of the personalities of the numbers associated with them always triggers a unique feeling within me associated with that situation. For instance, in my mind number 4 is a bright yellow with not so likeable characteristics, while number 7 is a specific shade of deep dark blue with very elegant characteristics. When number 4 and number 7 would interact, therefore bright yellow and a specific shade of deep dark blue would interact, it would trigger the same awkward feeling of when such personalities interact in real life. I realised that when I draw, I would always choose the palette of colours that I know if they would interact on my piece of drawing, the feeling associated with their interaction would be representative of the feeling and emotions I want to put out there. The choice of colours just seems right and I don't really think about it. This also made it easier for me to memorise numbers fast. For instance, I remember my hotel room number from summer 2018 to be 33 because 33 is a dirty green that looks like the colour that would represent vomit in cartoons, which triggers a feeling of disgust within me, it is also a lazy number and pretty fat in shape. I had never reflected on all these things and it explains so much about why I always found joy in intense colours and numbers.

After reconnecting a little with my past while having music on, I decided to start the reflection as a way to explore it more, and go through what I defined to be my virtues to see how they are linked to each other or whether I could see a pattern related to what I just felt. I sat down on the couch in the same room, in a corner that is chill and quiet, I took a deep breath, I focused on the music I was listening to in order to put myself in the right state of mind, a focused state of mind but also a state of connection with my deepest emotions, a state of acceptance of my emotions. And then I started the reflection process by launching the app.

**Think_about_your_most_recent_reflection.Please_describe_what_happened_by_including_as_many_details_as_possible_about_the_fol
lowing:-What_happened_from_beginning_to_end-Your_thoughts_and_emotions_throughout_the_process-
What_happened_in_your_surroundings,_if_any_**

I started the reflection process, which walked me through each virtue to rate how I did on each one of them. I realised two things during the process: 1. It seemed that I was not paying attention to virtues that were closely related to awareness of my emotions, or maybe that I did not want to pay attention to them. 2. Most of the virtues I defined, not to say all of them, were closely connected with a lot of negative experiences of my life. It might seem obvious if we consider that we are partly shaped by our life experiences. It was interesting to have those virtues written down and displayed to me. Looking at them made it easier for me to connect reflect upon how they are linked together and to myself. It made me more self-aware and more aware of the reasons why I was driven by certain things and why I was aiming for certain goals, which goals/virtues I am neglecting, which in my case seem to be the ones that are linked to my deepest emotions, maybe the repressed ones, maybe because it is scary to open that Pandora box. It made me question whether that was the reason I feel a strong resistance whenever I feel the fire to draw something and it stops me from acting upon it. Maybe I unconsciously decided to close the Pandora box and bury it since I see that I am not really working on those virtues. I felt that I deeply miss giving space to my emotions through such activities, like drawing and math in the past. I realised that it is not enough for me to accept my emotions, but that I also had to show myself symbolically that I accept them, through guiding and transforming that energy into something productive that brings peace within me, to resolve them in some sense and make peace with my emotions through actual activities in the external world. It might explain why I feel agitated and a lot of distress whenever I feel emotional.

I thought during the process that it would have been nice to be able to link some virtues to a specific flower on the device, so that I can visually perceive over time whether some flowers are blooming more than others, therefore which virtues I am neglecting and which ones I am continuously focusing on.

How_do_you_feel_about_your_experience_using Bloom-e_so_far?

4 (smiley)

I like the idea of it a lot. It is a well done prototype and I think it has a lot of potential to be more impactful.

Participant 3 (Mia) – Responses to the mid-way questionnaire

PARTICIPANT 3 (MIA)
I found the initial set-up process in the app easy to follow
6 (completely agree)
Why did you/did you not find the initial set-up in the app easy to follow?
It was straightforward and the language was clear. Ofc the reflection exercises for the virtues took some time because of their nature, but the set-up itself was easy and fast!
I found the initial set-up process in the app helpful
6 (completely agree)
Why did you/did you not find the initial set-up in the app helpful?
It was helpful because it made me take the time to think about my virtues and the virtues that I like in other people; It made me take the time for reflection.
Think about what you were doing before you decided to carry out your most recent reflection. Please describe the scenario by including as many details as possible about the following:-The activity/task you were engaged in- The people you were with, if any-The time of day-Your thoughts and emotions- What/who prompted you to decide to start the reflection-Where you went and what you did in order to start the reflection
Before my most current reflection, I was out with a friend and the moment I got home I felt pretty hungry. I quickly prepared a meal with some of my leftover food. I did not particularly enjoy the meal, because I did not put too much effort into it as I was too tired and hungry to bother. However, the meal was very filling and it served its purpose, so I quickly began feeling happier. Then the Bloom-e lit up and this prompted me to start my daily reflection. I did the reflection in my room, I started by recalling my day and trying to make connections between my virtues and my actions & feelings throughout the day. In such a way I evaluated to what extent I did follow each of the virtues.
Think about your most recent reflection. Please describe what happened by including as many details as possible about the following:-What happened from beginning to end-Your thoughts and emotions throughout the process- What happened in your surroundings, if any
not. I repeated the process for all the virtues. I got a nice feeling whenever I could see that I followed my virtues. I kind of felt pleased with myself. Whenever I could find examples of my day when I was not following the virtue (or doing the opposite of it) I would try to reflect on my actions and feelings. I cannot say I was angry or disappointed in myself. I tried to accept that I need to pay more attention to certain situations. What changed in my surroundings was Bloom-e - for the virtues I practised the flowers opened up a bit; while for the others they closed slightly.
How do you feel about your experience using Bloom-e so far?
5 (large smiley)
I like that it reminds me to take some time to reflect on my feelings and my reactions throughout the day

Appendix O. Post-experiment questionnaire: responses

Participant 1 (Dan) – Responses to the post-experiment questionnaire

PARTICIPANT 1 (DAN)
Q1. Did your experience with Bloom-e match or not match your expectations? Why/why not?
I expected to learn something about stoicism and I definitely did. Even though I have read books before about stoicism and read the meditations from Marcus, reading is very different from actually trying to implement it into your life. Your artifact has helped me practice some of my virtues, and discover through reflecting about my virtues what other virtues I want to follow and that I currently feel like I need to practice. The whole package, meaning the artifact and the accompanying app, exceeded my expectation.
Q2. Do you feel you gained anything from using Bloom-e? Please explain why/why not.
Yes I did, I feel that I was successful in practicing some of my defined virtues, which the tutorial helped a lot with to make concrete what you mean by virtue (as it is easy to have a different view of what virtue is because the word is one that could be perceived differently). It also helped me discover what other virtues I should pursue to alleviate some of the troubles that I was experiencing prior and during the experiment as well. I had a moment during the experiment when I, was in a moment of doubt and feeling of inferiority, I could kind of hold myself onto the virtue that I defined for myself and gain confidence that at least, I did some of the actions that was in line with the virtue, and that consequently gave me some sort of a confidence boost.
Q3[SQ001]. Which words would you use to describe the Bluetooth artefact, its appearance and the way it behaves?
beautiful
futuristic
extension
realistic
fascinating
awe
reactive
trail
progress
reminder
reflection
self
potential
n/a
n/a
Q4[SQ001]. Which words would you use to describe the smartphone app, its user interface and functionality?
useful
guide
structure
habit
extension
beautiful
helpful
soothing
calm
reflective
companion
methodology
tips
n/a
n/a
Q5. Do you have any other comments you would like to share?
I thank you for having me as participant. I have gained something regarding stoic philosophy in a practical sense.

Participant 2 (Jen) – Responses to the post-experiment questionnaire

PARTICIPANT 2 (JEN)
<p>Q1. Did your experience with Bloom-e match or not match your expectations? Why/why not?</p> <p>I did not have predefined expectations, I was just open to the experience and I really liked it, so I would say yes.</p>
<p>Q2. Do you feel you gained anything from using Bloom-e? Please explain why/why not.</p> <p>Yes I do feel that I gained something from using Bloom-e. Having my virtues written down and expressed in the external world helped me be more focused on the reflection process, and see patterns and connections between the virtues I have chosen that I would not have seen so easily if kept in my mind. I liked the fact that it forced me to think through articulating my virtues, and thinking through the type of person I want to be. I usually do that once to twice a year, but the difference is that Bloom-e made me confront myself everyday to evaluate and reflect upon my process to live by the virtues I defined. I liked the fact that I had the option to modify and refine my virtues along the way. I think it is very important because over time my views and my understanding of myself and the world evolve, so do my virtues. If I compare Bloom-e with my meditation routine, I would say that it is more guided, focused, visual and generally a pleasant reflection companion to have. I really like the physical element to it and the way it glows, overall very soothing and makes the experience so much better.</p>
<p>Q3[SQ001]. Which words would you use to describe the Bluetooth artefact, its appearance and the way it behaves?</p> <p>Soothing Futuristic Calming enigmatic magical colorful sentient delicate mystical spiritual telepathic crystalline symbolic potent sophisticated</p>
<p>Q4[SQ001]. Which words would you use to describe the smartphone app, its user interface and functionality?</p> <p>Soothing Calming Minimal Simple Clear Easy to use Informative Friendly Flexible Engaging Responsive aesthetic Helpful Well-structured n/a</p>
<p>Q5. Do you have any other comments you would like to share?</p> <p>I would really like to get updated about the progress in developing the artefact and app. Would be glad to test it further in the future. Super cool artefact!</p>

Participant 3 (Mia) – Responses to the post-experiment questionnaire

PARTICIPANT 3 (MIA)
Q1. Did your experience with Bloom-e match or not match your expectations? Why/why not?
I think it pretty much matched my expectations as I indeed expected that Bloom-e will light up to remind me to take time to reflect of my values!
Q2. Do you feel you gained anything from using Bloom-e? Please explain why/why not.
Yes! I was reminded to take some time to reflect on my day, which I usually do not do.
Q3[SQ001]. Which words would you use to describe the Bluetooth artefact, its appearance and the way it behaves?
beautiful
calming
balanced
aesthetic
blooming
harmonic
gentle
relaxing
synthetic, but
natural
mindful
coherent
n\a
n\a
n\a
Q4[SQ001]. Which words would you use to describe the smartphone app, its user interface and functionality?
aesthetic
beautiful
intuitive
calming
balanced
fitting
coherent
useful
helpful
functional
informative
interesting
surprising
n\a
n\a
Q5. Do you have any other comments you would like to share?
Bloom-e installation and Bloom-e app are matching very well together. You can definitely say that the app is made for the installation (but also could be used on its own). However, Bloom-e installation adds tangibility to the experience!

Appendix P. Interview transcripts

Participant 1 (Dan) – Interview transcript

Tue, 6/8 12:26PM • 1:17:56

SPEAKERS

Researcher, Participant 1 (Dan)

Researcher 00:01

Okay, it's recording.

Participant 1 (Dan) 00:03

Okay. Am I your first test subject, by the way?

Researcher 00:07

Yeah, you are.

Participant 1 (Dan) 00:08

Okay, cool.

Researcher 00:09

So it's very exciting.

Participant 1 (Dan) 00:11

Can imagine, yeah.

Researcher 00:13

Alright, so my first question is a bit of an open one. How do you feel in general about the past week?

Participant 1 (Dan) 00:21

I feel good. Yeah, it's, do you want me to explain? Like start of the, until now how I feel or just in general?

Researcher 00:33

Just in general, what is your impression? So you were saying it felt good. So it was...

Participant 1 (Dan) 00:40

It felt good. It had its emotional swings, I suppose. Because of the act of reflecting. But overall, I came out of it with some - like I had some practice in Stoic philosophy.

Researcher 01:04

What did you initially hope to get out of participating? You mentioned a little bit in the survey.

Participant 1 (Dan) 01:17

Initially, I was just curious about how you can learn something like Stoic philosophy, or implementing Stoic philosophy through technology, or through that computer technology basically, could be anything. And you made this plant flower-like thing that kind of reacts to what you are doing. And I was curious, what kind of effect it would have on me. Yeah, I was just curious about how that would work. And at the same time, I was trying to, you know, I was also observing myself, how I was feeling. But I'm not sure if that intervened with, you know I was just, you're naturally curious about it, because we're all doing the same study, I suppose.

Researcher 02:09

I suppose so. Do you feel you gained something? Maybe you wrote about it in the survey already?

Participant 1 (Dan) 02:19

I felt that the whole process held - it structured for me in the first sense to define what are the virtues you want to work with for this experiment, which was really handy. And then, while going through the process, I would add more virtues or change focus, like focuses on different virtues. And day by day, kind of see how was the previous day and how I'm going to do it now. But I would... actually, sorry, I kind of forgot your question.

Researcher 03:01

Oh, no problem, it was about what you gained from the experiment.

Participant 1 (Dan) 03:05

I gained some knowledge about me, what I would need. I reflected and I speculated what kind of virtue would help me currently in some emotionally distressed situations. And it actually helped. And it was really cool to observe that, how it helped, so to say, and what different behaviours - what kind of behaviours that triggered - like me reading certain books, for example, or me, it changed some of my behavioural decisions, in that sense.

Researcher 03:25

Did you actually encounter any frustrations or pain points along the way? On the flip side?

Participant 1 (Dan) 04:10

On the artefact?

Researcher 04:11

Regarding the artefact, yeah.

Participant 1 (Dan) 04:15

Just, you know, some minor UI things is that I thought that for the morning and the weekly session that there was a button to start. It wasn't, but I clicked on it. It's like nothing happened. When I clicked on the little bell, it actually gave me a description. "Okay, there is a description" but I did not know - it was quite hidden for me. Like the time I wanted to set the timer for reminding me, for it to glow. Like in the morning or something or in the evening, but it didn't glow. So, why not? But it didn't. And I guess it's more about - it's more me that I didn't exactly do it at the same time every day. I did it in the evenings, but I had, for example, yesterday is a good example. I was already in bed, super tired. And I was like "Oh no, shit. I got to do it." And I went out and did it. But it's more of a me thing, I guess.

Researcher 05:24

How was that doing that straight out of bed? I mean, was that different then somehow? That you had to quickly go?

Participant 1 (Dan) 05:34

It was not different. When I sat down at my initial spot, it was like any other time. The other thing is me, myself. I had to determine how much I did, how much I lived up to a certain virtue, like on the focus virtues. And I don't know if it's me, or if I'm biased, but I have a little bit of a harsh view of myself sometimes. But actually, sometimes I was like "Yeah, I definitely did this" but most of the times I was like "Ah, I'm not sure, like sorta". I did not know myself if I did that correctly.

Researcher 06:38

I suppose it's difficult as well, because it's a very personal question. So you're talking about the morning and the weekly reflections and that you couldn't start them? Were you interested in actually performing those? And did you have or did you think of something that you would have expected to be doing during those sessions?

Participant 1 (Dan) 07:06

Regarding the morning, I definitely - because it gave me that prompt to think about your day ahead in the morning - in terms of, either in terms of the things I had to do, but also the virtues that I had in focus. And maybe a way to, I don't know, I don't really know what I expected. It would maybe be helpful that it would have structured it a little bit for me. Like the evening process, like how was your day in terms of your virtues, like the way it was designed, gave me the structure of how to go through it. And I thought it was really helpful.

Researcher 07:54

And what about the weekly reflection?

Participant 1 (Dan) 07:58

I don't think I actually did that, to be honest.

Researcher 08:03

Would you... because it is actually not possible to do it in the app currently. But is there something you would imagine doing there?

Participant 1 (Dan) 08:14

It would be interesting to see how it can be structured that takes into account the whole week instead of day by day. To help you zoom out into a different level of granularity to see the week instead of the day. I could maybe come with different insights because of that.

Researcher 08:40

Okay, and what about that level of granularity, what part of that would help you? Why would it exactly be appealing to you?

Participant 1 (Dan) 08:53

Because it would help me in my reflective process; about my virtues, how I've been living up to them, in a sense that is not on a day by day basis but looking at the whole week. I imagine it could maybe show me like "Ah, you did this, this particular virtue, you did really well, or you progressed throughout the week in this particular virtue" and from my self-judgement. I could maybe

see that, and then I'd be like "Ah, why was that?" or "How did I do that?" Or "Why was this important?" And it could maybe show me things that were more important. Yeah, I imagine it could just trigger a lot of different kinds of insights.

Researcher 09:51

And those insights, do you think that they were currently... those kinds of insights were not really possible in the day to day sessions?

Participant 1 (Dan) 09:59

I think I did it throughout the whole experiment. I mean, I looked at it, you know, as a whole as well. And yeah, things like in the beginning, I had I think five virtues, and then I was not sure if I had the right virtues. And then the next day I added a bunch more. And then I was like "That's seven on focus, a little bit much. Am I just maybe focusing too wide instead of focusing more specifically on certain things?" and then I scaled it down again in that sense. But that whole act, now that I think of it, actually helped me to say "Okay, what do I actually want to focus on and what do I need?" And it's actually one topic where I was like "Okay, this is the one that I want to focus on." Even though I had multiple ones on focus, it would be things that I already, beforehand, was holding. But this one popped up that was more - I felt that I needed it right now. Focusing on that felt good.

Researcher 11:18

So you did talk a little bit about that moment where you were somewhat maybe stressed? And then you thought about your virtues and how to act through them at some point. Do you think either the app or the artefact played a role in that process? Or was it more of your own thought process that you had at that point?

Participant 1 (Dan) 11:54

It occurred to me - that stressful moment - was not during the reflection. But I would definitely say that doing it, the whole thing, the process of it and the way it's structured, and helping me define it, reminding you to think about it, that it gave me a little bit of a push to do that every day. That in the moment, during the day of stress or a stressful situation, especially on the emotional side which had different moments where I would go back to the virtues and be like "Ah, you know, I did these things" or also instances where it didn't help. And where I freaked out basically. But those are different actual instances. I don't know if you want me to go into the specifics?

Researcher 13:01

No, you don't have to go into the specifics. I'm curious, though, if you can recall, was the artefact nearby during that moment? Or was it just you were in a different spot?

Participant 1 (Dan) 13:13

I was in a different spot. I guess the position for the artefact is quite in the corner. And it's not in my face, and maybe that had to do with it? So it's not visually too visible for me.

Researcher 13:41

Okay, I would like to actually talk about the reflections themselves. So you already talked about you liked the process that the app was getting you through. Do you think that the app itself and the interface of the app influenced your attitude towards the reflection or had a role in it, somehow.

Participant 1 (Dan) 14:07

The interface and how it played a role in how I reflected?

Researcher 14:11

Yeah

Participant 1 (Dan) 14:13

I really liked the, like before it starts the reflection you have like this little quote. I really liked those. Like, I saw Seneca and I think Marcus, as well, a few times. But I do recall, I was sitting there like, okay, let's get into it. And then reading that gets me into it, like, It calms me down. I read it and like "oh" and then it's like, slowly fades in and slowly fades out. So I thought that was really, I don't know, that did something.

Researcher 14:51

And the content of the quotes, did that somehow contribute to the reflection itself, or was it just in that moment, when you were reading it?

Participant 1 (Dan) 15:01

I think that the change in like the mental state, reading that and then following up into the process of reflecting, that it actually, yeah, it does have influence on what comes next. But I would not know specifically what.

Researcher 15:21

What if the quote was not there? How would you have felt? Could you imagine that?

Participant 1 (Dan) 15:30

I could only imagine the absence of that calming effect, but I would not know. Because there was always a quote.

Researcher 15:43

Okay, and moving to the physical artefact itself, do you think that contributed to the reflections somehow, so the fact that it's there, it's present in front of you?

Participant 1 (Dan) 15:55

Um, I'm not sure about that. Because most of the activity, what is happening is actually during the day, for me, like the whole, like, you have like these moments where you interact with it, but most of it was outside the interaction of it. What I did notice was that when, you know, it's like giving water to it. That's how I felt. And it would like, "Okay, these things you sort of did" and then I would read them, like, "Ah, I sort of did these" and then this thing glows, and then you see things bloom. During the, I think the last three sessions, it kind of, I'm not sure whether it kind of felt like it, or did I imagine that it was an extension of me. Like, I would look at it, like, "Okay, this is me, and I can see something bloom out of my act that day". But how it has, if it did anything with the reflection? I don't know. But I would imagine it being a part of me and I would see it bloom, and then at the same time, it would, it would stay at that bloom state, and then everyday would bloom more. And also, like some things just like, I noticed, like some things like you sorted did these, and then it would bloom a little but like the ones that I like definitely did these, they would bloom more. It definitely felt like more like it was in line with, you know, I mean, I judged it that I actually did, I did a good job on certain things. And it showed me that it had more growth. And it left me a trail of my progress. So I thought that was cool.

Researcher 17:56

Okay. And by trail, what do you mean, exactly?

Participant 1 (Dan) 18:00

By trail, I mean, that the mere position of the flowers gives me an indication of the progress I had previously. Yeah. I don't know that's clear. Like it just shows me what I haven't done, I suppose. And that it's blooming, you know?

Researcher 18:29

I'm curious when you were because you mentioned that you did change your focus virtues at some point. So you went higher, then you went lower. When you did that, did you do that with the artefact or were you just somewhere in the house?

Participant 1 (Dan) 18:43

I think in the beginning, I just did it. Like I was sitting here, like the first time and then I think I heard something and I was like, "Oh, wait a second I heard something". And then every time I did it after that I would be close to it because it would react on the changes. I was like, "Oh, it changes as well if I change this focus or if I, yeah, so I did it near it.

Researcher 19:11

And did you want to be close to it then, when you changed your focus virtues? What part of that was appealing to you? Was there a part of that that was appealing to you? So why you wanted to be close to it when you did that?

Participant 1 (Dan) 19:27

The mere fact that it reacted to what I did on the app was a prompt for me to be like, "Oh, I should be close to it" when I change certain things. I want to have it stay as a thing that is an extension of me.

Researcher 19:56

So speaking of being close to you, you did mention I think in the halfway questionnaire that when you decided to reflect, you would just decide to do it. And then you went to the artefact and you got ready and you reflected. What do you think of the fact that it wanted to glow to remind you?

Participant 1 (Dan) 20:17

So it did not glow to remind me. I don't know why. But I remember the first day it did. It was just like, I don't know, at some point it was green. "Oh what is this, it glows?" But then the first day, like after you came, I was confused whether I should do it or not, because I didn't reflect on it that day. I was a little bit confused by that. But I would have liked it to remind me. It would have been easier for me to be like, "Oh, you know, let's do it now"

Researcher 21:03

And the glow during the reflection itself. Was it glowing?

Participant 1 (Dan) 21:09

Yeah, yeah it was. It was glowing and it had like this sound. And the flowers would bloom.

Researcher 21:16

I was just checking. I was just thinking like, was it? Was it not glowing at all? It got me worried there. Okay, cool.

Participant 1 (Dan) 21:25

It did glow when it shows you "Okay, these things you kind of did" or like whatever category it was, and then it paused for a moment that I could read it? And then it started glowing, started doing things.

Researcher 21:48

And do you think that the location you had it in? So you mentioned that you would like it to remind you by glowing? Do you think the location would have an influence on that, on that whole process?

Participant 1 (Dan) 22:01

Yeah, I think so. Because now it's a little bit behind. Like, it's behind like this wooden bulk, or like a, like a thing. I can see flowers, but I cannot see the pot. And I mean, if it would glow, I could see it from here as well. I think in hindsight, I would have liked it to be more of a centerpiece somewhere. So next time I would have, I would have if I did it again, I would have put it on the middle table here. And then I would sit on the couch. And now I sit on the beanbag close to it. Being itself being a centerpiece like that, I would look at it and be like "Oh, it's, you know, it's this whole thing that I'm doing."

Researcher 22:51

Would you have changed the location then if it weren't fragile? So if you could pick anywhere in hindsight, would you have changed the location?

Participant 1 (Dan) 23:02

Yeah, I think so. Yeah. And I think it is still a safe spot in this table. But my initial thought of putting it there is I thought it would be nice to be isolated. Like, completely isolated, like visually. Even though (my partner) might be sitting at her desk. Now I'm not isolated, but at least I can see that I'm isolated.

Researcher 23:17

Okay, at what point did you feel that you thought "Okay, it would be nice, it's nice isolated, but it would be nice to move it actually. Was that a specific part in the week or towards the end or beginning?"

Participant 1 (Dan) 23:41

Um, I'm not sure. Ah, that's it. Yeah, I was sitting here. And I mean, I'm going to the chiropractor now. He's like cracking my bones and shit. And it has some effect on my body and sometimes it hurt a little bit to sit on the bean bag. And then I was like, "Maybe I should have you know, chosen for a spot at the couch", you know, then I could have a good posture. The posture that the chiropractor said I should have that I cannot have on the bean bag. But also it visually being there, because I think it's a beautiful object, that I would have liked it to be more centred.

Researcher 24:38

And what would centre be then in that sense? How would you imagine that? Where exactly in the house?

Participant 1 (Dan) 24:47

Here in the middle of this room. There's a couch over there. There's a little table there. I would have put it on this table. I mean, we don't really use this corner but when we are here we sit at the desks. But it would be nice, because it's also, you know, right in front of the couch. If we look like here, or if I would look this way, I could see it right away. So in that sense I'm centred, it's more visible, kind of like, it's not near the edge of the room, but it's actually quite in the middle of the room.

Researcher 25:25

Okay. And any particular reason in this room specifically?

Participant 1 (Dan) 25:31

Well, because at that, in that room, like in the main room, all the spots, where there's like a flat surface where we can put it, it's close to a window. And sometimes sporadically it will start raining. Or it would have been a problem, for example, during these hot days, it would be hot, but then like, randomly it would start raining.

Researcher 26:00

Let's say it was waterproof. Would that have changed your decision, then?

Participant 1 (Dan) 26:06

I think the setup for us in that space is that we use almost all flat surfaces. So it would actually be in the way, There's the kitchen counter, but it's always full. Then there's the extra kitchen counter, but that's also kind of always full. And then we have a eating table where we eat. That's all the surfaces.

Researcher 26:33

Okay, then maybe one last question regarding the location. If, if it was waterproof, and you and there was a surface free, or you could make a surface free, that would not interfere with the other things in the other space. Would you have considered, do you think, putting it there? Or would it still be in this room?

Participant 1 (Dan) 27:02

I think it would still have been this room because of the fact that when we are here we are a little bit more focused. This is like for us two, this is like our office. Let's say, and we use it as that. I spent, after you know, my partner registered her business. Then we were like, okay, this is the location of the business. That's how we kind of saw it. We actually did the idea of maybe like, a little nameplate as well.

Researcher 27:41

At the entrance, or?

Participant 1 (Dan) 27:43

Yeah, at this door's entrance yeah. But I think now like (the coffee table) would be a perfect spot, because it's so centred, and we don't use this space much. And there's no risk of it being like hit or something. We don't really use, I don't know, it feels like a good thing that it's reflection, but it's also a centre of a space like it's symbolic to me.

Researcher 28:15

All right, so you were talking about seeing the artefact bloom in response to your reflection. The way that it was blooming. So seeing it bloom, did that contribute to your experience, somehow?

Participant 1 (Dan) 28:34

I think as I said before that how I perceive it was that it was an extension of me. So it was like, it felt like it was growth that I was having. But external, I can see it in front of me. Because it was reacting to my judgement of my day, judgement of the virtues that I was doing. So yeah, I think in that sense, it did influence it. But I think it influenced it less than the actual act of reflection. The actual act of judging myself on the app had more of an effect than it reacting to my judgement prior.

Researcher 29:28

Okay. Let's say the artefact wasn't there actually. So let's say it was just the app. Do you think you would have gone through the experience differently?

Participant 1 (Dan) 29:43

Let's see how that plays out. And first, I would not sit in that corner. And I would not have something that is like an extension of, something that is quite in the centre of me. But what I would do with how that would change the process, I am actually not so sure. I would have no trail to look at the thing and be like "Ah, it is more bloomed than when I started". And those thoughts would not come in my mind, neither would the thoughts come in the perceiving of it being a part of me would not be there. So the absence of that, I would not per se know what it would change, but would then not be there. I can only speculate that, you know, the absence of those things could maybe change the way I was reflecting. But maybe something unconscious, but that's very speculative. And I'm not sure.

Researcher 31:05

And when you say, because you mentioned that the act of reflecting was more significant than the fact that the flowers were blooming. So here if the flowers or if the artefact wasn't present, do you think that the act of reflecting would have the same weight to it or value to it?

Participant 1 (Dan) 31:23

I think so. Yeah. I think I mean, I, at least how I judge myself is that, I can be quite harsh on myself, but also that I am very keen on growing. You know, I would like to do something that is bigger than me while I am here. And sometimes, that gets a little out of hand, I would judge myself too harsh, or I would paralyse because of problems coming. And this showed me a little bit that when that happened, and like because of an event that, you know, kind of sometimes it would grip me like "Ah you can react in this way, instead". Yeah, I'm not sure if I'm answering your questions.

Researcher 32:45

Oh, no, no, thank you for sharing that. And it's really, yeah, it's insightful. Okay. I wanted to talk a little bit about the more passive role that Bloome had. So when you're not reflecting. You mentioned that it's in the corner of the room, so that you think it's not that visible to you. Would you have liked to change that during this week? Or if you imagined continuing to use it?

Participant 1 (Dan) 33:25

I am not sure if I understand what I would change?

Researcher 33:28

The visibility, sorry.

Participant 1 (Dan) 33:33

I think I would have changed it into the middle. Just also the fact that it's you know, a nice looking thing.

Researcher 33:43

And you also mentioned that you would then see it in the centre of the room that it would be kind of symbolic to you. Would you then have liked to be able to have seen it more often than in that sense? During the week?

Participant 1 (Dan) 34:02

I think the more it reminds me of the process the better for me. Like I would look at it and then it would you know, it would trigger a line of thought like immediately. And I believe that the virtues that I wrote down and trying to live up to them the best I could was a good thing. So, it would remind me of something that is good for me or would have been good.

Researcher 34:55

Right. So, even though it was here in the corner of your room, did you interact with the physical artefact in any way outside of your reflections? Whether you were looking at it or thinking about something, when you looked at it? Or was it more in those moments of reflection?

Participant 1 (Dan) 35:14

Yeah, I would not pay much attention to it, outside of the reflection.

Researcher 35:27

Okay, and the app itself, did you use that outside of your reflection activities? So you mentioned editing your focus virtues?

Participant 1 (Dan) 35:35

Um, yeah, I would, yeah. I would look at it and yeah, change the focuses, but also add some in a few instances, and I would look at them the virtues that I wrote down, which one I want to focus on, which one are a little bit of double or the same? Yeah, that's how I would try to interact with the app.

Researcher 36:07

Did you find yourself using the app with no particular purpose in mind? So with not the aim to change your focus, or was it always mainly to edit that?

Participant 1 (Dan) 36:18

I would also look to see what is there. And, you know, I saw like, I tried to put on the light or the reminder, for me at a certain time, I saw that there was a little UI for it, but the switch did not work. Yeah, no, it was mostly to read it - what I wrote down - and then edit it, and then change focus.

Researcher 37:01

Okay, um, so about Stoicism. What did you think about Stoicism itself? And do you think that your understanding of Stoicism changed during this period?

Participant 1 (Dan) 37:17

Yes, it did change. I did read, like two books about it. But it didn't somehow stick, I guess. And now I'm like, okay, it has to do with reason, that I'm sure. And it has to do with reason opposed to emotional reactions. And how you could react with reason instead of dominated by emotions. So yeah, it felt like the difference between this and reading the books is that I would read the books and I'll be like "Oh, that's cool" but now I'm like, I have repeatedly had to practice it. That's not something I could have set up for myself while reading it, because they did say so but I didn't. This experiment did it for me, in that sense. I feel like I have memories now of practising it actively. In that sense, like it's more of, I learned something that is applied.

Researcher 38:49

And did you think that your knowledge of Stoicism prior to this experiment, complemented the experience? Or do you see them as two kind of isolated things?

Participant 1 (Dan) 39:02

You asked if whether my prior knowledge about Stoicism did anything with this session?

Researcher 39:08

Yeah.

Participant 1 (Dan) 39:10

I don't think so. I don't think much. It's been some time since I read those books. And I've read a lot of different books in the meantime, this was definitely not something that was in the forefront of my thoughts. So it would be the same concept a little bit, but it would, yeah you know, from a different school of thought.

Researcher 39:40

How did it compare? How did your experience with stoicism during this week differ or was similar to what you were reading about in the books?

Participant 1 (Dan) 39:48

It would kind of have the same effect as reading that little quote before reflecting. But the books that I read, you know, they were not the Meditations from Marcus. It was from Ryan Holiday. 'He Was The Enemy' and another one. I'm sorry, what was your question again?

Researcher 40:18

Was it similar or different to what you were reading about in those books?

Participant 1 (Dan) 40:27

You mean the act of reading and the act of doing this reflection? Or?

Researcher 40:31

Yeah, I suppose more the experiencing of Stoicism. So the learning about it, but also the applying it?

Participant 1 (Dan) 40:38

I think I now I have something that I have done in practice that is more tested. And that it's not something that you only can learn by applying. It's the difference between theoretical knowledge and applied knowledge. That's what I feel is the big difference between these two acts of my thinking about Stoicism.

Researcher 41:12

Let's say the experiment didn't take place? Do you think you would have applied Stoicism? Like, at some point? And if so, in the same way? Or do you think this experience changed the way you would have applied it or are applying it?

Participant 1 (Dan) 41:29

I think now after doing it, I would apply it in a similar manner. But if I did not do this, I think the reason or maybe like I speculate on the reason why I didn't apply it while reading the book is that I am quite an abstract person. At least that's how I judge me that I think a lot of times in the abstract, and it makes it consequently, less applicable. Yeah, it's something I'm working on. I have noticed as well. And it's, you know, I would like it to be more applied than just me being in this, you know, cloud of my thoughts.

Researcher 42:31

Yeah, okay. Regarding the artefact and now about the appearance more: how do you feel about the fact that your virtues were represented in the flowers themselves? And how did the appearance of the flowers influence the way you thought about your virtues? So just the fact that they're there in the flowers?

Participant 1 (Dan) 43:00

I think what you just said, that it reflected my virtues, did you say that? It didn't reflect my virtues. I wouldn't say that's how I viewed it. I viewed it as me growing, or progress towards some growth of the self. You would just show me that it blooms but it would not show me... Yeah, I don't know. It shows growth. But it doesn't say per se growth in what. But that could also be maybe because I had different focuses quite some went like this instead of this. I'm like now I know which ones were very important.

Researcher 43:53

Did you end up using the twitch function? So if you long press on a virtue Bloome would Twitch.

Participant 1 (Dan) 44:04

Oh, really?

Researcher 44:07

You can try that now if you want.

Participant 1 (Dan) 44:13

Like I just press it?

Researcher 44:14

Yeah, if you just long press on one that's currently in focus.

Participant 1 (Dan) 44:18

Wait... oh they all correspond to a different flower! Or does it? I'm not sure. I think I would have, if I knew that was possible. Because I didn't discover that, that perhaps the individual flower represents a certain virtue, that would have been cool.

Researcher 45:13

Yeah, I actually had it as a little bit of like, uhm. I was contemplating keeping it kind of a secret to discover are just kind of letting you know about it because actually if you go to the Preferences section, and then you go to Connection to Bloome, I think it's called .

Participant 1 (Dan) 45:31

Bloome Status?

Researcher 45:32

Bloome Status, yeah. And then at the bottom, you'll see like a little text. But I was wondering if you would ever open that screen.

Participant 1 (Dan) 45:41

I never opened that screen. Cool. Yeah, I would have liked to try that.

Researcher 45:55

Would you then, knowing that this function is there, would you then see yourself using it throughout the week? Or more just in one go? And then you think "Okay, I know what it does".

Participant 1 (Dan) 46:08

I think it would just be one go. But it would have maybe changed the way I looked at the flowers. Then maybe represent, but then again, I don't know. Did it actually also bloom accordingly?

Researcher 46:30

Yeah.

Participant 1 (Dan) 46:31

That's really cool. Yeah, I did not notice. I thought that was just random. I had no concept of the individual flower correspond to a certain virtue. I think that would be hard to memorise, as well.

Researcher 46:55

Yeah. You also changed your focus virtues a couple of times as well?

Participant 1 (Dan) 47:00

Yeah.

Researcher 47:02

Then do you think that with this twitch function it would have been useful there or just not really helping?

Participant 1 (Dan) 47:09

I'm not sure if it would help. I don't think it would help in the reflection. I'm not sure, you know, if I would just go there and sit there and then press on some of them and see it twitch.

Researcher 47:26

Okay, yeah. All right. A couple more questions. Let's see. So regarding the app itself, what do you think of the app?

Participant 1 (Dan) 47:43

Soothing.

Researcher 47:44

Soothing, okay.

Participant 1 (Dan) 47:45

It had a calm vibe, especially the part where the reflection starts, you see like a little quote. And it's like loading, but like, slowly goes in and out. I was like, it signals to me that it's calm.

Researcher 48:04

And could you elaborate on why exactly, it signals that it's calm?

Participant 1 (Dan) 48:08

Because it shows like a slow movement. Like very natural. Like, just kind of fades in. Like your breath, I suppose, maybe. And then this quote would appear. And the quotes are really powerful. I think they're there to like, that single line could just show you a different perspective. And that sudden shift in like, looking at it, I'm like "Oh" and then starting the reflection was, I don't know, did something to me. And then the rest, you know, all the movements were quite, the reflection side was quite smooth, like it would fade, you would fade, all things would fade in and out. And regarding the rest of the UI, I mean, I like that it's green. And that it's like a little bit nature vibe-y for me. Let's see.

Researcher 49:24

And why did you think that the nature kind of vibe was appealing then to you?

Participant 1 (Dan) 49:37

It kinda, I think, points to kind of your true nature. Not sure if I say this because of hindsight, or, like I didn't think about it, per se, explicitly during but there is something about nature in the person? Yeah, I don't know, maybe it's something you know, unconsciously. Not sure how to answer that question.

Researcher 50:15

No problem. Okay. So let's say the, uhm, going back to the loading screen a little bit. Let's say that the loading screen, wasn't there. Would you have missed it then? Or?

Participant 1 (Dan) 50:33

I would not know what I have missed. If you would have given me once, and then it was not there, then I would be like, I don't know, I expected that there will be always a quote. And I would always read the quote.

Researcher 50:47

I see. Did you ever get bored of the quotes?

Participant 1 (Dan) 50:59

No, no, not bored. They were always different, I think. And, I mean, they're like legendary quotes. That's how I looked at them. Seneca was like, at the bottom of the societal hierarchy, while Marcus Aurelius was the Emperor, and that shows that this philosophy was for everyone. I recognise the names. I was like "Ah" at that particular thought I recognised because Seneca was a slave, but he was also an orator of Stoicism. And I thought that was a cool thing. I would see Seneca and was like "Ah it's Seneca", and then I would be like "Ah, it's Marcus Aurelius".

Researcher 51:49

Do you think if you wouldn't have known who those people were? Would you have seen it the same way?

Participant 1 (Dan) 51:57

Probably not. But the message of the quote would still be there. But I would not know that it's, you know, an emperor or a slave. Or, you know, who the hell it was in the first place. "Is it someone alive now? I have no idea."

Researcher 52:19

Right. And about editing your focus virtues? You did it a couple of times. Was that process clear in the app interface itself?

Participant 1 (Dan) 52:30

Yeah. It took me two, I was like, I had to figure out how to add, I mean, adding a virtue was quite easy, like with a button, but then I had to, like, select the category on my own, but then I figured out that I could just select the category and then add the virtue and then the category would already be there. So I would then, since I discovered that, I would just do that. Because beforehand, I already knew what category it probably was. Instead of adding it and then contemplating what category it was.

Researcher 53:12

So you mainly, you would say you mainly added it directly to a category?

Participant 1 (Dan) 53:17

Yeah.

Researcher 53:21

Did you use the the filter option, actually, at any point?

Participant 1 (Dan) 53:25

No.

Researcher 53:29

All right. I was just curious.

Participant 1 (Dan) 53:32

So like, only focus?

Researcher 53:34

Yeah.

Participant 1 (Dan) 53:35

No, no, I would just look at all of them. And then I would just look at the ones in focus. But also look at the ones not in focus. There was one of them that was really long that didn't fit during the reflection.

Researcher 53:50

Oh, really? You could actually scroll I think. Yeah. But during the reflection, that's, I can imagine that's not something that comes to your mind.

Participant 1 (Dan) 54:02

I know. But it was also not any more the one that, like, is in focus now. It's 'Acknowledge that good and evil runs through the human heart, but hopefully decide to trust in the potential for good, even though evil is present'.

Researcher 54:20

Wow, that's a long one. Was that something you just thought of yourself?

Participant 1 (Dan) 54:24

No, no. I mean, I've been trying to figure out what it is. I'm not sure. I just, I think it's been a long time since I started to learn about me. But then it progressed in learning about people and then into psychology first and then certain thinkers that I like and follow especially Jordan Peterson. He dived into what caused the Second World War. And he took a very deep look into what is evil. And then I looked into who he was reading about. And then you know, I, the conclusion is that evil runs through the human heart. And everyone is both. And you can either be trusting people but naive thinking that everyone is good until you encounter someone that is very malevolent, out there to destroy you and you would paralyse. Or you would see that actually evil runs through the human heart, and then you can become cynical, the other flipside. Cynical about the world, cynical about people that can, you

know, put you in a state of malevolence. Not a good virtue, but more of a sin. And then it's an act of courage to then try to decide that you believe that it's the good that will prevail, even though we didn't know, there's evil in every person.

Researcher 56:28

That's really interesting. That's really deep. Well, I'm going to be contemplating that for a while now.

Participant 1 (Dan) 56:36

I'm sorry.

Researcher 56:38

Thank you for sharing that. No, I loved it.

Participant 1 (Dan) 56:41

Yeah, no problem.

Researcher 56:44

So when you're talking about seeing your virtues also that were not in focus. So there's, you know, virtues that are in focus versus not in focus. The fact that you could see everything at once, but then also decide to focus on certain virtues. Do you think that was valuable to you?

Participant 1 (Dan) 57:09

Yeah, actually, every time I would decide which ones to focus on, I would just read all of them. But at some point, like it gravitated to 'gratefulness', then two different ones that were about gratefulness. Yeah, I don't know, I would read and then would just, like make the best judgement, I suppose. Like, which ones were like things that are more actionable, and things that were not that actionable. For example, one of them was like, 'Working to something that is bigger than you', something that I always try to do. But I do not know if I can judge myself, whether I am doing it. I'm hesitant to say that I am doing it because, yeah, I don't know. And then one is like 'Always in search for the truth'. Not in a scientific sense, but willingness to change what you think. Because it would not be truth anymore, but not trying to deceive yourself, or deceive yourself because it hurts your current structure. I did not want, I want the truth to prevail, instead of something that is more of an ego thing.

Researcher 59:02

Kind of, in a sense it's kind of the ignorance is bliss, a little bit.

Participant 1 (Dan) 59:06

Yeah, yeah.

Researcher 59:11

Okay, and when you had your, when you decided to focus on some virtues? Did you still find yourself thinking about or looking at the other virtues that were not in focus?

Participant 1 (Dan) 59:24

No, no. Honestly, from the midpoint, I think somewhere there, it was more like, "Okay, I have these in focus". But actually, what I am actively trying to focus on is 'gratitude'. There'll be still, like a few in focus, like I have five in focus now. But it would be "That one is the critical priority one."

Researcher 59:50

All right. And would you associate that to the current situation you're in? So what you're dealing with right now or is it just a feeling you had?

Participant 1 (Dan) 1:00:01

It is, uh. What I'm dealing with now? Yeah. I think (gratitude) is an overall very good attitude to have. Especially the one that was my number one virtue which is 'Be grateful despite of suffering'.

Researcher 1:00:37

That's quite powerful.

Participant 1 (Dan) 1:00:40

Yeah. And then after that, I was like, okay, and then I read a book here with the title of the last chapter was that and I read it, again, the whole thing, and then trying to really be personal with the words. So re-read it again. I guess you have the 'grateful' virtue, which, you know, did, yeah, it is helpful for my current state of being, I suppose, especially when it comes to like not being, like when you're not grateful or when you're frustrated about certain things that should maybe, you don't have to be frustrated about. Maybe they're just very minor problems. maybe. Yeah, in that sense and then the other virtue, which was 'Do not let emotions be the main' - what is it? - 'I am someone who does not let emotions dominate my decisions'. That was pretty helpful in my current learning journey of trying to trade in cryptocurrency.

Researcher 1:01:54

Oh, wow. I wouldn't have imagined, haha.

Participant 1 (Dan) 1:02:01

So I actively try to use that in trading.

Researcher 1:02:05

Okay, interesting. Cool. All right. So I have some final questions. How do you feel about the way that the app and the artefact work together?

Participant 1 (Dan) 1:02:23

How I feel about it? I think they worked well together. One is the organising factor, the reflecting thing, the factor, and the other reacts to your actions.

Researcher 1:02:24

Yeah. Do you feel that they were two separate things? Or that they were kind of one of the same thing?

Participant 1 (Dan) 1:02:47

I thought they were the same thing.

Researcher 1:02:54

Could you elaborate on why you thought it was more one thing?

Participant 1 (Dan) 1:02:58

Because it's in its hole is a tool for me to reflect on my Stoic virtues. So I would see it as a whole. It's a tool for me to do the process.

Researcher 1:03:20

Yeah. Okay. So I have some concluding questions. Right. If you're willing to share, do you engage in any other types of self reflection?

Participant 1 (Dan) 1:03:29

Sorry?

Researcher 1:03:30

Do you engage in any other like, activities to do with self reflection besides what you've been doing here?

Participant 1 (Dan) 1:03:37

Yeah. Yeah, I do. Yeah. Yeah, I think that's, I do that a lot. And I think I have done it to the point where I was not able to act anymore. Like it was too much reflection. Too much introspection. And I would read a lot of books about people, the psyche and the unconscious. And while reading those views, I would automatically reflect on what it would be, what is it in my specific case, especially the psychology. Psychologists, for example Carl Jung, for example, learning about his theory is very mysterious, almost. Yeah, I would say I'm a person that would reflect a lot.

Researcher 1:04:41

And how did how did Bloome compare then? Your reflecting with Bloome - how did that compare to these other moments?

Participant 1 (Dan) 1:04:47

I think the other moments are more are reflections on a different level of granularity. So it be like, it would focus way more on "What is it in me, in my unconscious, that is trying to tell me something?" That is me, but not within my control. So it's the realm of the unconscious. And this would be more of how did I do today? I have made something explicit. And how did I act on what I have specified? And I would then reflect on "What did that specifying do? What did trying to live up to certain virtues do with my mood in certain situations or my actions? My decisions in certain situations?" Yeah, it's a little different.

Researcher 1:05:51

Do you think that your experience with self reflecting either enhanced or detracted from your experience with Bloome?

Participant 1 (Dan) 1:06:05

I honestly don't know how it is to be a different person? I don't know. I would assume that it has something to do with it. But yeah.

Researcher 1:06:26

Was it, did Bloome feel like new territory, like completely new territory? Or was it, did it feel similar or familiar to you?

Participant 1 (Dan) 1:06:34

I think I have tried to, like, specify my virtues before? Either written down or thinking about it. As part of my other reflections, it would, you know, I want to know where I'm heading, for example. Why do I do the things that I do and where am I going? And that has something to do with also why certain virtues are good for I suppose. In my judgement, and I lost your question again.

Researcher 1:07:21

No, it was just if, yeah, if it felt familiar to you, what you would do in Bloome versus these other moments that you were reflecting.

Participant 1 (Dan) 1:07:32

I think the virtues were familiar, but what was unfamiliar was the practice. And yeah, in the end, I thought it was really nice. That I was able to actually practice.

Researcher 1:07:54

Yeah, thanks. Would you see yourself using Bloome in the longer term?

Participant 1 (Dan) 1:08:08

I think I would have slacked a little more. I think. Like, for example, yesterday, I would not go out of bed.

Researcher 1:08:17

Alright, yeah.

Participant 1 (Dan) 1:08:21

But I think it is something that would be nice to, that I just continue on my own. Make it a habit.

Researcher 1:08:30

Okay, you're referring to Stoicism then like the Stoic practice.

Participant 1 (Dan) 1:08:35

I will refer to, like, taking over exactly the same process. Without the artefact and the app. But I would write it down, and then I would remind myself to do it in the morning and remind myself to reflect in the evening. But if I'm going to do it, I don't know. I think it would be good for me.

Researcher 1:09:00

Okay. And would you see yourself using either the app by itself or the artefact by itself in the longer term?

Participant 1 (Dan) 1:09:10

I think in the longer term, once you are familiar with the process. I don't know if I would use the app.

Researcher 1:09:30

And are you saying that if you imagine using the app for a while or using the app and the artefact for a while?

Participant 1 (Dan) 1:09:39

I think yeah, I think the artefact, like if I would have to purchase it, for example, I would not purchase. I don't think you know, I don't think so. I don't think it would, I don't think it has a defining or like, how do you say, like a critical thing for me to have done the process. Not as much as the process itself.

Researcher 1:10:20

And the app is sufficient for that, do you think? For the process?

Participant 1 (Dan) 1:10:25

I think so. For example, the starting point I thought was really useful, because I did not know where to start. But the tutorial showed me how to start. "Oh, oo, I just, you know, I do this and then starting!" It was handy.

Researcher 1:10:46

How long did that tutorial take actually? I'm curious.

Participant 1 (Dan) 1:10:50

I think like 15, 20 minutes. I don't know how much time passed, actually, when I was writing the - it was cool, though. Like, it gave me these two perspectives What was it?

Researcher 1:11:11

Admired versus desired.

Participant 1 (Dan) 1:11:15

Desired and admired. And it was so different. They were very different and then the app said, like, that what you admire, what would it be if you were that or something in that sense.

Researcher 1:11:27

Yeah.

Participant 1 (Dan) 1:11:28

"Oh, yeah, that would be good!" So I really like that, that it put me in that spot of like, imagine something for personal characteristics that you admire? What if that's you? Like, yeah! What if it is me, you know? And that's again the virtues that I then

chose, or the virtues that eventually came from this process? Then I was more like, if I would be someone I would admire, what kind of person would I be?

Researcher 1:12:16

Yeah, my last question is, would you see yourself practising Stoicism in the longer term?

Participant 1 (Dan) 1:12:31

Um, I would see myself do that. I would hope that I would do it in a similar fashion, like I do now. But I do not know how long it will hold. That's it. Yeah. I also think that there's a lot of knowledge there next to Stoicism that I was already engaged in. And I mean, I also see Stoicism is a little bit embodied in the Judeo Christian kind of line of thought, or that, again, has influenced Western society. And that, again, has influenced you know, other things that I have been reading. So I think, maybe in a sense, I was already doing it.

Researcher 1:13:31

Right. Right. Yeah, I think I'm in the same position. I sometimes wonder that as well. Okay. Yeah, that's, that brings us to the end of the interview. Well, thank you very much for sharing your personal experience, really appreciated it. Some of these quotes, as I mentioned before, in the consent form, they might be used anonymously in the report or publications. If you ever feel uncomfortable with that, just let me know. And since I'm not going to pick up the material, actually, since (your partner) will use it. What you can do now is reset the app, and then she will be able to use it. It's in the Preferences section. And then there's the last option Reset.

Participant 1 (Dan) 1:14:19

Okay, I do have a question regarding if, it's actually a question for (my partner). Could we move the artefact?

Researcher 1:14:27

Yeah, totally!

Participant 1 (Dan) 1:14:30

Because she has even bigger back problems, and she cannot sit there.

Researcher 1:14:33

Yeah, yeah, totally. I also asked (your partner) as well, if she wanted to put it somewhere else. That's also totally fine.

Participant 1 (Dan) 1:14:40

Is there a specific way I should move it because I, like I really don't want to break it.

Researcher 1:14:45

So I was actually thinking because I was curious about the glowing. Could you try one thing for me?

Participant 1 (Dan) 1:14:52

Yeah.

Researcher 1:14:53

Could you set the set the evening reflection schedule. So in the Preferences, could you set it to 12 o'clock? So 12 noon? I'm just curious what it would do.

Participant 1 (Dan) 1:15:12

'Unable to connect.' What? I have to be close to it?

Researcher 1:15:18

I think it might, it takes a couple of seconds.

Participant 1 (Dan) 1:15:21

'Ensure your position is next to Bloome and then try again'

Researcher 1:15:29

Does it still?

Participant 1 (Dan) 1:15:31

Yeah, it just gives me that pop up. Like I should I like, remove it? I've actually not seen any other interface than your app.

Researcher 1:15:34

In that case if you close the app, and then just open it again. Oh really?

Participant 1 (Dan) 1:16:00

'Evening', and then 'Edit'. Ok, then on 12? Oh, it's glowing.

Researcher 1:16:15

Okay, it's glowing. But you were saying that it wasn't glowing throughout the week, right?

Participant 1 (Dan) 1:16:21

Yeah, yeah.

Researcher 1:16:23

Okay, so I was thinking if it's okay with you guys, maybe I would like to upload some code because I think there's an issue with that function. So I would like to try to fix it now. And then when I'm, because (your partner) has it scheduled at 2 o'clock, and it wouldn't require actually doing anything with artefact just opening it, plugging in a cable and uploading code. Would you be okay with that? And would (your partner) be okay with that?

Participant 1 (Dan) 1:16:53

That we help you with uploading the code on the artefact?

Researcher 1:16:56

That I could actually just come by, I think that that would be the easiest. If not, we can leave it as it is.

Participant 1 (Dan) 1:17:05

I think it's fine. But I'll discuss it with (my partner).

Researcher 1:17:08

Yeah. Okay. Yeah, you can let me know, because her thing is at 2, so you can let me know before that. Maybe around 12:30? If you can let me know whether it's, yeah okay. And if not, it's also totally fine. We can leave it the way it is

Participant 1 (Dan) 1:17:23

Okay. I'll let you know.

Researcher 1:17:26

Okay. And you can reset the app. Well, you can let (your partner) do it, or you can reset it yourself, now or later. It's up to you. Yeah. Thanks again.

Participant 1 (Dan) 1:17:36

I hope it was useful.

Participant 1 (Dan) additional questions asked upon collecting research materials – Interview transcript

Tue, 6/8 4:11PM • 1:24

SPEAKERS

Researcher, Participant 1 (Dan)

Researcher 00:00

Okay, so you mentioned that it's possibly an extension of yourself. Does that appeal to you in any way? Like, do you find it appealing in some way? Or does it influence your practice of Stoicism? Or?

Participant 1 (Dan) 00:17

It was quite interesting to see it as an extension of mine. So that the, I guess the mere fact that that came into my mind, that I was seeing how I was reacting to what I was doing, caused it, for me to think that it was an extension of me. And, I mean, it was. Yeah. I appreciated that. That it was there.

Researcher 00:42

And later, you mentioned that you're not sure if you would continue to practice your reflections, or Stoicism or to use the app, slash Bloome. Do you think that the artefact would influence that in any way if the artefact was present, in the long term?

Participant 1 (Dan) 00:59

Maybe it would always remind me that I should do it. So it'll be like a visual reminder. Like I look at it, I'm like, "Oh, that's my, you know, my reflection tree, or plant. So it would serve as a reminder, if it would still be there, I think.

Researcher 01:21

Okay, thanks.

Participant 2 (Jen) – Interview transcript

Tue, 6/15 3:39PM • 1:13:57

SPEAKERS

Researcher, Participant 2 (Jen)

Researcher 00:00

Yeah, now it's recording. Alright. So my first question is just a bit general. How do you feel overall about the past week?

Participant 2 (Jen) 00:38

It was a very interesting experience, overall. I never really used anything to do reflection, to be honest. Like, I usually, if I do any Reflection daily, I try to do meditation, but I don't really use anything else but the music to really isolate myself from the surrounding environment. So that was uh, that was an interesting experience to me. I tried to use apps in the past to reflect but it was either too guided, or a little bit, you know, kind of not working for me. I found this one surprisingly to be working a little bit more for me. Yeah.

Researcher 01:21

Okay, that's good to hear. What did you hope to get out of participating, actually? You might have already explained a little bit in the survey.

Participant 2 (Jen) 01:29

Yeah, I actually didn't really have any expectations, I just went in for the experience. But I did get a few things out of it. Mostly, the fact that I would, I would be forced to settle on a set of goals about who I want to be and what my virtues are. And then being, you know, kind of forced but like, more like encouraged, to look at them every day, and reflect on that. I never actually done something like this. I usually like, sometimes, like, once or twice a year, I would write down what kind of person I am working or aspire to be. But I don't really look at it again, daily, and then evaluate myself on whether I work towards specific goals or not. And doing this, first of all, helped me, like, seeing it in front of me, helped me reflect on my actual goals and what they mean and where they come from. Do they come from my own experience, or are they coming from external environments, and are there patterns of connection between them? It tells you more about who you are, really, and what drives you in life. So that was very interesting to see. And then being more aware of your state and your work through the day, and how aligned it is with which you think you are aspiring to be is very important. So, yeah that was interesting.

Researcher 03:08

Yeah, so you mentioned the patterns and connections. Was that during the specific activity, like the reflection itself, or when you were editing your virtues in the app? Or was it just in general that you had that?

Participant 2 (Jen) 03:23

It was mostly when I would start the reflection process. So it would make me go through each virtue that I chose to focus on. And then along the way, when you just kind of focus your mind on this set of virtues, you are also focusing on, especially when one virtue comes after the other, and then you start focusing saying "Okay, hey, this virtue seems a little bit connected to the other one". And you just, your mind is so focused on a small set of virtues that you inevitably start thinking how they're connected together, so it's more during the reflection process. It would also help to have them written down so you don't have to, you know, occupy your mind and like try to hold them in your mind, but they're actually out there. So you have more space in your brain to be able to focus on other things surrounding the virtues themselves.

Researcher 04:25

So you said that the app helped you with that during the reflection, so by showing it to you, you would have these connections or you would think about them. What about the artefact - did that contribute to that, do you think, in some way?

Participant 2 (Jen) 04:40

Yeah. Yeah, that was also extremely interesting. I really liked the artefact actually, I really liked the way it lights up. Kind of signifying that it is time to be your reflection, even if you don't really want to but it's like, you know, it's attractive enough for you to go towards it and try something. But the fact also that it responds to whenever you give your answer on how much you worked on a specific virtue, and then instantly you have that external response from the artefact is just, I don't know, there's something about that I cannot really explain. But it's, it's just very powerful. It makes you... I don't know, it's just, there's something about it that makes it powerful. And I cannot really know, like, I cannot really describe why. But I really like that instant reaction of the external world to whatever I am choosing. And it's really cool. It's like something, it's like somebody, they're saying "I hear you", you know what I mean?

Researcher 05:52

Right. Yeah, because you do mention I think, either it was the mid-way or the end. But you mentioned the word 'companion' somewhere? Is that, are you referring to the app or the artefact when you say 'companion', or both? or?

Participant 2 (Jen) 06:08

Yeah, for me, it was more about the artefact itself. It just felt that having some kind of weird, like presence in there, that responds to your, your mental answers, because you're kind of talking to yourself. And then it's like talking back to you, physically in the external world. Sounds like more like having a companion that is there listening to you and responding to you and calming you down. Because there's this, the pattern of, you know, glowing as well, is very calming for some reason.

Researcher 06:43

Was that at a specific point in the week where you felt that it was like a companion? Or did that progress in some way or change throughout the week?

Participant 2 (Jen) 06:55

I think that it was, it was, yeah, it was instant, actually, since the beginning. But then over time, it became more and more like stronger, you know, it kind of, it's weird, but you kind of build a relationship with it, where, you know it's there. And then at some point during the day, you will have to go and see it and talk to it. And over time, it was pretty cool. It would get stronger.

Researcher 07:23

Thanks. Thanks for sharing that. I would like to, so regarding the reflection itself, you already talked a little bit about how you could see patterns and what not, between your virtues. You mentioned that, I think it was in the mid-way survey that you had some kind of nostalgia while, I think, you were unpacking some personal belongings. And that was before you started the reflection. Would you describe your state of mind before you started the reflection that you were already in some kind of self-reflection?

Participant 2 (Jen) 07:58

Yeah, definitely. Yeah, definitely. I was in some kind of self infection and in a very emotional state, as well. And I felt the need to like, go and look at what I wrote down now. You know, kind of reconnecting with who I am now and who I aspire to be in the future, and it kind of made sense to go to the app, because that's where I wrote down those things. And yeah, it was, to me, felt like the right moment to do it.

Researcher 08:29

It was a beautiful story, by the way, just wanted to say that.

Participant 2 (Jen) 08:32

Thank you.

Researcher 08:34

Were there other days where, when you started a reflection that you were not in, kind of a state of self-reflection, so that you were, I don't know. I don't know if blank is the right word. But...

Participant 2 (Jen) 08:45

Yeah, yeah. For example, when, I think it was like two days ago, we went to see (my partner's) family. And we spent like the whole day with the family. And we came a little bit late at night. So it wasn't really a day where I would sit down and start reflecting on myself because I was living really in the external world and was connecting more with the external world. So it felt, kind of not right to reflect at the moment, but I still did it anyway. I tried to really engage with it. But like, it was a little hard. It was definitely harder than you choosing to go there. When you feel that it's wise and you kind of have some kind of emotional onset before preparation for it. That, I think is a little important, where you, something to put you in the mood for reflection.

Researcher 09:42

And how about the way that the app guided you? So you talked about the virtues that are displayed one by one, but what about when you started the reflection, for example, in the loading screen, there's a quote that's shown, but what did you think of that? At the beginning?

Participant 2 (Jen) 09:57

Yeah, I really liked that. I like the fact that it's changing. So every time you don't really know what is in there, and it's always nice, because you, sure, that is definitely one prompt to like, push you to reflect already, because you read the quote, and then you start thinking, having thoughts. So that was really nice. Yeah, I really liked it. And it was, I could see that it was related to Stoicism, as well. It was kind of, in the same spirit.

Researcher 10:27

How did you recognise it was related actually?

Participant 2 (Jen) 10:30

Because it was more about controlling your emotions and using more reason. And I thought, okay, that is definitely Stoicism.

Researcher 10:39

Okay, yeah. Did you recognise the authors of the quotes? Or?

Participant 2 (Jen) 10:45

No, no, no, no, not at all.

Researcher 10:53

Do you think that seeing those quotes - would you say it had an impact during the reflection itself? On your attitude in the reflection itself?

Participant 2 (Jen) 11:04

Um, for me, not really. And the reason I think is because there is, I think Stoicism is a really nice philosophy, I think. But I think it's not completely aligned with me, where I really, I mean, you could see through, for example, the little bit that I shared about my stories, that I'm more driven by emotion, but does not mean that I act upon emotions, like I am impulsive or something. But what I mean is that I really put as much importance as reason to emotions, because I think that they speak the language of the subconscious that is not always so logical. And I think it's listening to them, and knowing how to act upon them and control them for sure. But, but there are a lot of times in my life where I just followed my instincts and my emotions, rather than, and it did lead me somewhere. So I would say that it helped me reflect upon this, but I would say that I did not find it to be always true for for me.

Researcher 12:07

Okay. Right. Yeah, because you mentioned as well, in the survey that the virtues in the app, that the app was also showing to you then in those reflection moments was different to this emotional part that you're talking about. Did that make you want to change the virtues? Or did you just see it as Stoicism? That's, you know?

Participant 2 (Jen) 12:32

I don't think that I, I don't know whether my virtues are really aligned with Stoicism, to be honest. And that's I think, that's something that I expressed in the surveys, it's very hard to know whether you're kind of on the right track. And I know that it's very subjective, you can't really have a right track. And you can't really guide people towards a right track because it's so subjective, but I am not sure whether my virtues are so aligned with Stoicism. And I am not sure to which level of granularity should I express my virtues for them to be more practical versus too abstract for me to act upon them. I know that some of my virtues for example, were a little bit so abstract that for me to answer the question that I practice them is even difficult.

Researcher 13:23

With those ones that you found difficult, did you end up then unfocusing them? Or did you leave them as focus? Or did you change them?

Participant 2 (Jen) 13:31

Um, I did unfocus them. And I thought I should think more about this and how to rephrase them in a way that is a little bit more practical. And I also, I think, added, used the function of adding Virtue [incomprehensible], sometimes. I did add, and refine the virtues and I think it's very important because over time you do you want to refine your virtues, because you do want to experiment with this and iterate on them. Because you're also evolving as a person. So I thought it was cool feature.

Researcher 14:10

So my next question is about the artefact. So during the reflections, did the presence or the appearance of the artefact contribute in some way? You mentioned a little bit about the response that you found that that was cool. But during the act of reflecting, did it have an effect somehow?

Participant 2 (Jen) 14:31

Yeah, I did ask [my partner] about this, because I thought it was little, maybe it was not working properly. And I think it isn't working properly, sorry to say. There was one example. When I was... when I would choose. Like, there is a batch of virtues that I practised reasonably today and there's a batch of virtues that I could have paid more attention to. And then you would have a summary in the end and then you could, you would have the batches differently like this and then normally the artefact would response each batch. But I feel like if I, if 'I could have paid more attention to this', I would have maybe the artefact reacting to it. And then the next batch is 'I reasonably practiced these' and then I would have the artefact glowing again and maybe react. I did not have this - I had this reaction only once. And it was like at a random moment between the batches. So I thought it would have been cooler if I had the artefact glowing and reacting each time something appears on the screen, or each time a batch appears on the screen.

Researcher 15:37

Okay. Okay, yeah, good to know. And did the, let's say the appearance of the flowers, or the artefact in front of you, did that prompt you to think about your virtues in a certain way, or is it was it mainly the app that you were focusing on?

Participant 2 (Jen) 16:06

For me, it was definitely more the artefact itself. Because if I, again, I'm going to repeat it again. But like the shape of it, the pattern of glowing, but also the brightness of the light, all of it together, kind of sets the environment for, you know, getting deeper into the reflection, actually; very calming and soothing. And there's something kind of mystical about it. And it's a little, you would feel, you would literally imagine yourself in nature, you know, in a space that is a little bit outside of this world. And I know maybe it's me, but it's more like it sets the right environment for it. And I really liked that.

Researcher 16:55

And you also commented on the link in the virtues that you thought it would be nice during the process to link a virtue to a flower. Could you elaborate a bit more on that?

Participant 2 (Jen) 17:06

Yeah, so I did also try the feature where you would just click on one Virtue, and then you would have the flowers reacting to it. I thought that it would be nice if you could see it visually, which virtue was connected to which flower? So just look at the artefact and would know that this is virtue... I don't know visually how. But if I had this link, the moment I look at the artefact that would also, I think, would help me reflect more upon which virtues am I really focusing on during, practically in life? Like which ones am I neglecting? And that, and the connections between them, but also especially, where am I putting my focus on? And I think that's important.

Researcher 17:54

Did you use the twitch function outside of the reflections in any way?

Participant 2 (Jen) 18:00

Yeah, I was just going through the app, and I was just going through all the options. I was just thinking, how, how could it be made better? And then I found that little secret. And I was like, "oh, that's cool". And then I went there, and I tried to play with it. And it was nice.

Researcher 18:22

Was it only that one time? Or did you use it again, at some point?

Participant 2 (Jen) 18:27

No, I think it was just that one time, yeah. I think if I had to add a comment about the visual aspect of the artefact would be something about the range of motion of the flowers. That would be like a little bit, maybe more reactive, in a sense, because you really have to look at them and stare, sometimes you would hear it's moving but then you don't know exactly which one is moving. And so if the range of motion was a little bit larger, that would be easier to spot.

Researcher 19:13

Okay. So you talked about the glow. The reminder to reflect, so the glow to remind function. What did you think about it? And how did it make you feel when you would see it glowing before the reflection? You touched a little bit on that, I think.

Participant 2 (Jen) 19:33

Yeah, I think... yeah, I would not change anything about it, to be honest. Like, yeah, it's, it's really cool. I really like it. And the moment you see it, it's not like, it doesn't feel like "Oh, again, I have to go reflect" or something. It just feels very attractive, and more like very welcoming. So yeah, I would not change anything it, I really liked that.

Researcher 19:57

Good to hear. And when did you, when would you notice it? Was it when you were busy doing something else? Or when you were anticipating doing the reflection?

Participant 2 (Jen) 20:10

No, I was not anticipating the glow. Yeah, I would just be walking in the house and sometimes forgetting that it's time to reflect. And then I was just spot it, like glowing, like this. It's really nice. So I would be like, "Oh okay, time to reflect."

Researcher 20:31

And if you, if you compare that to other ways of being notified, do you, would you, for example, smartphone notifications?

Participant 2 (Jen) 20:43

Ya I think I would hate that, to be honest, because we just get so many notifications. And we just so, like used to, not, I don't know, I personally don't really like see notifications on my phone, it just means that there are things that aren't done and that you have to do and just not a good signifier, but I think this is way better.

Researcher 21:07

And the timing of the glow? Did what did you think about that?

Participant 2 (Jen) 21:14

Like it was before, like 30 minutes before? Or is it like, I don't remember exactly, because my reflection is at around eight. And then around that time, you would have the glowing happening. But it's not like hard timing, because sometimes I do it a little later, sometimes not. But it's very important... the most important thing is just that I noticed that it's glowing. And that it's time to reflect in the future. But then you can choose when.

Researcher 21:43

Okay, so did you notice that it was glowing when it was not at eight o'clock during the time to reflect?

Participant 2 (Jen) 21:52

Yeah, yeah. Maybe, maybe it's not accurate. But like, in my mind, that's how it felt.

Researcher 22:02

And did you then think to yourself "Okay, I'm going to wait a bit more", or did it - yeah, how did you feel about that?

Participant 2 (Jen) 22:10

So, yeah, that comes, I think I'll bring you back to what is it that we can do to put somebody in the mood of reflection, and I think there is some kind of step missing between the glowing, and then getting into reflection, and something to really smooth the process, and put me in the mood. And usually, what puts me in the mood, for me at least, is music, and a specific type of music. I don't know how it is for other people, I'm sure it's different. But if there is a way to... because otherwise, it's a little bit of a hard transition between maybe you're too busy doing something and you're not really in the mood of reflecting, maybe that something is also super neurological, too technical, not really connecting you with your emotions, and then suddenly, you have to switch back into reflecting on yourself. It's a little bit of a hard transition. So anything in between, I think would be really, really, a good addition.

Researcher 23:24

So in the app, there was the morning and the weekly reflections. Were you interested in actually doing those sessions?

Participant 2 (Jen) 23:33

Yeah. Actually, like when I've seen it the first time, I thought, "Oh I also have a morning reflection". And then the next morning at around eight o'clock, after I was ready for work and everything. And I went and I sat down and I tried to click on it, and it was not glowing, and it was not doing anything. And I was so confused. And then I went to see [my partner] and he was like, "Ah actually it's not really implemented". I was like disappointed.

Researcher 24:01

What would you have expected in the morning reflection?

Participant 2 (Jen) 24:07

More something about setting the intention for which you are going to focus on during the day. Like which virtues you think that you want to focus on today. And then at the end of the day, you would sit down and then reflect on how you did and why you did not do as you have thought in the morning or something.

Researcher 24:27

And what about the weekly reflection?

Participant 2 (Jen) 24:31

Yeah, I guess it's kind of, yeah, how well you did for the week. But I don't know if planning the week is a thing that, you know, would really attract me, it's more like, I would reflect on maybe my individual reflections or the group of all the reflections that I have done during the week and have some kind of analytics or something to tell me how I did and then think about it.

Researcher 25:01

And why would you, why do you think you might want the analytics, for example?

Participant 2 (Jen) 25:08

Because I, I am a firm believer that as human beings, you know, we don't have, it's always good to have some kind of other perspective. And I think that alone, we will always have a biased perspective. And having that additional perspective that is independent from humans is always an addition for you to take in. And also, we probably do not see everything that is perceived with our limited senses. And having analytics sometimes gives you information that you would not have paid attention, either because you did not have time, either you did not put the focus on it. Or you just don't have the ability to do so many calculations in your head and come up with those conclusions. So yeah, I would be interested.

Researcher 25:59

Do you have like, maybe it's a bit of a hard question, but do you have a vision for what the analytics could look like? Is it graphs, tables that you would want? Or?

Participant 2 (Jen) 26:16

That would be too boring. I think. Yeah, I think this graph as statistics about yourself. I have no real idea now about this. But I think something that would be more into the artefact would be nice, something represented by the artefact, to really strengthen the connection with the artefact. Also, it's like when you have analytics, you cannot ensure that people will actually interpret the data the way you want them to interpret when you give them these charts and everything. So it's better to actually do also the interpretation and then represented in some kind of, you know, on the artefact or something.

Researcher 27:08

I'd like to talk about the more, let's say, background role of the artefact. So you explain a little bit about the location, in the first survey, why you chose the location, could you elaborate what made this location suitable to you?

Participant 2 (Jen) 27:25

Um, so, first of all, it's not a location that we really use for work, or anything that is not chilled, that is like, too focused or something. So it's a pretty chill space. Also, what is surrounding it is also like, kind of, signifies chilling and spending time with yourself. And with the other, like, we have a chess board, we have tea around, we have a coffee machine. So all these things, also fairy lights - it's a space where, you know, when you go there, you don't, you're not going there for work or for intensive cognitive activities or something. You're there to either spend time with yourself reading, reflecting or just chilling or having coffee, or a break, all kind of signifies 'relaxing'. Or you're there with the other to play or something like that.

Researcher 28:20

Okay, all right. And why did you want to have the reflection activity there then, in that location?

Participant 2 (Jen) 28:29

Because it's, the reflection activity is an activity that is about connecting with yourself. And that spot specifically is about connecting with yourself and connecting with the others, if there is somebody there as well. So I thought it was a suitable spot.

Researcher 28:48

Do you think it remained the most suitable spot throughout the week? Or did you have thoughts about moving it?

Participant 2 (Jen) 28:53

No, I actually liked it.

Researcher 28:58

And if you didn't have to worry about the fragility of the artefact? Would you have picked another location still? Or?

Participant 2 (Jen) 29:06

No, I probably would have held it closer to me. Maybe, I don't know, on my lap or something. I don't know, to play more with it, touch it or something, but I would not change the location.

Researcher 29:22

Why would you like to hold it closer to you?

Participant 2 (Jen) 29:28

Because, I don't know. I'm a fan of the colours and the lights, I think you figured by now. But yeah, I think having it closer to me would just put me more in the environment of relaxing and the calming environment that it emits with its light and glowing and everything, so yeah. It's really just for being more immersed in the process.

Researcher 30:01

Did you end up interacting with the artefacts during the day? So outside of your reflections in any way?

Participant 2 (Jen) 30:11

Not really. No, I don't think so. Because I think that that's because I did not really know what to do. Like there was no function of like making it glow, or maybe there is, but I didn't know of it. But so there wasn't much to do. But I would have liked that.

Researcher 30:31

Did it maybe catch your attention? Whether you looked at it or?

Participant 2 (Jen) 30:40

I mean, it's always catching my attention, because it's kind of at the centre of the room. But nothing specifically about it except when it's glowing. The shape of it definitely is almost, like, futuristic. So that definitely makes it stand out.

Researcher 30:59

Did it make you, when it did catch your attention, did it make you think about certain things? Or?

Participant 2 (Jen) 31:07

It would make me think about the virtues, definitely. And a couple of times when I would do that, and then I would just be curious about, you know, re-reading my virtues during the day. And I would just go into the app and review the virtues and think about how I could, "Is this true? Is this really me, is it what I want to do" and "How can I refine them?" And "Are they practical?" and all these things, so.

Researcher 31:40

Do you think if it wasn't in a central spot like it is now? Would you have had those moments where you wanted to look at your virtues or edit your virtues, as well, still?

Participant 2 (Jen) 31:57

Yeah, yeah definitely. Now that I'm thinking about it, I think that, because I have some moments where, for example, because I'm doing work that is so connected to myself, my work is really meaningful to me. And sometimes when I learn more about it, or when I have questions like this that are rising, when I'm on my desk and reading something, it makes me think about myself as well, and makes me think about... I just have the urge to reflect. And now that I'm thinking about it, I think that it would have been

also nice to have the artefact on my desk sometimes when I'm in that state, because I know that my work makes me reflect a lot. So that could be also a suitable spot for it.

Researcher 32:51

Alright, if I can ask were the virtues related to your work, or were you thinking about your virtues in your work setting?

Participant 2 (Jen) 33:00

Yeah, yeah, a lot of them are related to my work, but also, my work is really related to my life. As a person, it's not really separate. It's also really related to my past experiences to who I am. And that's probably why I'm so passionate about it. But like everything is related together, so I can't really distinguish between work or not work anymore.

Researcher 33:25

All right. Yeah [your partner] was telling me that you wanted to put like a sign or something in front of the door or something like that? For like, your company or?

Participant 2 (Jen) 33:34

Yeah, that's yeah, that was just to celebrate what we did. It's so hard to start a company when you're an international, it takes forever. When you do it, you just want to celebrate it.

Researcher 33:52

Alright, and the app, so you did say that you changed your virtues at certain points. When you were editing your focus virtue, did you do that near the artefact or was it just anywhere that you were?

Participant 2 (Jen) 34:05

I was near the artefact, yeah.

Researcher 34:07

Okay. And could you explain a bit more why you wanted to be near the Artefact?

Participant 2 (Jen) 34:15

Just because it felt like, you know, the reflection spot really. It was, like, didn't make sense to do anything not near it. I think it is due to the, also the relationship or at least the feeling that it is a companion for you. And that whenever you want to reflect or talk to someone for this matter, you would just go there.

Researcher 34:45

Were you always, from the beginning, doing it next to it, or was it at a certain point?

Participant 2 (Jen) 34:52

Yeah, I think, no, I think from the beginning, usually whenever I take the app or want to do something that is related to it, I would just be near it. Also like, the room is so small, it's really hard not to be near it. So I would not know how it is if I was in a house of like three floors or something, I don't know if I would change floors for it.

Researcher 35:14

That's a good question. Yeah. Okay, I'd like to talk about Stoicism a little bit. So what do you think? So you talked a little bit about your opinion of Stoicism and how it might not exactly align with your virtues. Did your understanding of Stoicism change during this period?

Participant 2 (Jen) 35:40

No, I don't think so. But that's probably because I did not really focus on the Stoicism itself, the philosophy. There was nothing in the app really making me think about focusing on Stoicism. It was more like "Okay, in the beginning, you define your virtues" and that's part of Stoicism, but there was nothing about what Stoicism is, about how can you practice Stoicism? How is this related to it? Because my virtues could have been not connected to Stoicism and I would still do the reflection. So I don't think that I really reflected on that, no.

Researcher 36:22

And do you have experience with Stoicism? Before this experiment?

Participant 2 (Jen) 36:27

That's a good question. It's more, I think, I think that depends on how you define it. Because I did ask [my partner] and I read a little bit about it online. And it feels like, sometimes that I do it without really knowing that it's Stoicism. So if, depending on how you view it, and if you define it, then I would tell you.

Researcher 36:51

So I suppose the awareness of your virtues, I think maybe that's central to Stoicism. So awareness of what kind of person you want to be, maybe that's how to put it.

Participant 2 (Jen) 37:04

Yeah, I'm definitely very aware, self-aware about it, in general in life, yeah.

Researcher 37:09

Okay. And do you think Bloome played a role in how you practiced that during this week, compared to your prior experience?

Participant 2 (Jen) 37:18

Yeah, definitely. Because, you know, when you have this focus, just in your mind, as I said, and you're not really externalising that every day, and not looking at it every day, it's different, because you might be not aware of what you're doing and the direction you're taking on. So like, if you're not really reflecting on who you are today, and on your specific virtues that are well articulated and written down, then it's always difficult to come to conclusions, like writing them down and looking at them every day, with those words, specific words, and repetitively the same sentences and the same virtues definitely was different. And made me more focused on the reflection than I thought. And I think that I would continue even doing this in, in life in general, and not write my virtues once a year. So it's more like, writing down, put them close and look at them every day.

Researcher 38:15

Would you say that the app facilitated that more, or the artefact? or both or?

Participant 2 (Jen) 38:23

I would say that the app did that more. The artefact was more, like, there to make you connect with it more and help you get more into the reflection process and make it more enjoyable and make the experience a little better. But the app forces you to really focus on the virtues and articulate them. So I would say the app.

Researcher 38:54

So I'd like to move on to the way that the virtues are represented in the flowers, in Bloome. How did you interpret the appearance of the flowers in relation to your virtues?

Participant 2 (Jen) 39:08

In the beginning, I didn't really know that you had the flowers connected to the virtues, that they were blooming, specifically based on what you have focused on today. And I thought in the beginning, I thought, oh, that would have been nice if it was this way. And then I noticed over time that it was that way and I thought oh, that's really cool. So yeah, I think they could have, the design could be made better of the flowers themselves and increasing the range of motion would have been more impactful in some way at least for me. Yeah, but overall, I think it's a really cool idea. To have like one virtue connected to a specific flower.

Researcher 39:51

And, and why would having one virtue to one flower, what part of that is appealing to you?

Participant 2 (Jen) 40:00

The part that I can embody, like it does embody one of the virtues. And I really liked the idea, but also the part that I could somehow like, it's kind of like what I, what I put, I think in this survey, where I realised that it's not enough to, for me to just be aware of my emotions, but it's also very important for me to put them out there and really, symbolically show my body that I did accept them. And, and this is how I'm working with them. And that's kind of the same with the virtue, it just feels like externalising the virtue out there and seeing it. And then symbolically showing that it is there. It is physically there. And I think it's very powerful. There is something powerful about this.

Researcher 40:51

And what about in comparing one flower to the next flower? The differences in the way that one flower was more open than the other one? How did you interpret that?

Participant 2 (Jen) 41:05

I interpreted that as though that I am focusing, well, assuming that the same flower is connected to the same virtue every time, I would interpret that as though I focus more on certain virtues over the others. And that's very important to know, it's a form of actually, it's a form of analytics in some way that is displayed in a better way, where you could see that you focus on these virtues more than the others, and then that would lead to you reflecting on "Why am I focusing more on these? And neglecting these? Are these actually not important for me? Or is it because I am hiding from them? Or where is the reason?" So, yeah.

Researcher 41:47

Would you say that that is more appealing? That form of analytics is more appealing than like a graph or something in the app?

Participant 2 (Jen) 41:54

Yeah, definitely.

Researcher 41:56

Could you explain a bit more why? Elaborate a little bit?

Participant 2 (Jen) 41:59

I don't know if it's due to my background or something. But, uh, yeah, I don't really see equal ways of visualising the data in a way, you know, and, you know, just graphs and plots like that are very standard don't actually say much. They just give you the

power of interpreting that. And it's, a lot of times, you don't want to bother or a lot of times you do it wrong. So actually taking on that and interpreting it in a visual, more beautiful way, aesthetic way like this is much, much better. Because it takes the load off of you as the user. And it's just very easy to derive the conclusion that you're focusing on these virtues more than the others from how much the flower is opening, rather than looking at the graph. It's also more appealing.

Researcher 42:55

And when you say "It takes a load off of you as a user" - in what way would it take the load off?

Participant 2 (Jen) 43:01

I just, because for me, it is more intuitive to conclude, to get to that conclusion, from what you see in this sense, rather than looking at a graph and then trying to interpret what the graph is trying to say. And it's just more intuitive, I think, but maybe it's just me.

Researcher 43:22

Yeah, you mentioned your background, it might be your background, what background is that?

Participant 2 (Jen) 43:27

Very, very mathematical, very engineering-focused. So yeah. Yeah, I'm also now more like data science-focused. And I think it's really cool to see things like this being done. It gives me some ideas to my own work on how I want to display data to teachers about how their students are learning or something. It could be that it is appealing for me like this because I do, on the side, really like art, and it seems very artistic to do it this way.

Researcher 44:15

Okay, I'm moving to the to the app. What do you think of the app? You mentioned 'soothing' in the survey. Could you explain why you found it soothing? And you also mentioned 'friendly tone'?

Participant 2 (Jen) 44:27

Yeah, 'soothing' because the colours that you chose are really cool. They are actually some very good palettes that is one of my favourites. It's like on the cold tone, but not really, also on the nature side. So I thought it actually was going really well with the whole purpose of reflection and the whole environment and also with the device itself. So I thought the palette of colours was really cool. The way it is designed is just very simple and it's not overly done. So it's, it gives some kind of, a breeze to your brain. When you look at it, it's like very easy to understand. You don't have to look in all directions. It's concise, it's focused, it's clear. And then... what was the other? Friendly?

Researcher 45:20

Friendly tone, yeah.

Participant 2 (Jen) 45:21

Yeah, the friendly tone is... I think overall, during the exercise, the language that was used, I could not really go back to see what the exercise was about. So I, from what I remember, the exercise paragraphs were done in a very friendly tone. And then this, specifically when you start rating how well you have done in the virtues that is like, "I could have paid more attention to this". And this is super friendly and encouraging versus saying, I don't know, "I did not really do well on this". It's like, very negative on yourself. But saying that you could have paid more attention to this is more friendly, also with yourself, because you are reflecting. And for example, I have the problem that I'm always, I know that I'm super hard with myself compared to how I interact with other people. And the fact that I had an app that was so friendly, pushed me to be friendly with myself. So that was, that was really helpful.

Researcher 46:24

And the way that the reflection fades in and out, do you have an opinion on that during the reflection itself? So the animation, so the fading, and the pacing of the reflection?

Participant 2 (Jen) 46:39

Oh, yeah. I wish I had like the option of sometimes controlling the speed of the fading in order to really match how I'm feeling inside. But at the same time, I don't know whether it is a good idea. Because you know, at that moment, you really need to calm down, and you really need to relax. And that forces you to like, just take a break, wait, and take that time to reflect upon what is, what just happened. So it might be a good pace, actually.

Researcher 47:12

Okay. Is that the same for the loading screen?

Participant 2 (Jen) 47:18

The loading screen?

Researcher 47:20

Yeah. Like that it took a while to load?

Participant 2 (Jen) 47:25

No, not really, actually. No, it's more like the transition between the batches of the virtues, the summary and like how you're rate, yeah, mostly during the reflection, basically. So. But now that I think about, it might be actually a good idea. Because you do need that time. And sometimes I did feel that that pace specifically helped me calm down with myself and just be like, "Why are you rushing, you know, like, you could just, you know, breathe and take the time to think about it. This is your reflection time." So it might be good when you are in a rush or something.

Researcher 48:02

Okay. And the time is when it was on the flip side. So how were you feeling in the opposite way? So not that you were calming down, but when you thought it was too slow?

Participant 2 (Jen) 48:14

Yeah, I was like, I was more like, didn't really know what to do in between. I just wait for it to come and I didn't really know what to do in between. But I think that was my problem and how I did my reflection. But that was in the very beginning, I remember. And then over time, I, once I could understand how the app works, over time, I adapted to this. And I started planning how to enjoy it more, and changed my reflection process and adapted to it more so, and it was nice.

Researcher 48:54

Did you end up going backwards? Because there was a back button in the reflection, during the reflection. So once you would give it a rating, there would be a little arrow. Did you feel the need to go back to your previous ones or?

Participant 2 (Jen) 49:07

To be honest, I didn't even notice the arrow?

Researcher 49:09

Oh, it was pretty small, yeah.

Participant 2 (Jen) 49:13

Yeah. Yeah I did not that notice and I think that if I had it, I wouldn't really go back, no.

Researcher 49:25

And what about the function for editing your focus virtues? Was that clear to you?

Participant 2 (Jen) 49:30

Yeah, definitely. It was pretty clear. Yeah, clicking and dragging.

Researcher 49:38

And what part made it clear for you?

Participant 2 (Jen) 49:42

Okay, let me look at it again. Yeah, so like, you mean adding a virtue right? Yeah. Yeah, I mean, it's pretty straightforward. You just go to the menu and I was exploring the app. And I've seen that you could edit the focus. And then you had, you had the focus, the visual focus on the ones that you have now, and you could just click on them or unclick. And it was pretty straightforward for me.

Researcher 50:19

Okay. So when editing the focus, which part of the UI made it straightforward you think?

Participant 2 (Jen) 50:28

Which part of the UI, in the beginning or during the editing? It was the, definitely the rectangular green focus. But also the small dots that indicated or signified for me that those were selected. And then, since there is nothing to unselect, or something, so I figured, okay, that's probably just by touching it. Or, and then that happened. In the first time that I tried to do that, what I did is that I tried to select another, like, another virtue like a ninth virtue and that didn't work out. So then I figured, then you had that message that said, "Only hold a maximum of eight focus virtues", and then I figured that I had to unselect, and then select so and then red when you unselect. So it signifies selection. Pretty straightforward, I guess.

Researcher 51:31

So when you say you wanted to have nine virtues, if I can ask, how did the amount of virtues change over time? Was it roughly the same?

Participant 2 (Jen) 51:40

It was always eight at the maximum. And the reason is because I took time to define all those virtues. And I had many of them. And so it made sense that I would select the maximum because actually, if I could, I would select all of them. But then I thought, actually, eight is a reasonable number. I shouldn't overload myself with 30 virtues or so when I can just put focus on eight but yeah, it did make sense to me to choose the maximum because I wish I could select more.

Researcher 52:16

And if I can ask how many, was it that you had a lot more virtues? And you always... so what was the kind of the ratio of the focus of eight versus how many in total there were in the app?

Participant 2 (Jen) 52:28

Good question. It was like, approximately, like five per category or something. But only five or something.

Researcher 52:36

Okay. I was just curious. Because when I was developing it, I was wondering how many someone would want to add and, yeah.

Participant 2 (Jen) 52:49

Do you have like a lot of people adding a lot or?

Researcher 52:53

So far not really, I think you had the most. But, uh, cuz I also. Yeah, so to be honest, I didn't expect that they would have as much as you had. But also I was like "Okay, in case they do, I should make sure that that's possible." So visually, I tried to make sure that if they had a lot, it wouldn't look cramped, and all those things. But also, I have no idea.

Participant 2 (Jen) 53:17

Yeah, it looks super nice.

Researcher 53:23

Yeah, thanks. How do you feel about how the artefact and the app work together?

Participant 2 (Jen) 53:34

I think that it's really cool that they respond to each other as if the artefact responding to the app. I think in the future, there could be more a connection and more things happening on the artefact when you're manipulating the app. But overall, for a prototype, I think it's great.

Researcher 53:58

To have more of a connection, what would that do for you?

Participant 2 (Jen) 54:02

That depends on the functionality of the app, I think on how you can improve it and what you're planning to do. What I see from now is that you're having morning, evening weekly, I don't know you could have a distinction between how the artefact is glowing depending on whether it's morning, evening, or it's a weekly reflection or doing some other things with the flowers that could signify something else I don't really have any idea for now. But depending on the functionality, I think.

Researcher 54:47

And can I ask why you would find that important, to have more of an interaction between the app and artefact?

Participant 2 (Jen) 54:55

Because that would make me, that would help, for me, the artefact helps me be in the mood more and helps me, it helps set the environment for the reflections. I think having it do more things would help me immerse more in the reflection process. Maybe you could display, I don't know, emit some music, or I don't know, could use it like, I don't know. Yeah, I could use it to have my music on when I'm reflecting. Or it could be, I don't know, dancing on the music or doing something, you know, like it could build more of a relationship with the artefact as a companion, at least the way I see it.

Researcher 55:39

That brings me to my next question, would you use the app on its own? So if the artefact wasn't there? Do you think you would experience it the same way?

Participant 2 (Jen) 55:50

No, to be honest no, because the app on its own is like you listing your virtues. Sure, the exercise in the beginning is extremely useful to understand what virtues mean, having the quote as well, the quotes would be really helpful. Sure, rating your virtues and how well you have done would be nice, but I'm not a fan of using apps for reflection, mostly because I'm focusing on a device. And I would like to just focus on myself and within myself. So if I didn't have the app, I would probably just use a piece of paper and pen to write down my virtues and do that instead, because I just do like to connect more with the external world rather than digital.

Researcher 56:44

So you're saying that the artefact is a different kind of device than the app or the phone?

Participant 2 (Jen) 56:51

I would think they go together. And I would think that the app without the artefact would not make much sense. And that would not be so attractive compared to what is already in the market.

Researcher 57:03

And what makes the artefact a different device? Or would you even call it device?

Participant 2 (Jen) 57:13

Like a different, I would not say different, like on its own also would not make sense to use it on its own. I don't know I see them as, like, links together as a full product or package rather than the artefact on its own, as well. I mean, it's a cool artefact, but the whole purpose of it, like it would lose all its purpose if it was on its own.

Researcher 57:43

Okay, I have some concluding questions. So you did mention in the survey that you have a meditation routine that you already have one, and that Bloome is more focused and visual. So how would you describe the difference there? How would you compare that?

Participant 2 (Jen) 58:02

It's a totally different type of reflection. When I meditate, what I usually do is try to focus on myself and on my breathing, and then calm myself down and then calm every part of my body down, while focusing on what I feel each time. So over time, I noticed that, for example, most of my emotions and my negative emotions concentrated my diaphragm and also concentrate on my chest. So because every time I try to calm myself down, that's where I feel like a big bowl of stress. For the artefact it's a little different, because you are not focusing on your breathing, you're not focusing on calming yourself down, you're focusing on understanding yourself better and connecting with yourself better and how you're doing daily. I think it's a different type of reflection, I would definitely like to use it as an additional reflection, you know like I would use the meditation in the morning to really relax and set myself for the day. But then I would use the artefact to really reflect upon how my day went and also reflect upon who I am and who I want to become and how I'm doing on that.

Researcher 59:23

Would you see yourself using Bloome in the longer term? I think you mentioned earlier in the interview that you would want to continue practising, was that Stoicism, was that Bloome, the app?

Participant 2 (Jen) 59:34

Yeah, that was mostly Bloome. And I would say like for me, Bloome is the app and the artefact. I don't know if that's right. So yeah, I would be interested in using it longer and also seeing how it evolves and maybe contributing to give an insight on how it could evolve. Because I think that it does have a potential to be even better than this. And I know that this is a prototype and for a prototype it's really impressive, by the way. And I think that, yeah, I see it having much more power becoming more powerful. So yeah, I am definitely interested. And it's really weird because I'm not a user of these things. I don't usually use apps and I'm not a fan of apps, I usually just have my bank account apps on my phone. Yeah, for me to say that I would use this is like, yeah, it's odd.

Researcher 1:00:41

Okay, and what is the value of having the artefact there in the longer term, for you?

Participant 2 (Jen) 1:00:51

Pushing me to continue the reflection process with myself. I used it for less than a week. And it's already, I don't know if it was because I was predispositioned to like, do a reflection or a powerful reflection. But I do feel that it did help me connect more with myself and realise certain things in such a short time that I would like to do it more for myself. Because I think it's, yeah, as I told you, it like made me have a different type of reflection, that maybe I would not have had if I didn't use this. So I would like to continue doing it.

Researcher 1:01:36

Would you see yourself practising Stoicism in the longer term? So you already mentioned it maybe doesn't align with your virtues, but?

Participant 2 (Jen) 1:01:43

Yeah. If it is about focusing on specific type of virtues that I would define, then yeah, definitely, definitely. If it is that, then I'm probably already practising it, but maybe not so actively. And I think that Bloome would help me actually practice it more actively. So, yeah. But I don't know, I do think that there is much more to the philosophy of Stoicism. So I would like to be more informed about what it is about to make sure that I practice it right. But if it's about the virtues, then yeah, 100%.

Researcher 1:02:19

And what about without Bloome, would you see yourself practising Stoicism?

Participant 2 (Jen) 1:02:24

It would be a little bit harder, a little bit, now that I used it, it's a little harder, because I don't always, yeah I don't always have the, it's like, the effort has to come from you, you know, and Bloome is more like there in the external world. And it signifies that, "Oh you know you can do it", you know, and encourages you and welcomes you. So that is also super encouraging, and pushes you to think about it. I think that's very important. If I had to do it without it, I would probably skip some sessions over time, and then, you know, come to the conclusion that it's not for me, and then I stop.

Researcher 1:03:05

Okay, fair enough. What part of Bloome would you say is encouraging then or welcoming then?

Participant 2 (Jen) 1:03:16

Because I don't spend much time on any phone? I would say that for me would be the artefact, itself. Definitely.

Researcher 1:03:33

Right. So actually, that brings me to the end of this interview. Thank you very much for sharing your insights, and also sharing your personal insights, I really appreciated it.

Participant 3 (Mia) – Interview transcript

Fri, 6/25 11:32AM • 1:31:14

SPEAKERS

Researcher, Participant 3 (Mia)

Researcher 01:00

Cool. Yeah, so my first question is gonna be a bit more general. But how do you feel overall about the past week?

Participant 3 (Mia) 01:09

Actually, my past week was a little bit more stressful. So, it's not, it's not because Bloome but it was because of other factors. I got this, I heard about this opportunity for a job, but I was still not ready with my portfolio. So yeah, it was very stressful and busy. But, yeah. I managed to do it.

Researcher 01:39

Okay, so you applied for the job?

Participant 3 (Mia) 01:42

I applied for the job. Not with the best portfolio, but well, I still applied, so.

Researcher 01:49

Awesome, yeah.

Participant 3 (Mia) 01:50

Yeah.

Researcher 01:51

Cool. Yeah, I hope you get a response. Do you know when they're gonna get back to you?

Participant 3 (Mia) 01:55

Yeah, well, the thing is that I'm even, it was also stressful, because I was even not sure that this is the right place for me. But I also did not want to pass by this opportunity, like kind of took the opportunity. So I decided that "Okay, maybe just put the effort now and then later on you can improve your portfolio for other opportunities. That's why, that's why it was also stressful, because I was not sur, if that's the thing for me, but I also wanted to try. So it was very conflicting thoughts in my mind. The perfect time to have Bloome, maybe?

Researcher 02:46

Yeah, I also, I feel the same. I was also looking for, like, through job applications recently. And then I thought, yeah, this is nice, but I'm not sure. And then there was one requirement where I was like, "Hmm, I don't really meet that requirement, so can I apply then?" And then I felt insecure about it, and yeah.

Participant 3 (Mia) 03:04

Yes, I also did not meet the requirements for this job that I applied for. It's for UX design, actually. But yeah, I just applied.

Researcher 03:15

Yeah they say it's best to just, like, hit as many marks as you can. So just apply. And then also, like, you were saying, you get experience in the application. And then maybe that also improves your interview in the next one, or if you don't get it, then yeah.

Participant 3 (Mia) 03:29

Exactly, yeah. Yeah. But it's, it's very, it's very confusing, and I don't know, it's stressful.

Researcher 03:41

Yeah, I get that. Okay. Well, fingers crossed. Did you hope to get anything in particular out of participating?

Participant 3 (Mia) 04:02

Well, not, not really. I didn't, I was not searching for getting something out of it. But I was curious about it. I was curious about it, because I haven't, I didn't know too much, I didn't know too much about it before that. And also, because the whole installation and the app is about Stoicism and being kind of, at least this is how I interpret it, being more mindful and take time to reflect on your day, on your emotions throughout the day. And seeing if you have followed your beliefs somehow. Yeah, this is how I saw it. I don't know if I interpreted correctly, though?

Researcher 05:01

It sounds about right. Okay. And did you feel, do you feel like you gained something? Maybe you already wrote a bit in the survey?

05:12

If I gain something, yeah,

Participant 3 (Mia) 05:14

What I gained is, like the Bloome was reminding me and kind of, maybe 'forcing me' is not the right word. But I cannot find another word. Not, like, forcing me, but kind of reminding me and put into the situation and take the time to reflect. Yeah.

Researcher 05:43

Okay, and yeah, because I think you mentioned in the halfway survey that, indeed, it does remind you to reflect throughout the day.

Participant 3 (Mia) 05:53

Not throughout the day, like more, at the end of the day, to take a moment to think about my day, because throughout the day, I don't, I was not too much thinking actually about my values. Only at the end of the day, I was like, "Oh, yeah, okay. I did follow this, but I did not follow that." So, yeah. It's still one step towards the mindfulness.

Researcher 06:29

Okay. And when you say it reminded you, in what sense did it remind you? Or, how did it remind you?

Participant 3 (Mia) 06:40

Well, because I, when I was making, on the first, setting the app installation, I needed to select a time within the evening session, and I selected 10 o'clock in the evening. And then I started to notice at around 9, the Bloome will start, a little bit, like lighting up. And then I'll have, I'm reminded, yeah, this is how it reminded me that "Oh yeah, I need to take the time." And sometimes I would do it later. For example, at 10:30, sometimes at 11. So not immediately, but then I'll be like, "Oh, yeah, this is another thing I should do".

Researcher 07:42

Okay. And how did it make you feel to see it glowing?

Participant 3 (Mia) 07:51

It was very dependent on the day, to be honest, because if I was still busy with something, I would not pay too much attention to it. But on the other hand, I liked seeing it light up. It looks beautiful. And it's nice. It makes my room a little bit more cosy, as well, so I liked that. Yeah.

Researcher 08:29

So was it the light that made it cosy, you would say?

Participant 3 (Mia) 08:40

Not only the light, it's not only the light, it's like the whole, also the reflection of the light and the little flowers. I really also enjoyed seeing the flowers move, the petals of the flowers move. That was also quite fun. I would, like, pay extra attention after I submit my rate for the, for each of them. I would, somehow, just stay and look where it's going to move. Yeah.

Researcher 09:20

Okay. Did you encounter any frustrations or pain points throughout the week, actually? Regarding Bloome?

Participant 3 (Mia) 09:30

No. I did not use it every single day, because sometimes I was just too busy. I used it like, I used it four nights actually, out of the seven. I don't know if this is relevant.

Researcher 10:00

And the night that you didn't, you said you were busy?

Participant 3 (Mia) 10:04

Yeah. Or I was not home or not in my room.

Researcher 10:07

Okay. So you also just didn't feel like it or?

Participant 3 (Mia) 10:22

If it was already, like, time for bed. I would be like, "Oh, I would just go to bed now and maybe do it in the morning." Yeah.

Researcher 10:32

Okay. And do you feel like you were missing something? There was something lacking?

Participant 3 (Mia) 10:45

Well, maybe if I'm not in my room, but I have the phone with me, which was not the case, of course, because it's like on the separate, you know, on a separate phone, maybe it could give a light indicator on my phone? You know, when you get messages

how this little light pops up in a different colour. For example, for WhatsApp it's pink. And for Messenger it's green. Maybe Bloome can have its own colour to discreetly remind you.

Researcher 11:21

And this colour, is it, is it a function on your current phone?

Participant 3 (Mia) 11:26

Yes.

Researcher 11:28

And where's the light?

Participant 3 (Mia) 11:32

So this is the camera here. right? And the light is right next to it. If you text me on WhatsApp now, you're going to see it. Am I connected to the internet? Where is the light? Oh, that's embarrassing. Oh!

Researcher 12:17

Ah nice. Oh, wait. Oh, yeah, I see it. So it's blinking. Okay.

Participant 3 (Mia) 12:23

Yeah. Don't you have that?

Researcher 12:27

I don't have that, no.

Participant 3 (Mia) 12:29

Oh, what I thought that every phone has

Researcher 12:32

I think it might be just your phone. At least this is the first time I'm hearing about it. But I also have iPhone. So I don't know, maybe it's an Android thing?

Participant 3 (Mia) 12:38

Oh ya maybe it's the iPhone, but it's really, like it's dopamine, like, "Oh, something new is waiting."

Researcher 12:49

Okay. And this light, would you immediately respond to it then, when you see it? Or?

Participant 3 (Mia) 12:59

I would be curious what's going on, and I would click to see. And, for example, if I'm in a meeting, I will not immediately respond to it, but I would still be aware of it.

Researcher 13:15

Interesting.

Participant 3 (Mia) 13:17

I thought that because with my previous phone I also had this light.

Researcher 13:22

Oh, maybe it's, maybe it's an Android thing.

Participant 3 (Mia) 13:25

Maybe it's an Android thing, yeah.

Researcher 13:27

Which phone do you have?

Participant 3 (Mia) 13:29

I just have Huawei.

Researcher 13:31

Huawei, oh maybe it's a Huawei thing? Or was your previous?

Participant 3 (Mia) 13:38

I cannot say, I'm not sure. Alright, not sure.

Researcher 13:43

Cool. Okay. So I'm curious about the reflection itself. What did you think about the reflection activity itself, in general?

Participant 3 (Mia) 13:59

So in the beginning, when I was setting it up, it actually took quite some time to, like, think about values and virtues. And I also changed it a little bit later. I added a few more. What I actually liked for the, so adjusting the virtues, this was really taking your time to think about yourself. But then, in each day, when you needed to reflect, I liked that... okay, maybe that's actually a little bit lazy, but I like that it did not require that much time rating the virtues. Because I would just like, think about my day, which would like take me not that much. And then I could, I really liked that I could select the rate to which I followed the virtue. It was very easy to do.

Researcher 15:34

And the time, how much time do you think it took? Like on average?

Participant 3 (Mia) 15:39

Per session or per setting the virtues?

Researcher 15:42

No, per session.

Participant 3 (Mia) 15:45

Like, 5 to 10 minutes, maybe more towards 5? So if you think about it, it's not that much. But on a busier day - yeah. I just was too focused on other things. But also does the first day also count? The first night, when I set the virtues?

Researcher 16:29

You mean, in terms of the time, or?

Participant 3 (Mia) 16:33

Yes.

Researcher 16:37

Oh, you mean in terms of like the question of how long it took, or?

Participant 3 (Mia) 16:42

No, in terms of the seven days.

Researcher 16:45

Yes, yeah.

Participant 3 (Mia) 16:48

Because the first night, I did not reflect on them, right. They were just setting up. So it was actually six days rather than seven.

Researcher 16:56

True, yeah.

Participant 3 (Mia) 17:01

So I just didn't do it for two nights, which is good. I'm impressed with myself.

Researcher 17:10

Yeah, I mean, it's not bad, actually. Okay, and how about the way that the app guided you through the reflection? Do you think that the, the app interface played a role in your attitude during the reflection?

Participant 3 (Mia) 17:34

Maybe with these quotes that were by famous philosophers? This kind of, put me in a philosophical mind? If this is like, I think I can say. But yeah, it made me think, it just put me in this mood of reflecting and being wise.

Researcher 18:18

And why do you think it put you in that mood? You mentioned the word philosophical, but then what do you mean by that, actually?

Participant 3 (Mia) 18:25

Because I was reading the quotes. And they were wise, right? And then, I was like, "Hmm, yes."

Researcher 18:36

Do you think the quotes had an influence during your reflection? Or was it only in that moment?

Participant 3 (Mia) 18:43

Yeah. Now I'm thinking that I put too much emphasis on them, but in reality, I read them and they indeed, had some influence on me. But more sort of on the background of my thoughts. If that also makes sense.

Researcher 19:09

Yeah. And when you say it puts you in the mood, in what sense? Did it change your mood or?

Participant 3 (Mia) 19:27

Alright, they don't, they didn't really change my mood. But...

Researcher 19:36

Would you say it was the quote, or just simply that the quote was, like, being displayed or before it was starting?

Participant 3 (Mia) 19:41

Yeah I'm thinking with the words of how to express that. Yeah, I would say it indeed put me in more, it put me kind of in a mood to reflect and think philosophically? I'm searching for other synonyms of this word, because I'm not sure that 'philosophically' is the right word here. Ah maybe more calm, and peaceful, peaceful is the right word.

Researcher 21:07

Calm and peaceful you said?

Participant 3 (Mia) 21:09

Yeah.

Researcher 21:13

Okay. And was it the, would you say it was the quote that, like the quote itself that made you feel calm and peaceful? Or was it that screen or?

Participant 3 (Mia) 21:31

Well, the colours were also very, well, fading because it was not, it was like a gradient, right? And I also like the colour, the colour was also very calming for the eyes. So it could also add to the... maybe peaceful, maybe forget about calm but peaceful.

Researcher 22:08

And when you think about the mood, the mood before you picked up the phone, and you started the reflection. Do you think that there was a switch then that when you started the reflection it was, you became more peaceful? Or did that depend on the day that you're reflecting?

Participant 3 (Mia) 22:50

I'm sorry what was the question again? If I, when I clicked on the?

Researcher 22:54

Yeah, it was more than when you started the reflection, if you think of your mood before starting the reflection that you say you felt, it felt peaceful. Do you think that there was a difference then that it made you more peaceful? Or was it just depending on how you felt on the day?

Participant 3 (Mia) 23:15

It made me more mindful. That's the right word. More, yeah, mindful is the right word, I'm sorry. And it was, I don't know, it was a mixture of the quote, and also the colour, I guess. But it was like, before grabbing the phone and clicking on the app, I already knew what I'm going to do, right? Okay, now I'm got to take this phone and reflect on my day. So I was already kind of putting myself in this mood as well. As the app kind of, was in the right, uhm. It felt like it's to continue with reflection.

Researcher 24:15

Okay, okay. Alright. And what about the physical artefact itself? Do you think that the artefact contributed to the reflections in any way? Like, during the reflection?

Participant 3 (Mia) 24:30

During the reflection, maybe not. For what it contributed, it was like, kind of reminding me to take this time. It also, after I have reflected, I just liked seeing it move. Yeah. It was kind of a reward for me that I had reflected on this virtue.

Researcher 25:03

Sorry the line cut, did you say 'reward'?

Participant 3 (Mia) 25:05

Yes.

Researcher 25:11

Okay, and you mentioned in the survey that you, when you practiced your virtues, the flowers would open a little bit, and for the other ones, they would close slightly. Did you always see this reaction in the flowers?

Participant 3 (Mia) 25:35

Yeah.

Researcher 25:36

Okay. And how did it make you feel actually to see that difference?

Participant 3 (Mia) 26:06

I cannot say that it made me aware, because I was already beforehand aware by clicking on the rate thingy in the app itself, and the flower and the Bloome installation was just like, a visualisation of that, I guess.

Researcher 26:44

And what sense did you see it as a visualisation?

Participant 3 (Mia) 26:52

Well, because some of the flowers were more open than others. So then I could see that with some virtues, I follow more than others. In this kind of way.

Researcher 27:11

Okay. Yeah. And did you have like a particular response to that, to see that you practice some virtues more than others? How did you? Yeah, what did you think of that, actually?

Participant 3 (Mia) 27:26

That I should just pay more attention and be more connected to my experiences in the moment, rather than reflecting later and then realising "Oh, yeah, this was not something that I experienced in the right way." Or, not in the right way, but in the way that I would have expected to experience it.

Researcher 28:10

If I can ask, did you think that when you saw that, okay, some virtues you could pay more attention to? Did that change throughout the week? So did that actually, yeah, were there some virtues where you then did pay more attention to?

Participant 3 (Mia) 28:30

During the day? During the day, you mean or?

Researcher 28:33

Yeah, during the day? Yeah.

Participant 3 (Mia) 28:42

Well, yes, when I added new virtues, because at some point, I added new ones. And then I kind of paid more attention to the new ones that I added because they were kind of more relevant for the situations that I am right now in, somehow. And the ones that are, because some of the virtues were not that relevant to my days. So in this sense, of course, like it was somehow, they were somehow left behind so that's why I also understood why some flowers were not so opened than others. Yeah.

Researcher 29:34

Did you come to that conclusion when you saw the flowers were not opening or did you already know yourself? Yeah, these virtues are not really, yeah, relevant in this situation?

Participant 3 (Mia) 29:44

Kind of before that, yeah, before the opening of the flowers.

Researcher 29:50

So you anticipated it, kind of?

Participant 3 (Mia) 29:52

Yeah, I kind of anticipated it, yeah.

Researcher 29:58

Okay, and the way that you would rate your virtues during the reflection. The way that you rate it. So from the, you know, picking the circles. What did you think of that? You mentioned, I think 'easy', the word 'easy'.

Participant 3 (Mia) 30:16

Yeah, it was like these questionnaires were you, like, select 'I totally agree. I totally disagree and in the middle' so I am very familiar with them. So it felt very intuitive and easy to select. Yeah.

Researcher 30:39

Because you also mentioned in the survey that it took, in the beginning it took a while with the reflections?

Participant 3 (Mia) 30:47

Yeah with the exercise, you remember that there were some exercises?

Researcher 30:50

Okay. Yes, yeah.

Participant 3 (Mia) 30:52

Yeah, these took time. But I didn't do a reflection on that day, because, I don't know why not. I guess I didn't expect that I need to?

Researcher 31:08

I think it was the end of the day anyway. So it was, yeah, and you just, yeah you just started so, yeah.

Participant 3 (Mia) 31:13

Yeah. And what wanted to say? I think I never clicked on the totally agree one. Yeah.

Researcher 31:28

And why do you think, why do you think that you never clicked on it?

Participant 3 (Mia) 31:35

Yeah, because I was having, like, doubts if I practice the virtue to the fullest. So that's why, like, yeah.

Researcher 32:00

Okay. And one more question about the closing of the flowers. When you say that, yeah, some virtues that you didn't practice as much. Was that because you, you did practice them previously? So you, you felt like, "Okay, I'm not practising as much as I did, like yesterday or the day before"? Or was that when you saw that the flowers were closing? Or when you when you actually click the rating? What is it, "I could pay more attention to this."

Participant 3 (Mia) 32:35

When I felt that I needed to pay more attention to this, you're asking?

Researcher 32:39

Yeah, yeah.

Participant 3 (Mia) 32:42

When I read the virtue on the phone.

Researcher 32:45

Okay, yeah. And was that for the first, not the grey one, not the first circle, but the second circle? Or?

Participant 3 (Mia) 32:59

Wait. So you're asking me if when I have clicked the very first circle? When I was aware that I need to pay more attention to this one?

Researcher 33:09

Yeah. So did you, if the rating or if when you chose the rating, you already knew "Yeah. This one was, I didn't, I could improve it." Or only after when the flowers moved?

Participant 3 (Mia) 33:31

When I clicked it on the app, yeah. Yeah. Yeah. I don't know if this is what you wanted to hear, but.

Researcher 33:42

Yeah, I was just curious.

Participant 3 (Mia) 33:44

Because the opening of the flowers was happening afterwards. Not like simultaneously. Yeah. I don't know. I don't know if it was happening simultaneously, if this would have changed something.

Researcher 34:03

No, no, I don't think so.

Participant 3 (Mia) 34:06

But, yeah.

Researcher 34:08

Okay. All right. Okay, so you already talked about the glow, that you like the glowing? Yeah, somehow it was cosy together with the flowers at the top.

Participant 3 (Mia) 34:21

It was also very matching with the colours of the app.

Researcher 34:27

Okay, yeah. And what about the glow, after your reflection? What did you think of that? So when you submit your rating?

Participant 3 (Mia) 34:45

Was there a glow after my reflection?

Researcher 34:49

At least they should have, so on the phone it goes through, like the, each rating. So like, each group?

Participant 3 (Mia) 34:58

Yeah, it shows me like, an overview.

Researcher 35:00

Yeah. And then at least it should have glowed, as well.

Participant 3 (Mia) 35:05

The phone?

Researcher 35:06

No, the Bloome, me the artefact.

Participant 3 (Mia) 35:14

I haven't noticed, to be honest.

Researcher 35:19

That's so strange, it should have glowed.

Participant 3 (Mia) 35:24

Maybe it was glowing, but maybe I didn't pay too much attention to it?

Researcher 35:29

Did you see the flowers move at each group on the phone, like when it's going through each group?

Participant 3 (Mia) 35:38

Yes.

Researcher 35:39

Okay, but okay, there was no glowing?

Participant 3 (Mia) 35:52

I didn't notice the glowing. I thought that the glowing is just to remind me.

Researcher 35:57

Okay, no that's fine.

Participant 3 (Mia) 36:02

Maybe there was glowing, but I was thinking that I was not just paying attention to it.

Researcher 36:07

Yeah, okay. And you also said that, you were watching the flowers very carefully because you wanted to see...

Participant 3 (Mia) 36:14

Yeah, because, you know, like for each group different branches are moving. And I was also like, always looking "Oh, which one is going to move now?"

Researcher 36:28

So were looking at the phone and then at the flowers for each group? Or were you always looking at the flowers?

Participant 3 (Mia) 36:39

At the flowers, I was looking more at the flowers to catch them when they're moving.

Researcher 36:45

Okay, yeah. And were you, if I can ask, were you like close to it? Or were far from the flowers or?

Participant 3 (Mia) 36:52

I was close to the installation. I was basically on my desk, so, yeah.

Researcher 37:09

So now my next question is about the morning and the weekly reflections. So there were the options there, but you couldn't click on it.

Participant 3 (Mia) 37:18

Yeah, I tried multiple times.

Researcher 37:21

On both or just one of them or?

Participant 3 (Mia) 37:24

The morning one. Okay. And for the weekly one, I thought that it's by the end of the week. So like, tonight.

Researcher 37:39

Because actually, yeah, they're not implemented, so you can't start those ones. But were you, if you were going to start the morning one, was there something that you would have liked to be able to do in that reflection?

Participant 3 (Mia) 38:00

Now, when I think about it, this makes sense. Because you need to reflect on your day somehow. Because the question is, did you practice your virtues today? Did you practice this virtue today? So if it's for the morning, is more that it's for yesterday, right?

Researcher 38:19

Yeah. Well, yeah, it could be.

Participant 3 (Mia) 38:25

Because for today, you haven't started today? Or maybe it would have been useful to have, for the morning option, to what extent do you want to prioritise this virtue today? And then selecting it and then in the night version, you select how much actually you practiced it.

Researcher 38:56

Okay, yeah. And do you think, and yeah, would that have been useful to you, to be able to do that?

Participant 3 (Mia) 39:11

Yeah, maybe, yeah, I would say so. But then, I feel like I kind of need more time with it, in order to say for sure, because, yeah.

Researcher 39:26

Fair enough, yeah. Is there like a particular reason why you think it would be useful?

Participant 3 (Mia) 39:38

Maybe it would be useful because at the beginning of the day, you will somehow start the day with the virtues in your mind? So maybe, throughout the day, you'll kind of be reminded of them, or more aware of them? And then at the end of the day, is like "Okay, let's see if I actually really followed what I wanted to practice today", yeah.

Researcher 40:20

Would you say that that maybe was not the case this past week, that you were not aware of it in the day, and that this would make it stronger? Or?

Participant 3 (Mia) 40:33

I don't know to what extent I would have used it this week, both of them, the morning and the weekly one.

Researcher 40:44

So would you say that you were then also, because I think you mentioned that you were, that you weren't thinking about the virtues?

Participant 3 (Mia) 40:53

Well, no, I was too consumed with other things, unfortunately, during this week, yeah. I wish it was different. It was a little bit of a stressful week.

Researcher 41:12

Yeah, I understand, yeah. And was that, when you were not thinking about it? Was that, where were you in relation to the app or the artefact? Were you at work? Or were you at home? In your room?

Participant 3 (Mia) 41:28

I was both at [work] and at home. So it was sort of a mixture.

Researcher 41:42

And in your room, specifically? Were you in your room specifically? Were you in your room when you were not thinking about your virtues? Were you also in your room, spending time in your room? Next to the, next to the artefact?

Participant 3 (Mia) 42:08

Yeah, this could also be the case because, yeah, yeah, it could also be the case that I was at home and not thinking about the virtues, yeah.

Researcher 42:23

Maybe it's a difficult question, but then do you think like, how much time do you think, at home, were you working or spending time in your room versus, like, in the other parts of the house? Was it mostly in your room or was it mostly around the house?

Participant 3 (Mia) 42:40

When I'm home, I'm mostly in my room. Yeah.

Researcher 42:48

Okay. And for the weekly reflection, maybe it's also a hard question, but do you think, is there something that you would expect to do in that reflection?

Participant 3 (Mia) 43:11

I think I would, I probably would expect to see an overview of my days during the week, like how much I practised each of the virtues. Yeah.

Researcher 43:33

And would that be appealing to you in some way?

Participant 3 (Mia) 43:43

Um, yeah, it would just give me a sort of overview of the week. And yeah, just give me more awareness of how my week was, maybe compared to the previous week, maybe in the previous week I practised the virtues and then on this week, it was a bad week or a good week. You know what I mean? Like, comparing the weeks.

Researcher 44:28

So between different weeks, you would also compare?

Participant 3 (Mia) 44:33

Yeah, that would be nice, I guess. It could be useful, like kind of, kind of like keeping a journal.

Researcher 44:47

How would that be different from the, just like the daily reflection, like comparing the weeks?

Participant 3 (Mia) 45:00

Because it's like, a longer block of time. That's a good question, I don't know. I'm not sure.

Researcher 45:13

Yeah. Okay. And now to, I wanted to talk about the location for Bloome. You already explained in the first survey, like why you chose that location? Do you think that it stayed the most suitable location throughout the week? Or did you feel like you wanted to move it?

Participant 3 (Mia) 45:39

No, I didn't want to move it. And I think for my room it's the most suitable location. That's for sure.

Researcher 45:50

Your also mentioned that it was, it's like the central or it's central in your room? A central location?

Participant 3 (Mia) 45:54

Yeah, kind of?

Researcher 45:56

Could you elaborate a bit more? Like, why is it central?

Participant 3 (Mia) 45:59

Because I spent most of my time either chilling on my bed and watching something or on my desk. So if we separate the other half of the room, which is like more where my belongings are, and I spent less time there because yeah, there's no comfy furniture there, I would say. If I'm on my bed, I could see Bloome. And if I'm on my desk, I could see Bloome, as well. But if I'm in the other parts of the room, I don't see it anymore. Yeah. But it could pretty much also be positioned in the other part of the room, but there is just no suitable place for it because of my room.

Researcher 46:53

Okay, yeah. And so did you think that okay, you just wanted to put it there central? Or was there a reason that you wanted to see it, whether you are on the bed or on the desk?

Participant 3 (Mia) 47:15

No, there was no, I didn't put the thought behind it too much. Because when you told me that it needs some space, because my room is like a tent, right? And I don't have a lot of big surfaces that are not affected by this tiltedness in my walls. So it's mainly my desk. We could have also positioned it on the floor, somewhere. But yeah, no, it was just the perfect place because my room is small and yeah.

Researcher 48:07

Okay, and what if it was, what if the artefact was very small? Like, let's say? Like, this big, like, much smaller?

Participant 3 (Mia) 48:18

I think I would have positioned it on my desk, again, to be honest. Or maybe on one of my shelves that I have next to my desk. I don't know if you have noticed them?

Researcher 48:31

Yeah. The one right next to it, yeah?

Participant 3 (Mia) 48:34

On top of the mirror, because I have one mirror positioned there on top of it. Maybe I would have put it there, if it was smaller.

Researcher 48:44

Yeah, I noticed that you have like an air plant there, right?

Participant 3 (Mia) 48:51

Yeah.

Researcher 48:52

I also have an air plant. So I just, was like "Oh cool". Okay, all right. Yeah, so you, regarding when you saw it glowing - you also said sometimes you started it at that moment. But other times you did it a bit later?

Participant 3 (Mia) 49:17

Yeah, for example, if I was completing some tasks that I have started with, and I would see it glowing because it would start really gradually. But I would notice it and that's why I'm really surprised I didn't notice it. Maybe why I didn't notice it when I completed the survey, I kind of probably expected that it was going to go back to being off gradually. So yeah.

Researcher 49:53

When you, the survey, do you mean?

Participant 3 (Mia) 49:57

Not the survey. When you ask me about, after the reflections if I noticed the light? Maybe I just expected that it will just go slowly back to its off position.

Researcher 50:13

Okay, okay. Yeah. So it stayed on, you mean that it was staying on during the reflection and then you expected it to?

Participant 3 (Mia) 50:20

Yeah. To like gradually turn off.

Researcher 50:26

Okay. So it was on, basically, for the duration of the reflection?

Participant 3 (Mia) 50:41

I think so. I don't know. I was more focused on the app during the reflection, I guess. And then, and then the petals.

Researcher 50:56

Okay. And the times that you, yeah how did you feel about that you were deciding when to do it? So you saw it glow, and then you were deciding to do it now or later. Did you like that about it? Or what did you like about that?

Participant 3 (Mia) 51:21

Yeah, well, I liked that I could decide when to do it. Because then it was not, it didn't feel like that much as a task. Yeah, because I could do it later.

Researcher 51:49

Okay. And if you compare that to, like, I don't know, it's, like the blinking thing on your smartphone, or like a notification? Do you think you-

Participant 3 (Mia) 52:04

I would say it's similar, yeah.

Researcher 52:09

You mean similar to the blinking thing?

Participant 3 (Mia) 52:13

Similar as feeling I don't have to do it now, but I'm aware of it. It's in the back of my mind, somehow, as something that I would like to look into.

Researcher 52:32

And the times that when you saw it, and then you decide that, I think it was the two nights then right, that you didn't reflect because you were busy with other things?

Participant 3 (Mia) 52:42

I think I was pretty much not in my room then, to be honest.

Researcher 52:48

So there wasn't a moment where you saw it glowing but then you didn't do it?

Participant 3 (Mia) 52:59

Well, I remember that one of the nights I was, because we were watching a movie with my roommates, and then I started getting ready for bed and I saw the installation, but of course, it was not glowing anymore. It was not on, and I remembered about it, but I was kind of tired to do it.

Researcher 53:23

Okay, yeah.

Participant 3 (Mia) 53:28

So the installation itself reminds me of it. But depending on when I see it, yeah, I don't know. It definitely helps me to remind myself that I need to take some time to reflect on my day. But it doesn't feel invasive.

Researcher 54:13

Could you explain, like, why you think it wasn't or you felt it wasn't invasive?

Participant 3 (Mia) 54:23

Because it didn't, it was very discreet, somehow. The light was nice, it was bringing something to my room. And it was not like a red light, to be annoying and I will be like, "Oh yeah, let's do it now so that this stops glowing." It was not annoying or something. It was just very, it was very, like, fitting well with the environment that I was in. Because also, during that time it starts slowly to get darker. Then when it glows it's nice, it brings some light.

Researcher 55:18

The brightness, what did you think of the brightness of it? It's hard to say because I'm not sure how bright or how dark your room was, but?

Participant 3 (Mia) 55:27

It starts very gradually and then at 10 o'clock, I noticed that it's the brightest it can get.

Researcher 55:39

But you had no, you didn't feel a particular way to that really bright light?

Participant 3 (Mia) 55:43

It was not invasive. It was not, like I could see that, it's kind of trying to make me more aware of it by being more bright, of course, kind of talking to me in silent language. So I actually liked that. I liked that it started glowing slightly and then at 10 o'clock it's to its full brightness.

Researcher 56:24

Okay, and so, during the day, you mentioned, sometimes you're at home, sometimes you were away from home. Did you interact with the physical artefact in any way? Interact meaning did you, I don't know, look at it? Or did you?

Participant 3 (Mia) 56:40

Yeah, sometimes I would touch it. When I'm, like, distracted from myself, from my, from the work that I'm doing, I would look at it.

Researcher 56:54

And did it make you think about certain things? Or were you just, yeah.

Participant 3 (Mia) 57:01

It made me like, "Oh, yeah, I need to do this later."

Researcher 57:07

Okay. All right. And okay, yeah, no it's clear. And what about the app? So you did mention, like you added virtues at some point. Does that mean you also changed the focus virtues?

Participant 3 (Mia) 57:31

Yeah.

Researcher 57:31

Okay. Was that the only reason you used the app, outside of the reflections?

Participant 3 (Mia) 57:44

Yeah.

Researcher 57:45

Okay. And how often actually, if I can ask, like, how often did you add virtues or change your focus virtues?

Participant 3 (Mia) 57:57

So at the beginning, and then I think, the first night, because in the beginning, when I was adding the virtues, I didn't know what I'm going to do with them. So they were very broad and very, like, yeah, not not everyday stuff. And then the next day when I reflected on them, I was like, "Oh, okay. This is not really relevant to me right now. I'm going to change them tomorrow." And the next day I changed them.

Researcher 58:33

By changing Do you mean that you?

Participant 3 (Mia) 58:35

Adding them, adding new ones.

Researcher 58:37

Okay. And then did you put those in focus?

Participant 3 (Mia) 58:42

Yes.

Researcher 58:47

Did you notice, I don't know, did you ever visit the connection to Bloome screen in the preferences?

Participant 3 (Mia) 59:01

Oh, yes, there was connection to Bloome... but did I click it? I thought that I should not be clicking it because this was like, settings, that you put on?

Researcher 59:11

Oh, no, it was fine. You could have clicked on it. It was fine. Because in there actually, I can tell you now that there was like, it also explained if you long press on a virtue, then you would see it twitch on the artefact.

Participant 3 (Mia) 59:26

Oh, but I have seen that. I have seen that actually, like if I long press it, but I don't know where I saw it. Maybe I have clicked on it and I have seen it. Because I did that once. But I kind of more enjoyed them when they moved with the overview of the day.

Researcher 59:58

And when you were changing your virtues, were you doing that next to the artefact? Or were you somewhere else in the room? Like not looking at it or were you somewhere else in the house?

Participant 3 (Mia) 1:00:11

I was sitting in my room and I think I was on my yoga mat. I was very close to Bloome.

Researcher 1:00:27

Okay. Was that intentional that you were close? Or just simply because it's your room and you were there?

Participant 3 (Mia) 1:00:32

It was because, yeah it was my room and yeah.

Researcher 1:00:42

Okay, I would like to talk about Stoicism. So you had some understanding of Stoicism? I think you said you saw a video explaining it. Do you think that your understanding of Stoicism changed during this period?

Participant 3 (Mia) 1:01:16

Well, my understanding, I don't know if it was my understanding of Stoicism or my interpretation of the usage of the app and Bloome overall. So I don't know if reflecting is that much part of Stoicism. Is it?

Researcher 1:01:51

Yeah, yeah. It's a strong part.

Participant 3 (Mia) 1:01:54

Well, then I understood more about it.

Researcher 1:01:57

Okay, when you say interpretation of the app and of Bloome?

Participant 3 (Mia) 1:02:04

Because when [the app] asked "How much did you practice the virtue?" and for example, like, I didn't feel like I'm practising it that much, but following it, like this moral, not moral, but my ideas about, not ideas, but beliefs about how should I react to different things? So yeah, I interpreted it more like, following my beliefs and my virtue, my values actually, yeah my values.

Researcher 1:03:10

And was that for both of the virtues where you?

Participant 3 (Mia) 1:03:14

For example one of my virtues were "Try not to assume things too fast." And it was under my Wisdom thingy because there were different categories, right? And like "Have we practiced this today? It's more like "Have I followed this virtue today? Was I assuming stuff too quickly. Yeah, you know. So I don't know, I don't know if I have used it right.

Researcher 1:04:03

I mean, I think it really depends on your virtues. They could be specific, but they could also be quite vague. And also, like the virtues you said in the beginning that were not really practical or?

Participant 3 (Mia) 1:04:20

Yeah.

Researcher 1:04:21

Yeah. So it depends.

Participant 3 (Mia) 1:04:25

Yeah. Maybe if I had a virtue, like, "Meditate every day" that I could be like, "Oh, yeah, I practised this today or I didn't practice this today." But yeah.

Researcher 1:04:42

And if you think about your understanding of Stoicism, or even your practising of Stoicism before the experiment, and now after the experiment, do you think there was a change in the way that you, that you think about Stoicism or that you practice it?

Participant 3 (Mia) 1:05:01

I haven't practised it before the app. But yeah, I kind of want to be more mindful about my emotions throughout the day, and how I react to them. Because sometimes my emotions overtake my reasoning. Which is not a bad thing, but sometimes.

Researcher 1:05:34

Yeah, yeah. Yeah. I mean, that's what emotion does, I think, it's like the, yeah, it's the opposite of reason. Okay. So do you think that changed actually, during this experiment? Or do you think it's kind of been the same as it has always been?

Participant 3 (Mia) 1:05:58

Well, no, I cannot say that it has changed that quickly. Yeah. Maybe I'm just being a little bit more aware of it. But changed, I cannot say.

Researcher 1:06:23

And what about, do you feel like you learned more about Stoicism from this experiment? Whether from the first exercise or through your time reflecting?

Participant 3 (Mia) 1:06:34

Well, yeah. From the first exercise, I learned something that I did not know, I didn't know about the separation of, what was it, 'Wisdom'-

Researcher 1:06:36
'Wisdom', 'Morality'.

Participant 3 (Mia) 1:06:50
'Morality', exactly.

Researcher 1:06:54
'Moderation.'

Participant 3 (Mia) 1:06:57
And there was something else that I forgot.

Researcher 1:07:02
Something with 'Courage'.

Participant 3 (Mia) 1:07:05
Oh, yeah. This I didn't know before.

Researcher 1:07:11
Was that actually helpful to you, that you had those different boxes?

Participant 3 (Mia) 1:07:28
It just forced me to think about more virtues.

Researcher 1:07:36
More meaning different kinds or?

Participant 3 (Mia) 1:07:39
Yeah, exactly, different kinds of virtues?

Researcher 1:07:43
Yeah. Do you think that was useful that you were thinking of different kinds? Or?

Participant 3 (Mia) 1:07:53
Yeah, because in the beginning, I would notice a trend that I have a lot for one of the categories and not too many for some others.

Researcher 1:08:14
Okay. Did that make you want to have, did that make you want to think of virtues in the other ones or?

Participant 3 (Mia) 1:08:22
Yeah, it made me think about, "Okay, let's try to think about virtues for the other one."

Researcher 1:08:32
Yeah. Okay. Now, I want to talk about the flowers themselves. And the way that your virtues are represented in the flowers, like, what did you or how did you interpret what the flowers mean, in relation to your virtues?

Participant 3 (Mia) 1:08:58
The way how I interpreted was, does the flower that is more blooming was the virtue that I have practised more today. So this virtue is kind of blooming in my life. But the other one that I haven't practised that much are not yet blooming, so it's something to water more on.

Researcher 1:09:31
And did you know actually, like, which virtues those were by, or do you just generally have a feeling already about yourself? Like the difference between the ones that are blooming and the ones that are not?

Participant 3 (Mia) 1:09:47
If I knew, beforehand, that they're gonna be blooming and the other ones are not going to?

Researcher 1:09:53
Yeah, more actually, which virtues those were, like which ones they were talking about.

Participant 3 (Mia) 1:10:08
I'm not sure I understand the question, actually.

Researcher 1:10:11

Okay. No, no, it's more about when you see that some are blooming and some are closed, whether you, you know which ones are blooming, like, which virtues they're actually talking about?

Participant 3 (Mia) 1:10:23

Yeah, because it happens, one after another.

Researcher 1:10:27

Okay in the reflection?

Participant 3 (Mia) 1:10:29

Yeah. So I, I knew.

Researcher 1:10:33

Okay. And outside of the reflection when you would look at Bloome would you have the same information? Or, or do you need the app?

Participant 3 (Mia) 1:10:46

Well, I kind of remember, because I didn't have like, too much virtues. But I remembered more the ones that I didn't practice to be honest, rather than the ones that I practised. So maybe that's something that, yeah, because the ones that aren't practiced or like something, that's "Oh I need to be more mindful about this?".

Researcher 1:11:36

So you kind of had an intuition. When you saw the ones that are closed you already knew "Oh yeah, those are these virtues that I'm not practising".

Participant 3 (Mia) 1:11:46

Yeah, kind of.

Researcher 1:11:54

Okay. And regarding the app, what did you think, like, in general about the user interface of the app?

Participant 3 (Mia) 1:12:02

I really liked it. It was very, it was very beautiful. Yeah. And very like, easy to use. I didn't have any troubles or I was not in a situation when I was "Oh, what should I do?". Yeah.

Researcher 1:12:28

Good to hear. Yeah. And what about the loading screen? So there were the quotes but yeah, how it was loading and?

Participant 3 (Mia) 1:12:38

Yeah, it was taking some time, but it was definitely not too much time. And it was also nice that I was having something to read while I was waiting. Did you come up with the idea for putting the quotes because of the waiting time or?

Researcher 1:13:05

Yeah, so I thought, okay, maybe it's nice to have a quote there. I don't know.

Participant 3 (Mia) 1:13:10

Yeah, nice. I think it's a nice feature to have.

Researcher 1:13:19

And were there times when you thought "Oh, yeah, it's taking way too long" or?

Participant 3 (Mia) 1:13:25

No, not really.

Researcher 1:13:29

And what about the the way that the reflection fades in and out? So the fading in and the fading out? And how each virtue one by one?

Participant 3 (Mia) 1:13:42

Yeah, it just felt kind of organic.

Researcher 1:13:48

Was the speed, how did you find the speed of it?

Participant 3 (Mia) 1:14:07

I think it was the right speed for it. It was neither too slow, neither too fast.

Researcher 1:14:20

And by organic, did you, was it the speed that's organic, or the fade or?

Participant 3 (Mia) 1:14:36

Maybe both of them.

Researcher 1:14:43

Do you think it influenced the way that you were reflecting? So the way that it fades in and out?

Participant 3 (Mia) 1:14:53

Oh, okay. Now I get why, like, maybe you were trying to portray that you need to go like slowly into the next action or what?

Researcher 1:15:09

Something like that. But yeah.

Participant 3 (Mia) 1:15:16

To be honest, I didn't pay too much attention to that. So yeah. What was the question again? Like you're asking me if this influenced how I was reflecting?

Researcher 1:15:33

Yeah, like your your mood or how you were you reflecting; your mindset, kind of?

Participant 3 (Mia) 1:15:46

Yeah, I was calm, I was not nervous, or, I was also not angry when or upset with myself when I would see that I haven't practised the virtue. So it was purely reflective for me.

Researcher 1:16:06

Do you think the language has something, like the way that the rating was. So it wasn't, what was it again, the first one was 'Not applicable', then 'I could have paid more attention'. Then the next one was, 'I sort of paid attention to this', 'I very much paid attention'. And then the last one was like, something stronger. But what did you think of that language? Or that way of rating yourself?

Participant 3 (Mia) 1:16:40

Wait, were there colours? I saw only colours. I don't think I saw the words. I am confused, now. I kind of want to see the the app.

Researcher 1:16:59

Yeah, there were words. So when you click it, like yeah it would-

Participant 3 (Mia) 1:17:03

Oh, yeah, when you click it. Yeah, when you click it. But I also kind of never, yeah, I never clicked the last one, right? But I have clicked the 'Not applicable' one. So exactly, because I think, I think the 'Not applicable' one was helping, somehow, to not be too harsh on myself. But also, I feel like, Yeah, even if I have clicked the second one, I would also not be, like "Yeah, okay, like, you need to pay more attention to this" and not be like "Ugh, [participant's name] why did you do that?". At that moment, I would have not, the moment of the reflection. But also it was like, the thing is that I also knew that it would take some time for me to change some things. So yeah, maybe I'm just patient with myself right now.

Researcher 1:18:58

Would you say it was more positive or negative, like the way that the rating-

Participant 3 (Mia) 1:19:03

It was more positive, definitely more positive.

Researcher 1:19:10

And you also said the colours, that you noticed the colours more or was it the colours that were more important to you? Or the position of the circle or the text of the?

Participant 3 (Mia) 1:19:22

The colours. I feel like the colours gave me this gradient of rating. I could easily see the level of agreeing to the statement. Yeah, "you practiced this virtue today."

Researcher 1:19:56

All right, and now about editing your focus virtues. Was that process clear when you wanted to edit your focus?

Participant 3 (Mia) 1:20:04

Yeah, it was very, like right now, I do not remember what was exactly on screen. But I remember that it was not hard for me to do it. Because also, when I was putting my virtues in, the very first time, there was also immediately a text that I can edit them afterwards. So I kind of expected that it won't be too complicated. And it wasn't.

Researcher 1:20:39

And how many do you have in focus, actually, if I can ask?

Participant 3 (Mia) 1:20:46

So, in the beginning, I had three. And afterwards I had four, or five, in total.

Researcher 1:20:59

And how many did you not have in focus? So you had five in total, but then how many others were there not in focus?

Participant 3 (Mia) 1:21:06

The others that were not in focus were two of the first ones. So yes, I added four more virtues.

Researcher 1:21:24

Would you have liked to focus on more virtues? Or was this for you a good amount? Or was it just because you had that many at that time?

Participant 3 (Mia) 1:21:37

Yeah, it would have been, I could have added more with the time.

Researcher 1:21:48

Okay, and what about the way that the app worked together with the artefact? What did you think of that? Do you see them as two separate things? Or do you see them as one thing?

Participant 3 (Mia) 1:22:02

I saw them more as one thing, because they were kind of inter-connected. Like the installation reminded me to use the app. But after I used the app, the installation changed. So there was, like, a nice connection. Also, the colours were very consistent.

Researcher 1:22:27

Would you use the app on its own?

Participant 3 (Mia) 1:22:32

Yes, I also put it in the survey. That I would also use the app on its own. But Bloome adds like this tangibility to the experience. Like, the installation also adds to the experience. Because it's, yeah, it's a tangible thing. It's always nice to have something tangible as well.

Researcher 1:23:11

And how come for you it's nice to have something tangible?

Participant 3 (Mia) 1:23:15

Because it makes it more precious, somehow. But also if I'm away from my room, then I could have just used my app, but it was not on my phone, you know, so. I was not bringing the other phone around with me.

Researcher 1:24:03

What else do you think the tangible artefact does to the experience? You said, okay, it makes it more precious. Does it do anything else or add anything else?

Participant 3 (Mia) 1:24:20

Like this rewarding feeling after I completed, with the moving of the petals and changing the look of the flower itself.

Researcher 1:24:40

And was it rewarding because you, yeah, because you, of the way it moves or the way it looks or?

Participant 3 (Mia) 1:24:50

I think the way it moves. And yeah, maybe also the combination of both because I didn't have too much, like it was not changing too much. But still, I could see it change. I could see some of them less open than the others.

Researcher 1:25:21

What did you like about the way that it looks?

Participant 3 (Mia) 1:25:29

So I like the colour. I like that the sphere, has these triangles shapes, abstract shapes around it. And overall it just, it looks like a nice product, you know?

Researcher 1:26:12

So I have some concluding questions. Are you okay with time by the way?

Participant 3 (Mia) 1:26:17

I will need to go soon.

Researcher 1:26:22

Yeah, it's just some small questions. Do you do any other types of self reflection? Just as an open question.

Participant 3 (Mia) 1:26:32

No.

Researcher 1:26:35

Would you see yourself using Bloome in the longer term, whether the app or the artefact?

Participant 3 (Mia) 1:26:44

Maybe in the long term, I would say the app?

Researcher 1:27:02

And why not the artefact?

Participant 3 (Mia) 1:27:06

Well, because if I'm moving somewhere, I will need to move the artefact as well. And it's just too much of a hassle. Maybe if it's smaller.

Researcher 1:27:23

Okay. All right. Yeah. And would you see yourself practising Stoicism in the long term? Like without Bloome?

Participant 3 (Mia) 1:27:36

I would hope so.

Researcher 1:27:40

Alright. Okay. Yeah, that's the end of the interview. Thanks for answering some of the difficult questions.

Participant 3 (Mia) 1:27:52

Yeah, there were some difficult ones.

Researcher 1:27:57

I guess it took some reflection, as well.

Participant 3 (Mia) 1:28:00

By the way, did we schedule already a time for picking it up?

Researcher 1:28:05

Yeah. It was Monday at nine, I think. Did I send you. But um, yeah, that's one something I wanted to ask you about. Oh yeah, I sent you an invite. Yeah. Is it possible if, because I need to check with the driver, whether it's at nine or after five. Does that? Is that okay with you? I need to check with him what's possible?

Participant 3 (Mia) 1:28:29

After five? Yes, maybe after six?

Researcher 1:28:33

Okay, so after six. And if you need to, like do something else or eat dinner, it's also fine. I just need to take it apart. It wouldn't won't take that long, this time.

Participant 3 (Mia) 1:28:47

Yeah. Okay. And this time around my room won't be that warm. That's another nice thing. I don't have it in my calendar, but just tell me when it's suitable for you.

Researcher 1:29:01

Okay, yeah, I'll text you. Okay, thanks. And what you can do is you can reset the app if you want. So then you delete all your data on it.

Participant 3 (Mia) 1:29:11

I'm going to use it for a few more days. Because, why not.

Researcher 1:29:21

Yeah. Okay. But yeah, thanks again. Appreciate it.

Participant 3 (Mia) 1:29:25

Yeah, thank you for having me participate. It was nice. I'm really impressed with the work that you put into this, because it really looks really complete and coherent. Really nice.