

Designing Technology to Promote Mental Health and Wellbeing

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Abstract

Mental health and wellbeing are fundamental to our quality of life, enabling us to be resilient against everyday stresses, work productively, to have fulfilling relationships, and experience life as meaningful. While HCI research has recently begun to address important challenges in the treatment of mental illness, approaches to promote and protect mental wellbeing, as positive emotional, psychological and social health, have received far less attention. Besides, the design space for technology innovation for people with severe mental health problems and as hospital inpatients is largely under-explored.

The research presented in this thesis investigates how technology can promote the mental health and wellbeing of a group of women, living in the medium secure services of a forensic hospital in the UK. These women present a difficult to treat group due to the complexity of their mental health problems, extremely challenging behaviours, and a mild-to-moderate Learning Disability. Following an Experience-centred Design (ECD) approach in this context, the thesis describes how I worked collaboratively with hospital staff to gain a rich understanding of the women, their treatment regime, and constraints of their secure care; my approach to sensitively engaging this vulnerable group of women into a co-creative process to personalise their technology, and to carefully build up a relationship with them; and how the design of the technology builds upon qualities of creativity, physicality and personal significance for promoting engagement in mental health and wellbeing enhancing activities.

In response to the design context I introduce the concept of the *Spheres of Wellbeing*, a set of three artefacts designed to collectively offer opportunities for engagements that are stimulating, enjoyable and personally meaningful; contribute to the formation of a positive sense of self; assist in tolerating emotional distress; and help familiarise the women with therapeutic concepts of mindfulness. Furthermore, in presenting the findings of a real-world deployment and evaluative study of the Spheres, this thesis contributes to current discourse in HCI on how empathy can be enabled with vulnerable populations, and provides rich insights into the complexities and challenges of conducting design-led research within hospital settings.

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Previous Presentations

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Wallace, J., Thieme, A., Wood, G., Schofield, G., & Olivier, P. (2012). Enabling self, intimacy and a sense of home in dementia: An enquiry into design in a hospital setting. *Proc. CHI 2012*, 2629-2638.

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Glossary of Abbreviations & Terms

Abbr.	Term	Description
APA	American Psychology Association	The American Psychological Association is the world's largest association of psychologists and the largest scientific and professional organization representing psychology in the United States. Its work includes amongst others the promotion of research in psychology, the improvement of research methods and conditions and the application of research findings.
AR	Augmented Reality	Augmented reality refers to the real-time (direct or indirect) view of a physical environment whose elements are modified by computer-generated sensory input such as sound, video or graphics, thereby enhancing a person's perception of reality (e.g. adding something to it that isn't physically there).
BPD	Borderline Personality Disorder	Borderline Personality Disorder is a severe mental disorder that is characterised by significant emotion regulation problems, disruptions in behaviour, cognitive disturbances and difficulties to form and maintain positive, stable relationships with others.
BT	Behavioural Therapy	Psychotherapy treatment which argues that apart from inborn reflexes all behaviour is learnt through our interactions with the world and therefore new behaviours can be learned to replace those that cause problems (counter-conditioning).
CBT	Cognitive Behavioural Therapy	Psychotherapy that combines Cognitive Therapy and Behavioural Therapy. Cognitive Behavioural Therapy is the most widely applied and most extensively empirically tested psychotherapy in Western Healthcare.
CT	Cognitive therapy	Psychotherapy treatment that regards maladaptive, unhealthy internal thoughts patterns and beliefs as an important factor contributing to mental illness and through introspection seeks to cognitively restructure these.

ECD	Experience-Centered Design	In this context of this thesis, Experience-centred design relates to Wright & McCarthy's (2010) humanistic approach to designing digital technologies and media that enhance lived experience.
	Forensic Forensic Mental Health Services	Forensic means 'pertaining to the law'. Forensic mental health services are specialist services for people who have a mental health problem and have been arrested, or who are on remand or who have been to court and found guilty of a crime. These services are an alternative to prison for people who have a mental health problem and offer specialist treatment and care.
HCI	Human-Computer Interaction	Human-computer interaction refers to the academic field and study of how people interact with computers and how technology is designed and used to successfully support peoples' interactions within their everyday life.
HRV	Heart Rate Variability	The physiological phenomenon of variation in the beat-to-beat time interval between heartbeats. The higher the HRV the better the body's own regeneration and self-healing abilities.
LD	Learning Disability	Learning Disability is a condition that affects how the person understands information and communicates. Typically, this includes difficulties with regard to understanding new or complex information, how they learn new skills or the ability to cope independently.
	Mental Illness	Mental illness is a condition which causes serious disorder in a person's mental health and refers to more than 400 diagnosable mental disorders including Major Depressive disorder, Schizophrenia, Post-Traumatic Stress disorder, Anxiety or Borderline Personality disorder.

MSU	Medium Secure Unit	Medium secure hospital units usually house service users who are detained under the Mental Health Act, but who do not need to be detained in high security hospitals. They are 'secure', which means that people who are referred there are not free to come and go.
	Positive Psychology	The term Positive Psychology was popularised by Seligman and Csikszentmihalyi (2000), who described it as the study of the conditions and processes that contribute to human flourishing with a focus on what makes life worth living and determining the conditions for human wellbeing.
	Psychiatry	The medical field that is concerned with the diagnosis, treatment and prevention of illness.
SDT	Self-Determination Theory	Self-determination theory is a theory of human behavior and motivation that focuses on the degree to which the person's behavior is self-motivated which is inherent to their personal growth and their psychological needs.
SFT	Solution Focused Therapy	A very structured, strength-based and goal-focused psychotherapy approach whereby clients are invited to construct solutions to their mental health problems.
VR	Virtual Reality	Virtual reality refers to a computer-generated environment that simulates physical presence in places in the real world or imagined worlds. While most virtual reality environments offer primarily visual simulations, they can also recreate sensory experiences such as sound, touch or smell.
WHO	World Health Organisation	The World Health Organization is a specialised agency of the United Nations that is concerned with international public health.

Introduction

1.1 Overview

Good mental health and wellbeing are fundamental to people's general health and quality of life. They enable them to build resilience against everyday stresses, to work productively, have fulfilling relationships, and to experience life as meaningful (Coyle et al., 2014; Thieme et al., 2013b). Mental health however has become a major concern for society due to an increase in the occurrence of mental illness and the devastating effects it has on the individual and economy worldwide (Keyes, 2010). In 1996, the World Health Organisation (WHO) published a report on the Global Burden of Disease that highlighted the large number of acute and chronic mental conditions and the severity of their impact on people's quality of life and life expectancy. Recent large-scale international surveys by WHO indicate an increase in the prevalence of mental disorders with estimated rates across many countries ranging from 12-47% of the population being affected by mental health problems at some stage in their lives (Kessler et al., 2007), and predictions that by the year 2030, mental illness will be the leading cause of burden for developed countries (WHO, 2008).

Mental illness refers to more than 400 diagnosable mental disorders including Major Depressive disorder, Bipolar disorder, Schizophrenia, and Borderline Personality disorder (APA, 2004). These are mental health conditions that disrupt a person's psychological functioning, and are characterised by alterations in thoughts, emotions and behaviours. Their symptoms vary in intensity (mild, moderate, severe) and include for example low mood, anxiety, delusion, substance abuse (e.g. alcohol), or self-harm (e.g. Linehan, 1993a). The often severe impact these disorders have on people's lives highlights the need for effective treatment approaches and access to mental health services. However, despite advances in the development of therapeutic approaches, a large proportion of the people who suffer from mental disorders do not receive a recommended treatment due to social stigma preventing uptake, the cost-intensive nature of many treatments, difficulties with treatment adherence, and general access to mental health services (e.g. Matthews & Doherty, 2009).

In recent years, this has led to a number of explorations into how the field of humancomputer interaction (HCI), and digital technology more broadly, can improve access to, engagement with, and the outcomes of therapeutic treatment (cf. Coyle et al., 2007; Doherty et

al., 2010a). While research in this area is still relatively new, existing technology applications are designed to help with a wide range of mental disorders and client groups, and build on a number of well-established therapeutic strategies (e.g. self-monitoring, exposure). The majority of these interventions follow the format of traditional models of psychotherapy, and are targeted at outpatient services and adults with mild-to-moderate symptoms.

To date there has been a primary focus on increasing access to therapy resources and facilitating treatment, thus little consideration has been given to approaches to, and designs for, preventing mental illness. Only a small number of digital technology-based designs address the importance of offering post-therapy support for averting relapse (e.g. Lederman et al., 2014), or the promotion of mental wellbeing, which we define in the scope of this thesis as positive emotional, psychological and social health (informed by conceptualisations of the hedonic and eudaimonic tradition in Western Psychology and the Eastern Buddhist concept of mental balance). In recent discussions in healthcare and psychology (e.g. Keyes, 2014) it is argued that perspectives on both the *treatment of mental illness* and the *promotion of mental wellbeing* should be considered to holistically address important mental health challenges for effectively preventing or supporting recovery from mental illness.

In response to this, the research presented in this thesis explores the role of digital technology in promoting the mental health and wellbeing of a group of women, who live in a medium secure unit (MSU) of a forensic hospital in the UK. These women are an extremely difficult to treat group due to the severity of their mental health problems, extremely challenging behaviours, and their mild-to-moderate Learning Disability (LD). Research and technology design for hospitalised people with complex mental health problems are largely under-explored areas in HCI.

In this thesis, I present my approach to design in this context. Since strict ethical considerations and procedures regulate access to sensitive care settings or direct contact with highly vulnerable client populations, the application of traditional user-centred and participatory design methods was restricted (cf. Coyle & Doherty, 2009). I therefore describe how I engaged in an empathic, collaborative design process with healthcare and research professionals at the hospital. This enabled me: (i) to gain insights into the complexity of the women's mental health problems, their recommended treatment, and the organisation of their care; (ii) to identify sensitive approaches to working with this vulnerable population; and (iii) to inform, iterate and evaluate the technology design. In response to identified design requirements that evolved from this collaborative process, together with my research team at

our university research lab and key enablers of this research project at the hospital, I developed the concept of the *Spheres of Wellbeing* (short 'Spheres').

The Spheres are a collection of three artefacts that are specifically designed to engage the target participants of the women in activities that assist them in practices of mindfulness, in tolerating emotional distress, and in constructing a positive sense of self; all of which contribute to the promotion of their mental health and wellbeing. The Mindfulness Sphere (Figure 1) assesses and reflects a person's heart rate through colourful lights as a means to invite focused attention; the Calming Sphere (Figure 2) is a non-digital bead-bracelet that can be used for self-distraction when feeling slightly nervous or anxious; and the Identity Spheres (Figure 3) play back short videos that reflect personal interests and meaningful contents related to the person, to invite processes of positive self-reflection and social performances of their identity.



Figure 1. The Mindfulness Spheres.



Figure 2. A Calming Sphere.



Figure 3. The Identity Spheres: closed and opened.

The design of the Spheres builds on qualities of creativity, physicality and personal significance and sought to increase the women's motivation to engage in therapeutic and

wellbeing enhancing activities, to reduce stigma and to respond sensitively to limitations in their cognitive abilities. The women were invited to take part in a carefully scaffolded creative process through which they personalised content and components of their set of Spheres. The artefacts were then deployed with a group of six women in a medium secure hospital unit, an activity which initiated a 15-week evaluation period and the collection of rich qualitative data. This data included the perspectives of multiple stakeholders, to gain an empathic understanding of the women's experiences of the personalisation process and their interactions with the Spheres.

1.2 Research Questions

The research presented in this thesis explores the role of digital technology in promoting the mental health and wellbeing of a group of women who had complex mental health needs, a Learning Disability, and lived in the medium secure unit (MSU) of a forensic hospital in the UK. The thesis focuses in particular on the following research questions and contributions:

1. *How are mental health and wellbeing understood in HCI and how has this shaped the design of digital technology interventions?*

The design of technology for mental health and wellbeing is a relatively new research area in HCI. In considering how mental health and wellbeing are understood in the fields of Healthcare and (Clinical) Psychology, I describe how these have shaped understandings of mental health promotion in HCI and the design of digital technology in this area. I outline how a pathology-based definition of mental health – as absence of mental illness – has led to HCIbased approaches that support access to, effectiveness of, and engagement with, therapeutic treatment; in which the majority of technology applications have built on traditional psychotherapy models and treatment formats. This strong focus on treatment has led to less attention being paid to approaches and designs that seek to prevent illness, avert relapse, and promote mental wellbeing. To extend current understandings of mental health promotion in HCI I define mental wellbeing as positive emotional, psychological and social health (informed by the hedonic and eudaimonic tradition in Western Psychology and the Eastern Buddhist concept of mental balance) and argue that approaches to both the treatment of mental illness and the promotion of mental wellbeing are required to holistically address important challenges for improving and protecting mental health and wellbeing.

2. *How to conduct experience-centred design in the context of the severe mental health problems of the women and their hospital setting?*

People with severe and complex mental health problems are an extremely under-researched population in HCI, especially within the context of (secure or forensic) hospital services. Conducting research in this area is challenging, in part because there are strict and time-consuming ethical considerations and approval procedures that are required to gain access to sensitive care settings, or to be in direct contact with highly vulnerable populations. Furthermore, there is a prevailing expectation in such settings that only fully developed and rigorously tested technologies will be used in end-user engagements, an expectation that conflicts with traditional user-centred or participatory design practices that typically involve the progressive refinement of prototypes. In this thesis I therefore specifically address the following research questions:

2a. How to gain a rich understanding of the design context to inform the technology?

Because of stringent ethical requirements, I was restricted in my engagement with the women in the early stages of the design process. I therefore explored the opportunities and challenges of following a collaborative design approach with a range of different hospital staff responsible both for the care and treatment of the women and for the governance of any research on-site. To create and foster a better understanding of each other's work practices, I describe how, from the side of the research team, this process included presentations of examples of previous HCI research projects employing person-centred, empathic design approaches. I also showed early prototypes of the Spheres to hospital staff, to demonstrate and discuss opportunities offered by digital design. In return, different hospital staff would outline their experiences of working with the women and show me around the MSU, which enabled me to gain an initial understanding of the mental health problems of the women; recommended approaches to their treatment; and their secure care environment. Furthermore, my conversations with hospital staff assisted in the identification of sensitive approaches to working with the women, and helped inform and iterate the design concept of the technology.

2b. How to actively and sensitively involve the women in research and design activities?

Since the design concept of the technology was primarily informed by my collaboration with hospital staff and the academic literature, the importance of identifying a sensitive approach to support the women in actively contributing to and taking ownership of the technology became very apparent. The starting point of the women's involvement was therefore a creative process, in which each woman was invited to engage in a series of creative activities

to personalise elements and the content of their Spheres of Wellbeing (following ethical approval for an exploratory study of the Spheres). I describe how this cocreative process was carefully set-up and scaffolded to assist the women in making pieces that would appeal to them, to help create a place that they would feel comfortable to be in and to interact with and start building a relationship with me. Discussing the value of the creative process itself and the positive contribution engaging in it can make to the mental wellbeing of the participants, I share insights as to how design activities can be constructed that are suitable to the emotional and cognitive abilities to the very vulnerable population group of the women. In this regard, I highlight the importance of involving local research collaborators in the process and how they enabled me to respond more sensitively to the capabilities and some of the problem behaviours of the women. This also helped create a space that felt relaxing to the women, in which they would open up and engage in conversations that would allow a snapshot into their personal interest and experiences.

2c. How to understand the women's experiences of their engagements with the research activities and the technology (and thereby the efficacy of the intervention)?

The complex mental health problems of the women, and their mild-to-moderate LD, can make it difficult for them to be aware of, understand, or articulate their own emotions and experiences. Understanding their experiences of the creative activities and the Spheres, and thus the efficacy of the design, therefore required a continued, empathic process that involved my direct engagements with the women as part of the co-creative process and the technology deployment that were situated within the hospital context. Also adding to my level of understanding were consultations with a multitude of hospital staff, who would share their observations and experiences of the women, and also their perspective on the care environment with me. I discuss my approach to empathic engagement in this setting including, the importance of debriefing experiences with clinical experts, how my understanding of the women developed over time, and how these insights contribute to recent debates in HCI on the role of empathy within sensitive health and care contexts.

3. What are opportunities and challenges for technology design in promoting mental health and wellbeing for people with severe mental health problems in hospital settings?

The work described in this thesis responds to recent challenges in HCI for mental health around identifying strategies for motivating people suffering from mental health problems – who often show symptoms of low mood, hopelessness and helplessness – to engage in therapy, and to

support long-term adherence to effective treatment approaches. In this regard, the technology to be developed for this design context is intended to be perceived as very personal and unique to the individual (rather than as a technical or medical artefact), to lower motivational barriers for engagement and to reduce stigma. Moreover, to date, very little work in HCI has reported on the design or real-world deployments of mental health technologies within hospitals, and within HCI specifically there is a deficit in understanding of how to conduct fieldwork in such settings. The research presented in this thesis therefore also aims to contribute to an understanding of some of the specific practical and organisational constraints of designing and deploying technology in clinical care contexts.

3a. How can interactive physical artefacts become a vehicle for promoting mental health and wellbeing?

In this thesis I explore the role, and potential value, of combining digital technology with attributes of physical artefacts in the creation of a more personally meaningful technology – which is reflected symbolically through the physical form of the Spheres and sentimentally through personal contents that get embedded within the artefacts – in the hope that this will address motivational challenges to engagement. In addition, interactions offered through both digital and physical attributes may be particularly suitable for mental health and wellbeing designs for people who experience restrictions in their cognitive abilities. Physical artefacts, as they emotionally or physically find a place in people’s lives, can furthermore become objects of comfort, and act as mediators of facets of the person’s identity. This deserves particular consideration in the context of this research, where the women are often deprived of any objects that could be of danger to them (e.g. due to risks of self-harm), thereby restricting their ownership of personal possessions that reflect their individuality and that can serve to reinforce their self-concept.

3b. How do the complexities of the design context impact on the conduct of the research?

Finally, I describe how, at times unpredictable, declines and general difficulties related to the severe mental health problems of the women can impact on the conduct of the research and their engagement with the Spheres. Moreover, I discuss challenges for technology adoption within this highly regimented hospital environment, which relate to the work responsibilities, training needs, and rotations of a large number of ward staff that are involved in the women’s care, the hospital culture, and the overall management and organisational structure of the service.

1.3 Research Approach

Aiming to gain an understanding of, and to enhance people's experience with and through technology, the research in this thesis builds on a humanistic methodological approach that has been described by Wright and McCarthy (2010) as Experience-centered Design (ECD). This approach is focused on a person's lived and felt life experiences and involves an understanding of the person's relationship with technology (how they appropriate and make sense of it in the context of their everyday life), and how their interactions and experiences are unique to the person through their own interpretations, feelings and value judgments (McCarthy & Wright, 2005). Developing an understanding of the person and their experiences with technology has drawn attention to the role of empathy in the relationship between researchers and technology users.

According to Wright and McCarthy (2008), empathy evolves through a meaningful emotional encounter between the designer and participant that involves a rich, holistic understanding of the person's lived and felt life experiences; what it *feels like* to be that person and how they *make sense* of their situation, which is closely informed by the person's personal history and anticipated futures. The formation and importance of an empathic relationship is valued in both HCI, as a vehicle for providing important insights for technology design and assisting in the interpretation of research findings; and in healthcare, to frame the care of vulnerable populations in sensitive settings.

In this thesis, my approach as to how empathy can be enabled and supported must address: (i) the mental health condition of the women and limitations in their cognitive abilities, which mean that they may have – more so than others – difficulty in recognising or articulating their own emotions and experiences; and (ii) my personal unfamiliarity with the specific healthcare context of a specialist medium secure hospital unit as a researcher with a background in HCI. In embracing these challenges, and informed by existing design processes for mental health interventions (e.g. Coyle et al., 2007; Doherty et al., 2010), my research adopted an inter-disciplinary approach, whereby the research team worked collaboratively with mental health care providers at the hospital (including Staff Nurses, Consultant Psychologists, Clinical and Research Managers) to gain a rich understanding of the women and their care context, to inform and iterate the technology design, and to support the realworld deployment and evaluation of the Spheres with the women and within this specialist care environment.

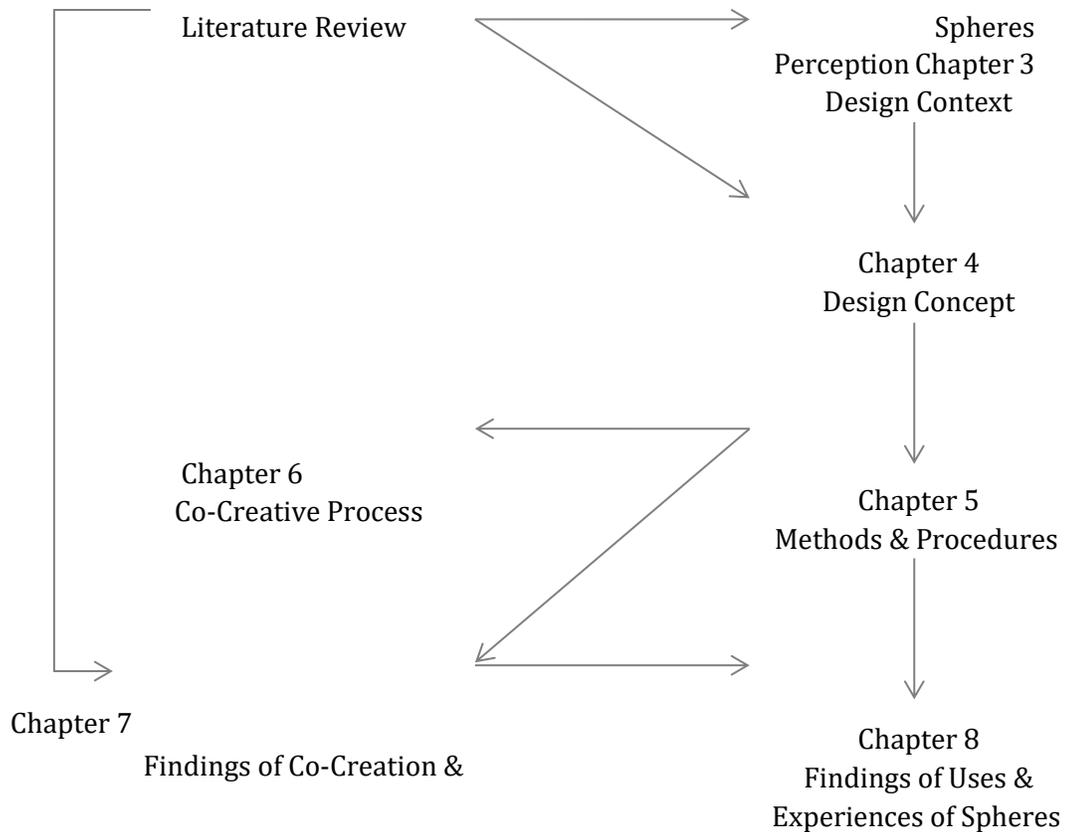


Figure 4. Visual description of the thesis chapters and how they link to each other.

1.4 Thesis Structure

Figure 4 provides a visual representation of the structure of the thesis chapters and how they link to each other.

In Chapter 2, I introduce two main perspectives on mental health from the fields of Healthcare and (Clinical) Psychology, and describe how these have shaped the design and evaluation of mental health technologies in HCI. Furthermore I argue that approaches offered by both perspectives: the *treatment of mental illness* and the *promotion of mental wellbeing*, require consideration to more effectively promote good mental health.

Chapter 3 describes my approach to the acquisition of an initial understanding of the design context of this research. It outlines how I developed a relationship with different staff members at the hospital, and how these engagements provided first insights into the mental health problems of the women, recommended treatment approaches, and specific constraints of their secure care environment.

Chapter 4 summarises identified design requirements and presents sensitive approaches to design in this setting. In response to these I then introduce the design concept of

the Spheres of Wellbeing, which are a set of three artefacts, specifically designed to engage the target group of women in practices of mindfulness, to assist them in tolerating distress, and to strengthen their sense of self. To invite the women to actively contribute to, and enable the development of a more intimate relationship with their Spheres, the artefacts present a set of digital and analogue templates that get completed through a co-creative personalisation process with each woman.

In Chapter 5, I describe both the overall procedure and the individual methods of the creative personalisation process, deployment and evaluation of the Spheres. This includes an outline of: the process of gaining ethical approval; the considerations for protecting my personal safety as well as that of the ward staff and other service users; the arrangements for recruiting participants (ward staff and the women); and for the co-creative activities with the women. It further details on the fabrication process of the Spheres and my approach to collecting, analysing and presenting the research data.

Chapter 6 describes in detail my approach to engaging the women individually in a cocreative process whereby they are invited to make personalised content and elements for their set of Spheres. Following an account of the setting in which these creative activities were situated, I outline the purpose, rationale, procedures and materials that informed each of five activities that were spanning over a five week period.

Chapters 7 and 8 present the findings of the co-creative activities with the women; how the women's involvement in this personalisation process had shaped their relationship with the Spheres; and how they experienced their interactions with these artefacts.

Guided by the research questions, I then discuss the findings of the work presented throughout this thesis in Chapter 9, which includes proposals for future research and technology design for mental health and wellbeing.

CHAPTER 2

Mental Health and Wellbeing: Perspectives & Technologies

2.1 Introduction

Research into the study of technology in healthcare is a large domain that includes fields such as Health Informatics (Goldberg et al., 2011; Hung et al., 2013), or Pervasive Health (Röcker, et al., 2014). Within the scope of this thesis however, I focus more specifically on HCI research and design for mental health and wellbeing; and approaches to design with, and for, vulnerable populations (see Section 4.3).

This chapter introduces two main perspectives on, and approaches to mental health in Healthcare and (Clinical) Psychology; and describes how these have shaped understandings of mental health promotion in HCI and the design of digital technology in this area. The first perspective equates mental health with the absence of mental illness and thus, is promoted in the treatment of mental health problems. I introduce psychotherapy as a key approach to treatment, and describe how technology has been employed to increase access to therapy and to improve the effectiveness of existing treatments. The second perspective considers mental health promotion as the nurturing of mental wellbeing through positive emotions, psychological functioning and social wellbeing. While mental wellbeing is a relatively new concept in Healthcare and HCI, I present early examples of how strategies for mental wellbeing have been realised in existing technology designs, and outline remaining challenges. Although I structured this account according to these two perspectives, the *treatment of mental illness* and the *promotion of mental wellbeing*, their strategies in promoting mental health at times overlap, and in line with the Positive Psychology approach adopted in this research, I argue that in order to improve mental health and wellbeing holistically, approaches stemming from both perspectives have value.

2.2 Mental Health as Absence of Mental Illness

In recent years, mental health has become a major concern for society due to an increase in the occurrence of mental illness and the devastating effects it has on the individual and economy worldwide (Keyes, 2010; WHO, 2008). Mental illness refers to more than 400 diagnosable mental disorders (APA, 2004) including Major Depressive disorder, Bipolar disorder, Schizophrenia, and Borderline Personality disorder. These are mental health conditions that disrupt a person's psychological functioning, and are characterised by alterations in thoughts, emotions and behaviours. Their symptoms vary in intensity (mild, moderate, severe) and may include low mood, anxiety, impulsivity, distortions in thought patterns, or self-harm (e.g. Linehan, 1993a). The often severe impact they have on people's lives highlights the need for

accessible and effective treatment approaches. The first half of this chapter therefore describes how the fields of Healthcare, (Clinical) Psychology and HCI have addressed the promotion of mental health by advancing treatments for mental illness.

2.2.1 Pathology Tradition in Healthcare & (Clinical) Psychology

In the fields of Healthcare, Clinical and general Psychology, the concept of mental health has long been defined as the *absence of mental disorder* (Dubberly et al., 2010; Keyes, 2007; Wood & Terrier, 2010), operationalised through illness-related measures of depression, anxiety, distress or substance abuse that helped to distinguish people who were assessed as ‘mentally ill’ from those considered to be in a ‘normal’ symptom range (Thoits, 1992; Keyes, 1998).

Exploring its origins, Seligman (2002) explained how, with the end of World War II and the foundation of the National Institute of Mental Health (NIMH) in 1947, many academics were awarded with grants for research on pathology. As a result research in Healthcare and Psychology was largely devoted to the study of healing negative human functioning, repairing damage and weakness (Diener, 1984; Ryff & Keyes, 1995; Seligman & Csikszentmihalyi, 2000). While related programmes of research into analysing mental illness and their environmental stressors enabled important advances in the understanding, diagnosis and treatment of mental illnesses, a conceptualisation of mental health that builds on pathology means that important positive mental health aspects – to which I refer as *mental wellbeing* – were for many years largely overlooked in Western medical care and practice (e.g. Jenkinson & McGee, 2002; Keyes, 2014).

Aiming to address this general imbalance, in 2000, Seligman and Csikszentmihalyi established the Positive Psychology movement, which called for more research on human strength and virtue – on how skills and strong qualities of a person can be identified, amplified and nurtured – in order to enable people to *buffer* against troubles or threatening life events, and *flourish* within their social and cultural context. Although positive, strengthfocused approaches are increasingly incorporated within mental health treatments – both in clinical care (e.g. Wood & Terrier, 2010) and HCI (e.g. Lederman et al., 2014) – research in this area is in its infancy.

2.2.2 Psychotherapy Treatment

One of the most important and widely applied treatment approaches for mental illness is psychotherapy, alongside psychiatric medication (e.g. *antidepressants*, *antipsychotics* or *mood stabilisers*) and other less common methods such as Electroconvulsive therapy (controlled

delivery of electrical shocks to the brain) or Psychosurgery (NAMI, 2014). Psychotherapies are psychology-based interventions, whereby the person with mental illness – in mental health contexts referred to as the *client* – engages in a collaborative relationship with a therapist, who employs different techniques to help the person understand, overcome and prevent the re-occurrence of harmful thought patterns, feelings or behaviours (Young et al., 2008). While there are a multitude of therapeutic techniques, psychotherapy approaches can generally be distinguished as belonging to four major schools: psychodynamic, cognitive-behavioural, humanist-existential, and eclectic-integrative (cf. Coyle et al., 2007).

The *psychodynamic* (or *psychoanalytic*) approach supports the client to bring forward and explore unconscious aspects of their self. To this end clients are encouraged to speak freely about their past experiences, with a view to enabling rich insights into how they view their self and others, and make sense of their life. A particular focus is given to distressing and conflicting thoughts or experiences (e.g. childhood trauma) and how they affect the person in the present. In discussions with the therapist, clients would learn to identify and understand certain re-occurring patterns in their thoughts, feelings or behaviours that they may feel unable to escape, which becomes the starting point in changing for the better (Shedler, 2010).

The *cognitive-behavioural* approach combines Behavioural Therapy (BT), which argues that apart from inborn reflexes all behaviour is learnt through our interactions with the world and thus new behaviours can be learned to replace those that cause problems (counter-conditioning); with Cognitive Therapy (CT) that regards maladaptive, unhealthy internal thoughts patterns and beliefs as an important factor contributing to mental illness – alongside behaviours and emotions – and through introspection seeks to cognitively restructure these (cf. Coyle et al., 2007; Hollon et al., 2006).

One very prominent approach that combines both Cognitive and Behavioural Therapy is Cognitive Behavioural Therapy (CBT). CBT is the most widely applied and most extensively empirically tested psychotherapy in Western Healthcare services (e.g. Carr, 2009). It is frequently applied in the treatment of mental disorders such as Depression, Anxiety or PostTraumatic Stress; and has been adapted to meet more specific therapy needs (e.g. Dialectical Behavioural Therapy, see also Section 3.5). Moreover, due to its highly structured format it can be readily supported by digital technology and thus has become the most widely used approach for the design of computerised and online-delivered therapy (Anderson & Cujipers, 2009; Doherty et al., 2012).

In CBT, clients are taught to bring attention to the relationship between their thoughts, feelings and behaviours. They learn about distorted cognitions – rooted in the cognitive

structure of schemata¹ that help to automatically screen, code, and evaluate our experiences – through which they often overestimate the likelihood of the occurrence of negative events and feel unable to cope with those. The aim of the therapy is to encourage a more objective evaluation of the likelihood of negative events and to incorporate evidencebased appraisals (Allen et al., 2008). To this end, a variety of therapeutic techniques can be applied including i.e. the elicitation and questioning of automatic thoughts to help the person understand how they construct reality; relaxation strategies; self-reliance training, whereby client learns to take more responsibility for daily routine and start gaining control over emotional reactions; or exposure treatment (Young et al., 2008). Moreover, in-between therapy sessions, clients are required to keep a diary in which they record significant events and associated feelings, thoughts and behaviours as they occur. Such self-monitoring is an important component of CBT (and many other psychotherapies), as it helps clients to identify important factors that influence their mood or actions, and to develop control by applying their coping skills (e.g. Matthews & Doherty, 2011).

The *humanist-existential* approach regards the person as a unique individual, who has their own values and can make free choices, has the resources for personal growth and selfactualisation, and thus is not a victim to their past, but can re-interpret it in order to live a more fulfilling future (Längle & Kriz, 2012). Within humanist approaches, the *Person-centred* (or *Rogerian*) therapy proposed by Carl Rogers (1961) has been very influential. Rogers believed that the client-therapist relationship is of fundamental importance to healing. For this to happen, the relationship should be characterised by empathy and ‘unconditional positive regard’ for the person. By accepting the person for who they are within an empowering relationship, growth and thus, the development of self-esteem and respect for self and others become possible. In fact, across all psychotherapy approaches (independent of the specific school), the importance of the therapeutic relationships is recognised. Assay and Lambert (1999), for example, estimate that the quality of the therapist-client relationship accounts for about 30% of the overall therapy success, alongside therapy contents and client factors (e.g. their strength and personal resources).

Finally, an *eclectic-integrative* approach involves the flexible use of a selection of therapies in response to the unique experiences and circumstances of the client. Two or more

¹ Maladaptive schemata are for example ‘*mistrust/abuse*’ – as the expectation that others will hurt, humiliate, abuse, manipulate or take advantage of the person; ‘*failure*’ – as the belief that one has failed, will inevitably fail and is inadequate compared to their peers (less achieving) (Young et al., 2008, p.261f).

approaches are therefore combined and integrated with each other to more holistically meet the client's needs (Pearson, 2012).

2.3 Technology-Supported Mental Health Interventions

Despite advances in the development of therapeutic approaches, a large proportion of the people who suffer from mental disorders do not receive recommended treatment due to a range of factors including its often cost-intensive nature; social stigma preventing uptake; and difficulties adhering to treatment and accessing mental health services (WHO, 2008). This has a particular impact on some of the most vulnerable client groups such as children and the socially disadvantaged (Coyle & Doherty, 2009; Harrison et al., 2011). In response to this, a number of explorations have been conducted into how HCI (and digital technology more broadly) can improve access to; engagement with; and the outcomes of treatment (Doherty et al., 2010a). While research in this area is still new, the following describes a variety of existing technology applications that address a range of mental disorders; client groups (children, adolescents, adults); and therapeutic strategies (e.g. homework compliance, exposure). In this context, I further outline some of the core challenges for technology design related to issues around social stigma; protecting confidentiality of client data; engagement with treatment; maintaining a therapeutic alliance; and ethical concerns.

2.3.1 Computerised & Online Therapy

Many early technology interventions replicated traditional therapeutic strategies with the aim to increase the capacity of available treatment services (Coyle & Doherty, 2009). Such electronic formats were similar to paper-based workbooks, made available for people that were in example on waiting lists (e.g. *Beating the Blues*²) and as supplements to face-to-face therapy sessions; thereby reducing contact time with therapists and thus financial costs (e.g. Marks et al., 2007; Spek et al. 2007). While online-based treatments offer a variety of advantages including convenience and ubiquitous access, adaptability to a wide range of mental disorders, and were demonstrated to be effective in controlled settings (see recent review by Andersson & Cuijpers, 2009), they typically suffer high rates of attrition, meaning that users often do not complete the entire treatment programme (e.g. Lederman et al., 2014). Addressing these high attrition rates has been a specific recent concern and in the following, I present three very

² *Beating the Blues* is a computerised, interactive CBT treatment that was recommended in 2006 by the UK National Institute for Health and Clinical Excellence (NICE) for the management of mild-to-moderate depression. [Last retrieved 08.06.2014 from <http://www.nice.org.uk/nicemedia/pdf/TA097guidance.pdf>]

recent approaches that have been proposed to increase engagement with online therapy interventions with the aim to improve overall therapy outcomes.

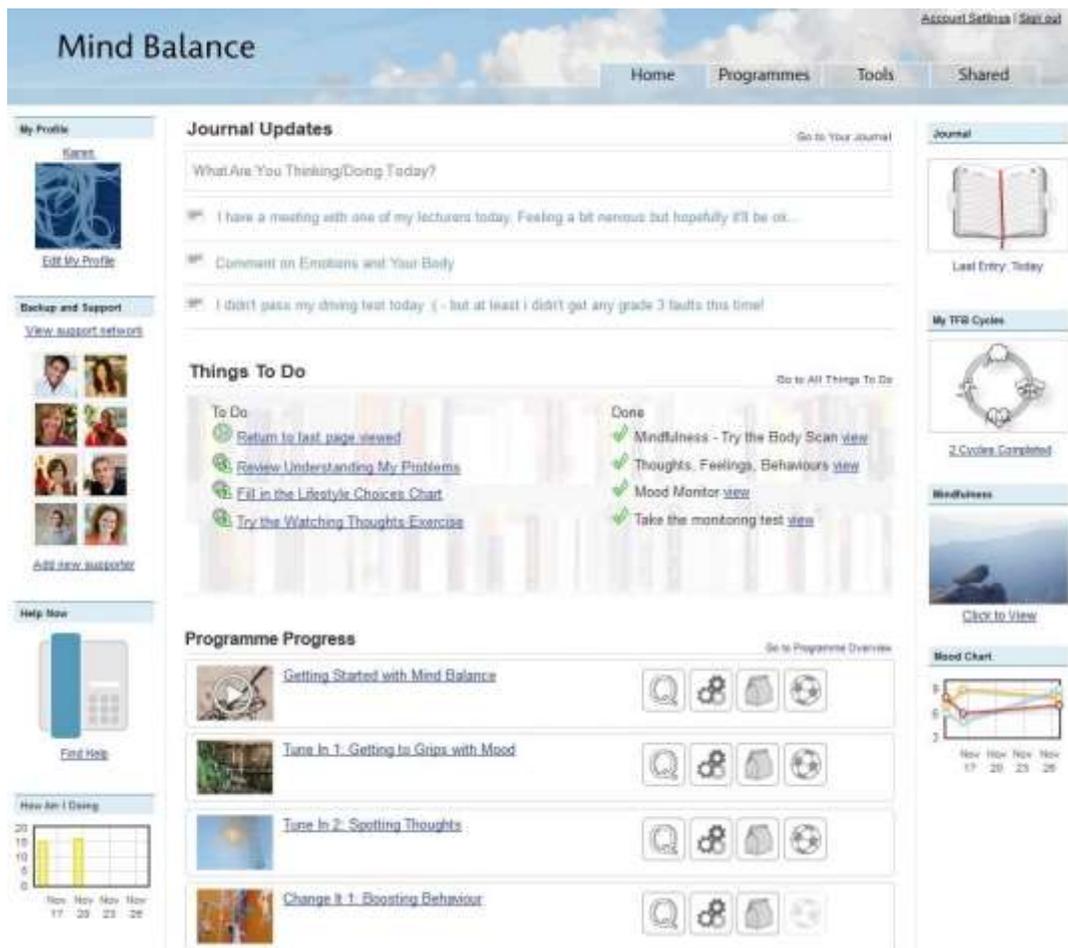


Figure 5. Screenshot of the Mind Balance³ interface.

In 2012, Doherty et al. introduced *Mind Balance* (Figure 5), a guided online CBT programme for depression that is deliberately designed to be an engaging online experience. To this end, they increased opportunities for *interaction* with the system by offering a diverse range of exercises and immediate feedback; designed for a more *personal* experience by including a user profile page and allowing for flexible access and design of their treatment pathway (as opposed to linear content presentation); provided *support* through email contact and content sharing with real therapists; and facilitated a sense of belonging to a *social* community of peers with similar difficulties by allowing users to indicate, anonymously, if they liked certain therapy contents (and show the results across groups of users), and to share their personal story with others. Findings from a clinical trial revealed an increase in adherence to treatment and an overall decrease in their depressive symptoms.

³ <http://www.jmir.org/article/viewFile/2248/1/24329> [Last retrieved 13.09.2014]

Building on concepts of social support, accountability (e.g. taking responsibility for own learning), and Positive Psychology for on-going engagement, Lederman et al. (2014) combined their online therapy service, *Horyzons*, for young people (age 15-25) suffering from Psychosis with a social network structure. In contrast to Mind Balance, in *Horyzons*, all clients accessing the online service are affiliated with the same mental health clinic. Since the online service is carefully moderated and supported by clinicians, it was considered a safe enough space for clients to communicate with each other. Findings of an initial trial showed how users did not only achieve a better understanding of their condition through their use of the service, but identified with their peers and valued in particular the positive support and personal advice that they exchanged with one another.

Finally, the importance of social support for improved user engagement with computerised therapy has resulted in propositions to employ 'relational agents' in mental health interventions (Lisetti & Wagner, 2008). These are animated computational characters, designed to engage clients in social dialogue to facilitate empathy, establish rapport and trust, and thus form a relationship with them, with the goal of enhancing treatment adherence and outcomes. Early pilot studies with clients have shown promising adherence effects (e.g. in medication intake) and a general appreciation of the agent by most clients (Bickmore & Pfeifer, 2008). However, the use of a computer program simulating a person, particularly in psychiatry, raises ethical issues as clients may feel confused, anxious about, or develop a social dependence on such an agent; there is further uncertainty about the accuracy of provided advice; and the ethics of persuading the client to engage in certain behaviours suggested by an automated system (Bickmore & Gruber, 2010).

2.3.2 Mobile Technology for Self-Awareness & -Monitoring

As a platform to support individual management of mental health problems, mobile technology (especially the mobile phone, which is widely used by the general population) is becoming increasingly important. Mobile technology has the potential to facilitate real-time monitoring of thoughts, feelings or behaviours and thus, aid in the completion of important therapy-related tasks; enable in-situ access to therapeutic guidance; collect contextual information to aid identification of distressing triggers; and send reminders (Ben-Zeev et al., 2014; Harrison et al., 2011). Moreover, data collected through the device facilitates important data review and analysis processes for the adoption of treatment approaches to each client by therapists, and the assessment of overall therapy outcomes (Sa et al., 2007).

As a result, mobile devices to support self-awareness and self-monitoring have been developed for a wide range of disorders, and have been used in a number of different ways ranging from self-assessment by people with Schizophrenia (e.g. *FOCUS*, Ben-Zeev et al., 2013; *MATS*, Depp et al., 2010); to the recording of sleep patterns for people with Insomnia (e.g. *Sleepful*, Lawson et al., 2013). Furthermore, more technologically adventurous propositions are emerging for the use of context-aware systems that use sensor data (e.g. activity levels, GPS location) to automatically identify the onset of mental health difficulties for people with Bipolar disorder (*PAM*, James et al., 2009), or Depression (*Mobilyze!*, Burns et al., 2011).

By way of example, the *MONARCA* system by Bardram et al. (2013) for people with Bipolar disorder utilises and combines many of the particular advantages of mobile technology. On a daily basis, this CBT-informed, phone-based system prompts clients to enter and revisit self-assessment data about their mood, sleep or ‘early warning signs’. In parallel, the phone application automatically collects and visualises sensor data about physical activity (accelerometer based) and social activity (number of in- and outgoing calls and texts); offers self-help materials; and supports medicine intake. Findings from a field trial revealed that clients particularly appreciated the self-assessment and visualisations tools, and that – compared to paper charting – their adherence to self-management tasks improved.

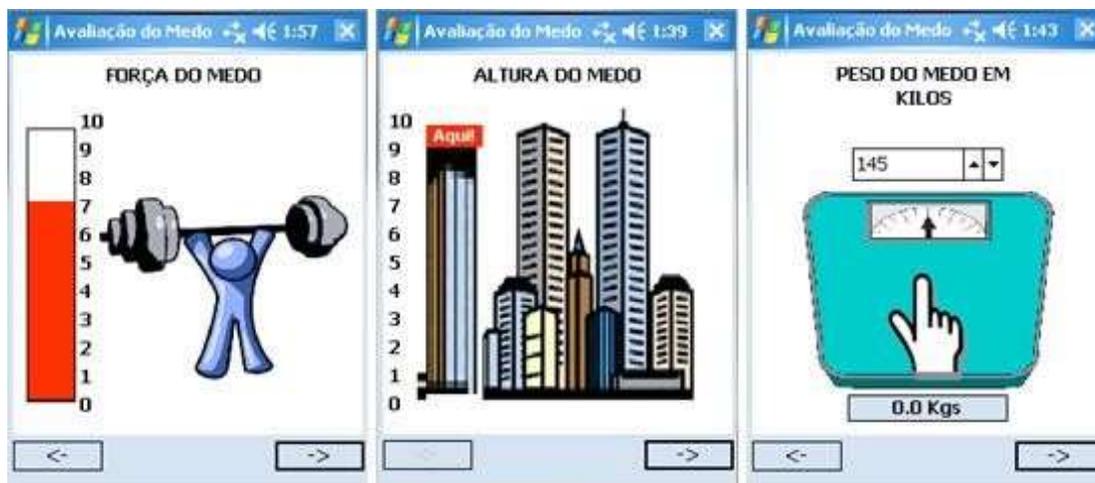


Figure 6. Interface metaphors for quantifying the strength, height and weight of fear.

Despite recent developments in the use of mobile technology for mental health management, the majority of these applications target mild-to-moderate symptomatology and rarely address more vulnerable client populations such as adolescents or children. Counterexamples however include Matthews and Doherty’s (2011) *Mobile Mood Diary* to aid adolescents (age ~14) in adhering to mood-charting activities in-between therapy sessions; and

a system by Sa and Carrico (2012) to support self-monitoring for children (age 5-14), receiving fear therapy.

In their design, Sa and Carrico gave particular consideration to the ageappropriateness of content, and they develop easy-to-use and accessible material for children, who may not possess any reading skills. Building on popular metaphors, Sa and Carrico produced a series of drawings (Figure 6) that could be manipulated by the children to express the intensity of subjectively experienced fear; these images are later revisited by the children together with their therapist. In initial evaluations, children stated a clear preference for the application compared to traditional paper-based tools, which they felt were less fun and less accessible. However, they had a preference for the inclusion of audio feedback, and for the graphics to be more natural and expressive of fear. Early findings of a clinical study revealed significant improvements in compliance with frequent fear charting.

Despite of their advantages, not all clients like to use their mobile phone for therapeutic purposes, and variations in technology literacy skills (of both clients and therapists) can impact on client confidence in using a service (Matthews & Doherty, 2011). Indeed there are a number of barriers to widespread use of mobile technology for mental health services, including the continuous release of new devices (and the associated need for continued development and support of such applications); overall engagement problems as observed with more standalone applications; important perceived privacy concerns about monitored personal, potentially sensitive data despite user consent, secure servers, password protection and data encryption (Depp et al., 2010; Doherty et al., 2010a; Harrison et al., 2011); as well as ethical concerns particularly about system prompted self-assessments of the clinical state of people with severe emotional difficulties and high risks for self-harm and other psychiatric emergencies (as this could trigger negative thoughts or behaviours without necessarily more appropriate, or needed professional support at hand).

2.3.3 Technologies to Complement Traditional Psychotherapy

In contrast to both standalone systems for the delivery of therapeutic strategies and mobile systems to assist in self-management in-between therapy sessions, the following considers a number of systems that were designed to complement traditional psychotherapy activities.

2.3.3.1 Virtual/ Augmented Reality Exposure in Treatment of Anxiety or Phobia

One common strategy used in Behavioural Therapy (BT) or CBT for the treatment of Anxieties or Phobias is to 'expose' the client to their feared stimuli or context. To support this, virtual

reality (VR) and augmented reality (AR) systems have been developed, and evidence for the most recent systems demonstrates an effectiveness that is comparable to traditional evidence-based interventions (Oprış et al., 2011). The use of virtual contents has a number of distinct advantages including the ability to adapt the stimuli (e.g. spider, flight simulation); stimuli control by therapists (e.g. their amount, size); and exposure performances within a safe environment (Wrzesien et al., 2011). However, such systems are generally expensive to deploy, and in few cases clients were found to not have an emotional reaction to the 'virtual' stimuli (Oprış et al., 2011).

2.3.3.2 Game Features to Support Self-Expression for Children & Adolescence

Game play has been explored for engaging in particular client groups such as adolescents or children in therapy in the hope that it can increase motivation, self-esteem and self-efficacy. Coyle et al. (2005) introduced the 3D computer game *Personal Investigator* (PI) for use within treatment sessions. This role-play game builds on Solution Focused Therapy (SFT), a very structured, strength-based and goal-focused psychotherapy approach whereby clients are invited to construct solutions. As part of the game, the client (age 13-16) becomes an investigator on a mission to resolve their personal problems (Coyle & Doherty, 2009) that includes activities such as goal-setting, writing about in-game experiences in a detective notebook, and watching of videos of peers telling their stories.



Figure 7. Example of two gNats and a screenshot of the game interface⁴.

A related approach is found in the *gNats 3D* game for adolescents (age 10-15) that implements concepts from CBT. Here, players are on a tropical island, where they can get stung

⁴ <http://www.gamification.co/wp-content/uploads/2013/08/gnats-island-2.png> [Last retrieved 13.09.2014]

by little creatures called gNats (Figure 7) that represent and cause a variety of negative automatic thoughts. Together with a team of wild life explorers, the player learns to identify and challenge these thoughts (Coyle et al., 2011).

A series of evaluations of both games, targeted at clients with moderate-to-severe mental disorders (e.g. anxiety, depression), showed: that clients enjoyed using it, how it acted as an icebreaker; offered context for deeper conversations, and reduced difficulties related to face-to-face conversations (e.g. avoidance of eye-contact).

Presenting a non-directive therapy approach, Pykhtina et al. (2012) introduced *Magic Land*, a touch-based tabletop application (Figure 8) that included a wide range of interactive digital toys to promote self-expression, storytelling and creativity during play therapy for children (age 5-11). Findings of a real-world pilot study revealed how the children enjoyed, felt empowered by, and had a sense of mastery using Magic Land that was evaluated by therapists to have enhanced opportunities for creative play beyond traditional therapy toys.



Figure 8. The Magic Land game and tabletop interface for child play.

For all systems intended as treatment complements, such as games and also VR or AR tools, there is concern that they may interfere with the therapeutic alliance or offer too much distraction – for example if a client gets more involved with a game than the therapist or contents (Coyle & Doherty, 2009; Coyle et al., 2011). However, thus far, such concerns have been only marginally confirmed (Wrzesien et al., 2011) or the opposite effect has been demonstrated (an enhanced therapist-client relationship), where the tools are carefully embedded in the collaborative dialogue, and are shared or controlled by both parties (cf. Coyle et al., 2013).

2.3.3.3 Biofeedback for Monitoring & Controlling Physiological States

Finally, the use of biofeedback technology has become popular, and shown to be successful, as an adjunct to psychotherapy, particularly in the treatment of anxiety and negative mood

(Henriques et al., 2011), depression (Karavidas, 2005), and stress-related chronic pain (Hallman et al., 2011). Biofeedback allows for the direct observation of a person's physiological state and can thereby increase self-awareness, which provides opportunities for self-monitoring and to achieve more self-control. Biofeedback has been widely used as a component of relaxation training to reduce symptoms of stress. One prominent example is the *StressEraser*⁵, a hand-held biofeedback device (see Figure 9), commercially developed and distributed by Helicor in 2006, which visualises the heart rate of the client (assessed by an infra-red fingertip sensor), and cues clients not only to slow down their breathing but to synchronise their inhales and exhales with the natural cycle of their heart rate, also referred to as heart rate variability⁶ (HRV). In clinical studies involving clients receiving CBT treatment for stress-related conditions such as Depression, Insomnia and Post-Traumatic Stress disorder (e.g. Reiner, 2008), findings revealed that the device helped to significantly reduce anxiety, anger and difficulties with sleep.

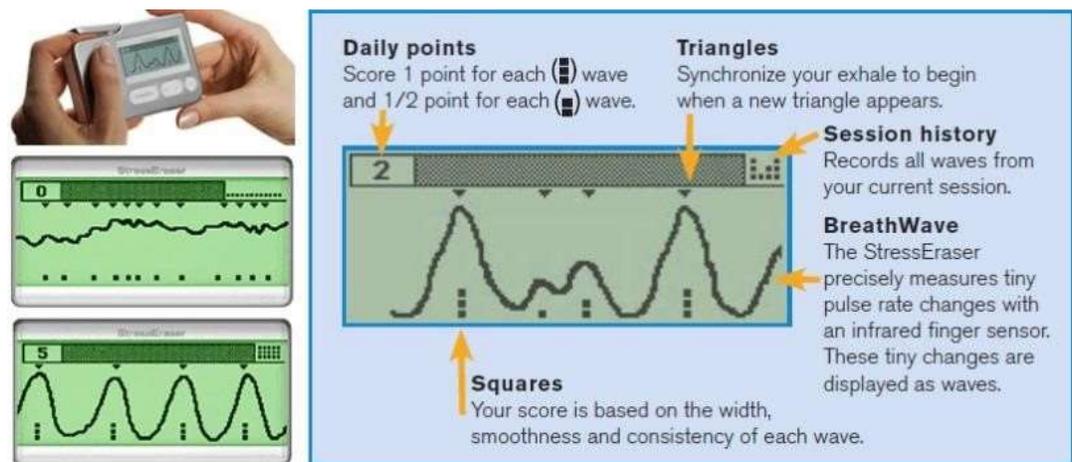


Figure 9. The StressEraser device.

Another, very recent commercial HRV biofeedback device is the *Qui*⁷, which is marketed to clients with a range of disorders including depression. The Qui also assess a person's pulse using infra-red, but presents its feedback as a red or green LED light at the top half of the ball-shaped device (see Figure 10). The user is guided in their breathing frequency by blue LEDs on its side.

⁵ <http://stresseraser.com/> [Last retrieved 11.06.2014]

⁶ HRV is the beat to beat difference of the heart rate in milliseconds. It reflects the activity of the parasympathetic nervous system: the higher the HRV the better the body's own regeneration and self-healing abilities.

⁷ <http://www.biosign.de/qiu/> [Last retrieved 10.06.2014]



Figure 10. The Qui HRV biofeedback device.

2.3.4 Approaches to Designing & Evaluating Mental Health Technologies

An in-depth understanding of how people experience in particular severe mental health problems is difficult to achieve, especially for HCI researchers, who typically do not have any clinical training or prior experience of therapeutic settings (Matthews et al., 2014). In addition, there are strict ethical considerations and procedures that regulate access to sensitive care settings or direct contact with highly vulnerable client populations, and these place considerable constraints on the application of traditional user-centred, participatory and iterative design methods (Coyle & Doherty, 2009). Most developments in this area therefore follow a two-stage process whereby at first new technology is designed and developed in close collaboration with mental healthcare providers, and are then deployed as part of clinical evaluations (Coyle et al., 2007).

For stage one, the design and development of the technology, researchers often start by developing an understanding of their target client group and design context using the academic literature on characteristics and theories of mental health problems as well as treatment manuals (e.g. Ledermann et al., 2014). Some also engage in therapy related training (Pykhtina et al., 2012); others extend their understanding by studying video documentations of real therapy examples (Sa et al., 2007); or build on data and experience reports of previously conducted healthcare fieldwork (Doherty et al., 2010b; Furniss et al., 2014). In addition, due to the restrictions placed in accessing and working with clients, the design of mental health technologies is often undertaken by a multi-disciplinary team, whereby HCI researchers engage in a collaborative and iterative design process with mental health professionals (MHPs), who

can play an important role in informing and assessing technology concepts (Doherty et al., 2010a).

Collaboration with MHPs can utilise a variety of design activities. Typically, these include meetings, interviews and focus groups that enable MHPs to share their knowledge of the client group, existing treatments and practices. Discussion and conversations stemming from these activities help establish common ground and often contribute to design ideations and iterations (Doherty et al., 2010a). At times, this process can be supported by *role-play* activities and simulated therapy sessions, which help clarify in-situ system use and the potential training needs of therapists (e.g. Matthews et al., 2014; Sa & Carrico, 2012). Furthermore, low and higher fidelity *prototypes* can be used to both stimulate imagination or deepen discussions about potential designs, and to assess and iterate usability issues and the general fit of a design concept with existing services (e.g. Wrzesien et al., 2011). Early stage system evaluations that form part in this process typically involve therapists, who provide feedback on the design concept, and ‘mentally healthy’, non-clinical peer users, who act as clients and give feedback on system usability or appeal (Matthews & Doherty, 2011).

The involvement of mental health clients in the design stage is extremely rare. Lederman et al. (2014) interviewed clients at a youth mental health clinic about the kinds of functionalities they wished to include in a therapy-related online social support network; and also Bardram et al. (2013) reported on the involvement of clients with Bipolar disorder in design workshops to understand how they were affected by their illness and to assist in the system design. However neither provide much detail about how they sensitively engaged their participants in these design activities, other than accounting for ethical considerations such as utilising a familiar environment, avoid causing distress, and ensuring that they can stop participating at any time; and noting that participants were more open to share personally sensitive issues in one-on-one interviews rather than in groups (cf. Marcu et al., 2011).

In order to deploy a technology with clients and in real-world clinical contexts (i.e. Stage 2), designs must be reviewed and approved by MHPs as be suitable for clinical use, and any study requires ethical approval. This can be complex and time consuming to organise and can only succeed if the safety (*‘no harm to clients’* rule) and a potential positive impact of the proposed study have been thoroughly demonstrated (Coyle & Doherty, 2009).

Since research and development in the field of HCI for mental health is still in its early stages, the vast majority of clinical studies present exploratory evaluations of a new technology rather than Randomised Controlled Trials (RCTs). During such evaluations, systems are primarily assessed in terms of their usability, usefulness and user satisfaction (e.g. Coyle et al.

2011); how they impact on the quality of the client-therapist relationship; the extent to which they engage clients with the treatment; support reductions in symptoms (e.g. using quantitative assessments such as *Beck Depression Inventory (BDI)*; Beck et al., 1961) and increase adherence to therapy (e.g. Bickmore & Pfeiffer, 2008).

Common clinical evaluation methods include expert reviews (e.g. Coyle & Doherty, 2009); semi-structured interviews with MHPs (Pykhtina et al., 2012) and clients (Lederman et al., 2014); questionnaires for therapists and clients (often administered via therapist or online-system) to evaluate their technology experiences (e.g. Coyle et al., 2005); and also the logging of user interactions with a system (e.g. Bardram et al., 2013). As noted earlier, recently increasing use has been made of sensor technology to better support continuous and objective measures of mental health (e.g. Rabbi et al., 2011; Khosla et al., 2013).

2.3.5 Summary & Remaining Challenges

The serious impact of mental disorders on people's mental health and society as a whole has in recent years led to increased efforts by HCI researchers to support the access to, effectiveness of, and engagement with therapeutic treatments. Existing digital technology applications address a wide range of mental disorders, client groups, and therapeutic strategies. They provide opportunities for psycho-education; goal-setting and behavioural change; symptom charting and self-monitoring; reminder setting; automatic collection and review of client data; tools in support of exposure or relaxation activities; and can serve as vehicles for self-expression and storytelling. As a consequence of the particular affordance of digital technology, and the accumulation of evidence as to clinical efficacy, these technologies find overall positive acceptance by both clients and therapists. However, despite these important advances, a number of significant challenges remain.

Due to mental health clients being generally considered as vulnerable, and the stringent ethical approval processes that restrict access to them by non-clinicians, there has so far been little, if any, involvement of clients in the design process of new HCI technologies to address their needs. This leaves space for explorations as to how sensitive engagement with clients could be designed to facilitate the design and development of more appropriate technologies, systems and digitally enhanced approaches to care and therapy.

Moreover, many existing technology-supported mental health interventions very closely follow the format and structure of traditional therapeutic approaches. It is likely that this is a consequence of the requirement to demonstrate the potential benefits of a technology to ethics committees and MHPs in order to receive approval for technology deployments within

clinical contexts. This is most easily achieved where the technology builds on accepted treatment models; is integrated within already established practices; and is used under guidance of MHPs. As a consequence, this can limit the scope for technology and design innovation in this area.

In addition, the majority of described treatment aids, particular standalone and largely self-educational systems, are targeted at adults with mild-to-moderate symptoms. To date, far less attention has been paid to clients with more severe and complex mental health problems or – with existing designs largely targeted at outpatient and primary care services – hospital inpatients, who often present as the most vulnerable and challenging to treat.

Since there has been a primary focus on increasing access to therapy resources, only a small number of systems have been developed as therapy complements, and there is an underexplored space for digitally-enabled therapeutic strategies for self-expression, or positive storytelling (see further Section 2.5.2). Furthermore, although existing designs consider the importance of client factors for therapy outcomes and argue for the need to adapt services to the individual needs and strength of each client, this has largely been understood and addressed in very pragmatic terms (e.g. customising therapeutic contents; fine tuning of medication reminders). However, opportunities for utilising strategies based on *personalisation* and *person-centeredness* for client engagement with therapeutic activities are still largely underexplored.

Only a very small number of systems, mostly in the context of designing for children or adolescence, take potential restrictions in client literacy into account. Individuals with a Learning Disability (LD) are the population that is most at risk for developing mental health and behavioural problems (Lew et al., 2006) with the prevalence of anxiety or mood disorders being twice that of the general population (Robertson, 2011). This means that many mental health clients often also experience cognitive deficits, which impacts on their ability to sustain attention, to learn new things, or to understand complex problems (MENCAP, 2012).

Finally, since to date the primary focus has been on treatment, there has been little consideration of strategies for preventing mental illness; and only a small number of technology concepts address the importance of offering post-therapy support for averting relapse (e.g. Lederman et al., 2014). This suggests that the field should extend its focus on mental health promotion by including strategies for supporting aspects of positive emotional, psychological and social health, to which I refer in the following as *mental wellbeing*. This may not only increase our understanding in terms of reducing and preventing illness, but also as to how positive psychological functioning can be maintained, enhanced and protected.

2.4 Mental Wellbeing as Positive Mental Health

In recent years, the illness-related focus on mental health has changed. Increasingly empirical evidence confirms (e.g. Keyes, 2007) that an absence of mental illness does not ensure the existence of positive psychological health, or vice-versa; instead mental health and mental illness were found to present two distinct continua. Thus, to effectively promote mental health requires both the reduction of mental illness (*pathogenic* focus) and the presence of mental wellbeing (*salutogenic* focus) as positive mental health (Keyes, 2007; 2014). This more holistic view is for example captured in the following definition by the World Health Organisation (WHO, 2004), which describes mental health not in terms of absence of illness but as a state “*which allows individuals to realise their abilities, cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their community*” (p.12).

Over the last 50 years, there have been many attempts to define mental wellbeing, a concept that presents itself as rather complex, multi-faceted and dynamic (e.g. Beiser, 1974; Ryff, 1995). In social and psychological sciences, mental wellbeing has mostly been operationalised under the rubric of *subjective wellbeing*, which is based on an individual’s own, internal evaluation of their quality of life, making it distinct from externally assessed, objective measures such as a person’s wealth or education level (Keyes, 2012). The literature on subjective wellbeing further distinguishes two main perspectives, both of which are closely interwoven: the *hedonic* perspective equates wellbeing with positive ‘feelings’ towards life and refers to it as *emotional wellbeing*; whereas the *eudaimonic* perspective considers wellbeing in terms of a person’s level of ‘functioning’ in life, including the extent to which they can realise their true potential, as *psychological wellbeing*, and also *social wellbeing* (e.g. Biewas-Diener et al., 2009; Keyes & Annas, 2009; Ryan & Deci, 2001). While the eudaimonic perspective is primarily informed by Western psychology research, I suggest adding to it the concept of *mental balance* from Eastern Buddhist tradition by Wallace and Shapiro (2006).

While I describe for each perspective important factors that were identified to contribute to, and help achieve mental wellbeing (see Figure 11 for an illustrative summary⁸).

⁸ This illustrative summary is informed by Gallagher et al.’s (2009, p.1035) *hierarchical wellbeing models*; Diener’s (1984); concept of *subjective well-being*; Keyes (2007, p.98) *13 dimensions of flourishing*; Baumeister and Leary’s (1995) *belongingness*; Ryan & Deci’s (2001) *three psychological needs*; Ryff’s (2013, p.11) *six dimensions of psychological wellbeing*; and *mental balance* (Wallace & Shapiro, 2006).

However there are a variety of moderating factors⁹ that can influence how wellbeing is experienced that are not extended on in the scope of this thesis.

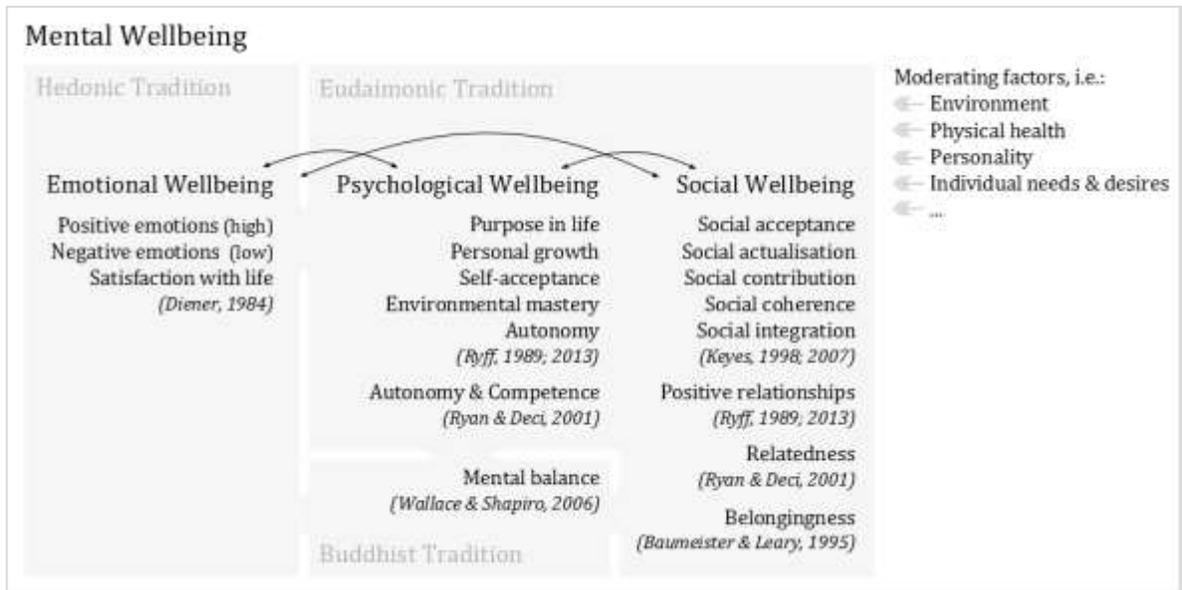


Figure 11. Illustrative summary of prominent wellbeing concepts and their contributors.

2.4.1 Hedonia: Pleasure and Happiness

The hedonic perspective regards wellbeing to result from attaining pleasure. It is informed by a long tradition in philosophy (e.g. Aristippus, Hobbes, DeSade) that regards the pursuit and experience of a maximum of pleasures as the goal of life, with happiness resulting from the accumulation of hedonic moments. These pleasures can be related to the body (e.g. food, sex, physical achievement) as well as to the mind (e.g. fulfilled self-interests). Within the hedonic perspective exists a predominant view that wellbeing is constructed from the difference between pleasures versus displeasures, and how satisfied one feels with life (Bradburn, 1969; Diener, 1984). This perspective therefore suggests that all human beings should strive for maximum happiness whilst avoiding pain (Kahneman et al., 1999; Ryan & Deci, 2001).

2.4.2 Eudaimonia: Realising One's True Potential

The eudaimonic perspective questions pleasure and happiness as a key criterion for wellbeing (Ryff, 1995). Instead, it proposes that experiences of wellbeing are gained by leading a 'virtuous' life, whereby the person attains a sense of self and can live in accordance with their 'true' self (Diener, 1984; Ryan & Deci, 2001). According to Waterman (1993), if people's activities in life

⁹ These include inter-personal differences in *personality traits* (e.g. *Openness* links to personal growth; Schmutte & Ryff, 1997), and in *needs, desires* or *interests*, and the extent to which they require fulfilling (e.g. Diener, 1984); *environmental* factors that can hinder or support wellbeing developing (e.g. Ryan & Deci, 2012); and *physical health*.

are in agreement with their deeply held values and beliefs and they fully engage in these activities, then eudaimonia occurs as a feeling of intense aliveness and true authenticity. In the eudaimonic perspective, simply attaining pleasures could be a gratification of ‘wrong’ desires such as striving for wealth, approval or fame that can in reality increase discontentment and frustration (e.g. Dalai Lama & Cutler, 1998; Kahneman et al., 1999).

Instead wellbeing is achieved by finding meaning in life and in realising one’s potential (Ryff & Keyes, 1995; Ryff, 2013). Thus, activities that relate to eudaimonia afford opportunities for personal development and growth, and may be experienced as challenging or effortful.

2.4.2.1 Purpose, Personal Growth, Competence & Autonomy

In 1989, Ryff provided a theory-informed conceptualisation of wellbeing that was rooted in the existing developmental, humanistic and clinical psychology literature on positive human functioning (e.g. Erikson’s (1959) *psychosocial stage model*, Roger’s (1961) concept of the *fully functioning person*) and identified six distinct dimensions that since have withstood extensive empirical testing (Ryff, 2013). These include the extent to which the person believes their life has purpose, meaning and direction (*purpose in life*); a sense of continued development and growth (*personal growth*); the possession of strong social ties with others (*positive relationships*); the capacity and competence to manage their life situations (*environmental mastery*); positive evaluations and acceptance of themselves (*self-acceptance*); and a sense of self-determination (*autonomy*) (Ryff, 1995; 2013).

Ryan and Deci’s (2001) self-determination theory (SDT) also embraces the assumption that all individuals have a natural and constructive tendency for personal growth (unless hindered due to social-environmental factors). Yet, for growth and psychological wellbeing to develop three universal psychological needs have to be fulfilled: *autonomy*, feeling to initiate one’s own behaviour and to act in one’s own interest; *competence*, feeling effective in one’s interactions with others and experiencing opportunities for expressing one’s capabilities; and *relatedness*, feeling connected to others and feeling cared for (Deci & Ryan, 2012, pp.7-8). Their fulfilment is considered to lead to optimal personal wellbeing and social development, enabling the person to feel intrinsically motivated, capable of fulfilling their potential and seeking out greater challenges in life.

A person’s motivation to grow and strive towards realising their true potential is closely linked to their understanding of themselves, as their *sense of self* or *self-image*. As such, a positive and strong sense of self is crucial for psychological wellbeing. Through expressions of self, via the narratives that people tell about themselves, they construct their self-identity,

which includes a variety of personal and social roles such as their identity as a family member, or work colleague (Gibson, 2014; Ricks et al., 2014). Thus, a person's sense of self is informed by their life experiences, which brings attention to the interconnected role between identity and a person's memory. In particular episodic memories that relate to emotionally relevant experiences (Tulving, 1972) and autobiographical events form part of a person's identity. Autobiographical memories include knowledge about different periods and general events in a person's life as well as detailed knowledge about specific events. As life experiences can become autobiographical memories, autobiographical memories, when recalled, allow the person to (re-)experience their past self and integrated it with their active self-image. Thus, through the construction and retrieval of personal memories, as a 'resource' of the self, aspects of self can be defined, sustained or adapted. This aids in the creation and maintenance of a coherent sense of self over time (Conway & Pleydell-Pearce, 2000), and, if disclosed to others, can enable vital social interactions and reminiscence. Finally, the internal recall of positive memories can also act as a cognitive defense strategy for emotional distress (cf. Boden & Baumeister, 1997).

2.4.2.2 Mental Balance

While these previous conceptualisations resonate with Western understandings of mental wellbeing, the fields of Healthcare and Psychology have also started to draw on the spiritual tradition of Buddhism¹⁰ and its 2500 year old history of cultivating and sustaining people's wellbeing in the identification and treatment of mental problems (Wallace & Shapiro, 2006). In Buddhism, skilful and continuous mental training is regarded to free the mind of any mental imbalance (as a source of distress) and enables the person to realise their "*fullest potential in terms of wisdom, compassion, and creativity*" (Wallace & Shapiro, 2006, p.691). In this tradition, an authentic sense of wellbeing reflects the inner state that remains when all external, pleasurable stimuli disappear, highlighting the importance of mental balance and the cultivation of positive attitudes and meaningful commitments to life.

To achieve and maintain mental balance, *mindfulness* meditation practices have recently increased in popularity and have been successfully incorporated in healthcare and clinical practices (e.g. Bear, 2003; Fjorback et al., 2011; Kabat-Zinn, 2009). According to Jon Kabat-Zinn (2004), a major pioneer of this meditation approach in the Western medical community, mindfulness "*means paying attention in a particular way: on purposes, in the present moment,*

¹⁰ Buddhism here refers to the two Buddhist Schools of the Theravada Buddhism of Southeast Asia and Mahayana Buddhism that originated in India and later evolved in Tibet (Wallace & Shapiro, 2006).

and nonjudgmentally. This kind of attention nurtures greater awareness, clarity, and acceptance of present-moment reality.” (p.4). Mindfulness is not about accomplishing something, doing something perfectly or changing anything; it is simply about *being* (Chilvers et al., 2011; Kabat-Zinn, 2009) by stopping to notice and appreciate whatever happens in the moment (Chödrön, 2001; Linehan, 1993b). As such, mindfulness allows the person to tune into their body and mind, to find inner strength, to feel more in control of themselves (CMRP, 2012), and to remain centred in the reality and fullness of who they are (Crump & Fraser, 2011).

2.4.2.3 Social Wellbeing

As already included in the wellbeing conceptualisations of Ryff (*positive relationship*) and Ryan and Deci (*relatedness*), Baumeister and Leary (1995) also regard what they termed *belongingness* to others to be a fundamental human need. Building on a large body of empirical evidence, they highlight its strong connection to general health and mental wellbeing. In their hypothesis of belongingness they propose that “*human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships*” (p.497). However, they found that mere affiliation alone, without a sense of caring cannot satisfy this need. Instead, they suggest that individuals need to have frequent personal contact with some other person and that these interactions have to be perceived as pleasant and provide an interpersonal bond that is marked by stability, continuation and affective concerns (e.g. that one feels cared about by the other).

The importance of a person’s integration in social structures and communities for their health and wellbeing has further been acknowledged by Keyes (1998), who extended previous wellbeing conceptualisation by a social dimension with five components. According to him, socially healthy individuals should feel as being part of a society (*social integration*), feel valued by and to contribute to others (*social contribution*); should be able to understand and predict the dynamics of a social group (*social coherence*); feel that their social group can grow and develop (*social actualization*); and feel comfortable with and trust others (*social acceptance*); all of which contribute to their self-perception as a valuable social resource and to feel safe and cared for within their social environment.

2.5 Positive Technology: Designs for Mental Wellbeing

Research in Healthcare and Psychology has identified important factors that contribute to mental wellbeing and the importance of promoting ‘positive’ health for treating and preventing illness as well as for nurturing and maintaining wellbeing more generally. However, how to

enable people to stay well, function well, and flourish still presents a challenge (cf. Keyes, 2010). While there have been first examples in Clinical Psychology reporting promising results of more positive approaches to psychotherapy treatments (e.g. *daily diary keeping of positive experience* as an addition to CBT, Fava et al., 1998; promotion of positive emotions through *recall of positive autobiographical memories*, Tarrier, 2010), research in this area is in its infancy. Similarly, research and design within HCI has only recently begun to respond to this positive agenda for mental health and wellbeing (Coyle et al., 2012; 2014; Thieme et al., 2012). Although many of the designs or systems presented in the following were not explicitly designed with a wellbeing agenda in mind, or developed for, deployed and evaluated within a health or care context, they relate to and have shown the potential to support some of the mental wellbeing factors described.

2.5.1 Design for Pleasure

Pleasure can result from engaging in enjoyable activities such as play, entertainment, from the aesthetics and beauty of things, or their novelty. HCI research concerned with pleasurable experiences has brought forward concepts or disciplines such as *funology* (Blythe et al., 2003), *emotional design* (Norman, 2004), or *hedonomics* (Hancock et al., 2005).

In this area, researchers have argued that for technology to be pleasurable the design needs to be *aesthetically appealing* in terms of beauty, feel or sound (e.g. Norman, 2004), and respond to people as human beings with rich senses and a body, who gain pleasure through qualities such as *tangibility* and *physicality* that offer texture, weight, and possibilities to manipulate and have a sense of physical control (Overbeeke et al., 2003). Some argue that *usability* is a prerequisite for enjoyable technology use (e.g. Jordan, 2000), others describe how certain disruptions can feel enlivening (Wallace & Press, 2004), make people wonder (Paulos & Beckman, 2006) or enchant them (Wright et al., 2008). This brings value to qualities such as *ambiguity* (Gaver et al., 2003), *slowness* and *expressiveness* (Hallnäs & Redström, 2001) for their thought-provoking potential, and thus, as a source for pleasure. Finally, people's interpretation of, and relationship with technology, as proposed through situated interactions, deserve closer consideration: how are people making sense of the technology, or how does their use support expressions of their identity, and therefore, help fulfill their wider emotional and social needs (cf. Blythe et al., 2003; Hassenzahl, 2004; Jordan, 2000; Thieme et al., 2011)?

Although what is considered pleasurable very much remains in the eye of the beholder, there have been large efforts both in industry and HCI research to design for entertaining experiences. Computer games are at the forefront due to joy that often results from a sense of

control, mastery and achievement. In the context of mental health and wellbeing interventions for vulnerable populations, many examples relate to playful engagements in technology designs for children with Autism¹¹ and other special needs.



Figure 12. The 'body paint'¹² interaction translates movements into colourful visualisations.

ReacTickles (Keay-Bright, 2012) for instance are a set of applications that were designed as cause-and-effect activities whereby certain visuals would playfully respond to gestural interactions (using Kinect) or multi touch inputs (using tablets) by autistic children (age 4-7). Through movement or touch that appear to pull away, push or stretch abstract shapes and in using bright colours, light and sound for different visualisations (Figure 12), curiosity about the interaction is nurtured and moments of surprise and creative, playful selfexpression are enabled. As such, interactions with *ReacTickles* were described by the authors to allow children to focus their attention, help reduce their challenging behaviour, and to make them feel happy and relaxed, and to increase their confidence in own abilities (KeayBright & Gethin-Lewis, 2011).

Playful interfaces such as *ReacTickle* and games more generally present activities that enable the experience of *flow*, defined by Csikszentmihalyi (1991) as an optimal feeling of pleasure or happiness, where the individual feels strong, alert, in effortless control, unselfconscious, and at the peak of their abilities. Yet, flow is not a passive experience. It needs to be cultivated through an activity that is within the control of the person and that sets challenges which are neither too simple (risking feelings of boredom), nor too demanding to achieve (avoid risking feelings of frustration or anxiety; Diener, 1984). Associated developments of skills, feelings of personal growth and mastery that characterise flow distinguish it from the simple attainment of pleasures. Thus, flow can be considered to sit inbetween formulations of hedonia and eudemonia.

In other words, emotional wellbeing – alike the concept of pleasure described in HCI– is often regarded as an outcome or by-product of engagements in activities that are described

¹¹ Autism spectrum disorder causes difficulties to socially interact and communicate and also the display of restricted or repetitive activities (Keay-Bright, 2012).

¹² Image from http://lukesturjeon.co.uk/wp-content/uploads/2013/04/2_RET2.jpg [Last retrieved 16.06.2014]

in the eudaimonic tradition such as the joy that can arise from partaking in stimulating activities (e.g. ReacTickles); meeting friends; or reminiscence activities (cf. Biswas-Diener et al., 2009). The examples that I present in the following will make the interwoven nature of the mental wellbeing perspectives and factors even more apparent.

2.5.2 Design for Self

As outlined in Section 2.4.2.1, personal memories and their (re-)construction are fundamental to a person's self-concept. Conceptualisations of self are expressed through narratives, either internally – as the person reviews and reflects about their life and discovers a trajectory within it; or externally – as personal life stories are shared with others. Thus, personal narratives and opportunities for self-expression have increasingly received attention in mental health care (e.g. *Narrative Therapy*, Ricks et al., 2014; White & Epston, 1990).

Technology offers a wide range of possibilities that allow people to capture, author, make sense of, or pass on their personal stories including tools to promote self-awareness and reflection (e.g. *Affective Diary*, Ståhl et al., 2009; *SenseCam*, Hodges et al., 2011); interactive devices for creative self-expression or storytelling (e.g. *Magic Land*, Pykhtina et al., 2012); media contents for reminiscence (e.g. *CIRCA*, Astell et al., 2010; *PhotoStroller*, Gaver et al., 2011); technology heirlooms (e.g. *Timecard*, Odem et al., 2012); or interfaces for constructing and revisiting self-portraits (e.g. online profiles on social network sites, Livingstone, 2008). These designs commonly encounter challenges around privacy, ownership and control over person-related information; the relevance of offered interactions and contents to the self; space for openness and restrictedness in stimuli, self-expression or interpretation; and technology use to construct, represent and also forget personal stories (e.g. Sas & Whittaker, 2013). In terms of design for self and psychological wellbeing, there have also been large efforts to enable people to live autonomously such as assistive technologies in the field of pervasive and ubiquitous computing (e.g. Arnrich et al., 2013); and a multitude of computerised tools in education (e.g. Jenkins et al., 2011), supporting personal development through the learning of new skills.

While there are many technology applications that could be employed to support people in the construction of a positive self-image, this topic has received little attention so far within HCI research on health or wellbeing. Exceptions include research by Isaacs et al. (2013), whose smartphone application *Echo* invites users to record everyday life events through photo, audio or video snapshots, text labels and happiness ratings, and encourages them to revisit and reflect on these later. Findings of a 1-month study revealed improvements in participants' wellbeing, who enjoyed capturing and reminiscing about positive events and described to have benefitted

from analysing negative events or emotions; as it helped identify recurring patterns or habits, and plans for changing those that were unwanted.

Moreover, within the scope of this thesis, the following two designs that were targeted at promoting sense of self of vulnerable populations deserve closer consideration. I first present research by Wallace et al. (2012), who designed an interactive art piece for people living with moderate-to-severe Dementia in a secure, inpatient hospital unit. *Tales of I* has been designed with the intention to foreground the person (not their illness) by bringing emphasis to their personal interests, relationships or experiences as a way to maintain and reconstruct a sense of self. The two-part furniture piece comprises of a wall cabinet with a selection of resin globes (Figure 13) that, when placed on top of a bespoke TV cabinet (Figure 14), trigger the playback of a short film, showing footage of a specific theme (e.g. nature, football) and different periods. Interactions with the piece enabled activities of reminiscence; offered a space for calm, relaxation and distraction; and by recognising and referencing to self-relevant materials in the videos, it helped preserve a sense of self through stimulated person-focused, intimate and more balanced conversation between the person with Dementia and their care givers; this further enabled meaningful relationships to be formed (e.g. with new hospital staff) or strengthened (e.g. with family members).



Figure 13. The Tales of I wall cabinet with globes.



Figure 14. The television cabinet with the Nature themed globe on top and the Nature film playing.

Second, I present research by Clarke et al. (2013), who explored the role of photosharing practices at an international centre for women who are survivors of domestic violence. Domestic abuse can take many forms (e.g. physical, financial, sexual) and impacts particularly on a person's self-esteem, as it often causes feelings of shame, a lack of confidence and identity; and affects their relationships with other people. To rebuild a life, an understanding of self as well as trust and confidence in new social bonds after such a life disrupting experience is challenging. Clarke et al. describe their sensitive, feminist participatory arts approach to research and design in this context, whereby they invited the women at the centre to partake in a series of informal, group-based 'digital portrait workshops' to collect, create and share photo- and video representations of their personal experiences. To stimulate ideas and prompt reflection on self, the women were provided with a 'portrait pack' (Figure 15) that included a digital camera, sound recorder, portrait frame and a set of paper tokens to inspire the women to record aspects of their lives they valued. Through joint acts of co-located photo-sharing or curations of video contents, the women would reflect about and share their stories and experiences of 'moving on', which enabled interpersonal performances of self; helped in forming social bonds; and at times reminiscence. Some of these stories would reflect and highlight the importance of newly formed friendships; others visualised movement and transitions in their life (e.g. adapting video contents over time from presenting images of sadness towards more positive, hopeful footage), highlighting the dynamic and complexity of re-building a sense of self. From these workshop engagements evolved the design of *Photo-parshiya*¹³ (Figure 16), an interactive, portable piece that enables the sharing of personalised photo-collections at the women's centre.



Figure 15. Inspiration tokens and portrait pack used in the workshops with the women.

¹³ <http://di.ncl.ac.uk/things/photo-parshiya-digital-photo-album/> [Last retrieved 14.06.2014]



Figure 16. Photo-parshiya¹⁴ enabling the creation of personalised photo-collection.

While not all of these examples of existing technology are necessarily positioned in relation to promoting facets of psychological wellbeing, they reveal a wide range of opportunities as to how digital design can be employed to support people in the (re-) construction of a positive and stable self-image. In this context I have highlighted the importance of personal self-expression through narration, either internally or socially. Internal sense-making processes can be triggered and enhanced by technology, providing tools to capture, present or represent self-relevant information; thereby increasing self-awareness, inviting self-reflection, and creating opportunities for positive experiences of reminiscence. Socially, a person's perspective is constructed in the stories they share with others, which enables social affirmations of their identity and can nurture social bonds. This however requires a supportive environment where the individual feels safe to open up.

2.5.3 Design for Mindfulness

The increasing popularity of mindfulness meditation as a means to maintain or restore mental balance; to cope with everyday stresses; and to promote work-life balance, has led to a multitude of commercial software applications such as *Buddhify*¹⁵, *Stillness Buddy*¹⁶ or *Head Space*¹⁷. These are commonly used to remind their users to take regular breaks for practices of mindfulness, and offer a variety of exercises to choose from. Within HCI however, only few examples exist of technology design or research on mindful awareness.

In 2007, Shaw et al. presented for example the *Meditation Chamber*, a virtual environment installation that creates and displays audio and visual content through a headmounted display, and guides the user through a meditation experience (e.g. guided breathing or body movements). Using biofeedback of the person's heart rate, respiration and galvanic skin response, users can further subtly alter presented visual contents.

¹⁴ <http://di.ncl.ac.uk/wp-content/uploads/2014/04/photo-parshiya-heritage.jpg> [Last retrieved 13.09.2014]

¹⁵ <http://buddhify.com/> [last retrieved 22.04.2014]

¹⁶ <https://www.stillnessbuddy.com/> [last retrieved 22.04.2014]

¹⁷ <http://www.getsomeheadspace.com/> [last retrieved 22.04.2014]

A similar approach can be found with Vidyarthi et al.'s (2012) *Sonic Cradle* (Figure 17), an interactive piece comprising of a hammock chair placed inside a dark chamber (to remove any visual distraction) that enables the person sat in it to shape the soundscape in the room through variations in their breathing, as assessed by respiratory bio-sensors attached to their chest. As such the system invites meditation novices without any guidance to bring continued awareness to either their breathing or the sound. In a qualitative study reported by Vidyarthi and Riecke (2014), participants described how *Sonic Cradle* led to experiences of relaxation, mental clarity or reduce thinking; which align well with notions of mindfulness.

A related design is the *ExoBuilding* (Figure 18) by Schnadelbach et al. (2012), a breathcontrolled architectural structure in the form of a tent that maps the respiration of the person lying underneath by increasing or decreasing in volume, and sonifies and visualises (via LEDs) the person's heart rate. A user study revealed how engagements had reduced participants' respiration rate, increased coherence between respiration and heart rate, and enhanced their awareness of their inner physiology. However, being perhaps too immersed, participants responded with judgement to their physiology (e.g. expressed worries about a too fast heart rate and tried to alter it), revealing the core potential of the tent for uses as a biofeedback training interface (e.g. as HRV technology) rather than mindfulness.

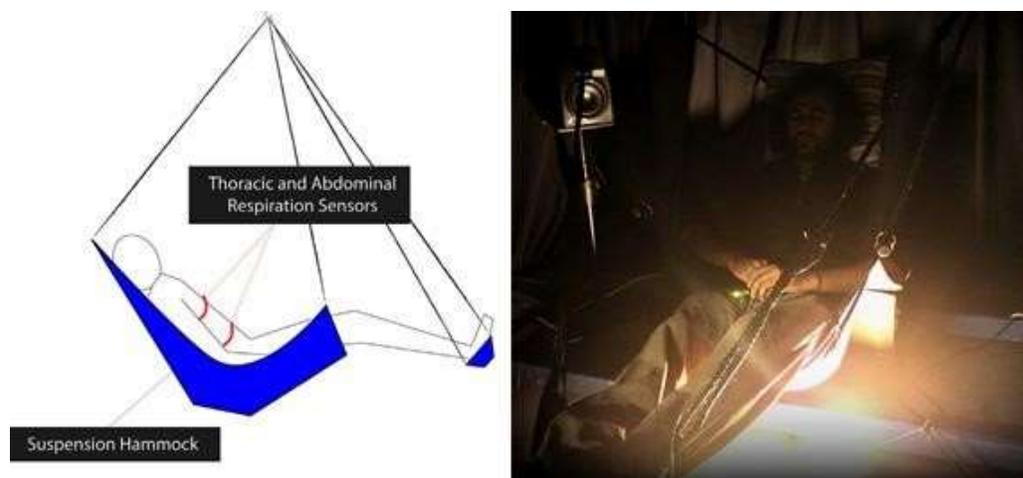


Figure 17. Diagram of Sonic Cradle and image of the dark chamber (lit for clarity).



Figure 18. The ExoBuilding breathing tent contracted (left) and expanded (right).

Inspired by self-reflective practices of mindfulness, the *Mind Pool* (Long & Vines, 2013) is an interactive artwork that assesses participants brainwave frequencies (using Electroencephalography via electrodes placed across the scalp) and visualises them through the production of ripples inside a ferro-fluid pool (Figure 19), supplemented by sonic feedback. As such it is envisioned to invite exploratory interactions and to provoke a state of mindful reflectivity in participants upon their mental state.

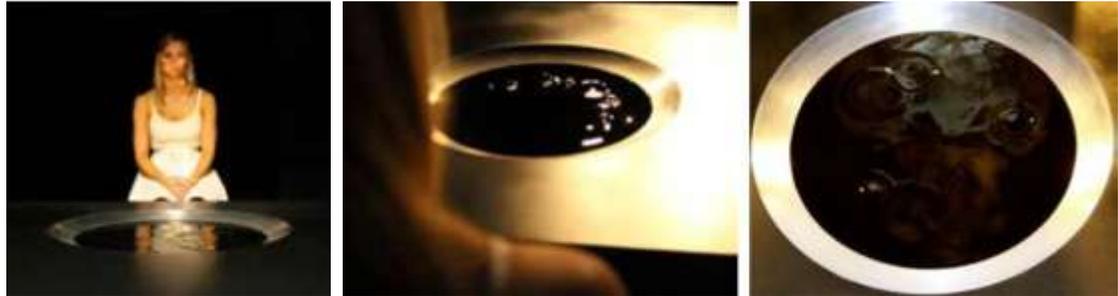


Figure 19. The MindPool as it was deployed in a public gallery.

Finally, Feltham and Loke (2012) introduced the *Slow Floor*, a pressure sensitive interactive surface that creates sound in response to bodily movements, thereby inviting users to explore movements and to bring focused attention to their body. Overall, these early, mostly theory-informed designs commonly build on externalisations of internal physiologies or feedback on body movements as assessed by sensor data, enabling users to bring focus attention to a certain stimuli (e.g. breath, movement, brain activity) that they themselves can potentially alter or control. While some designs guide the user, they mostly offer experiential exploration to promote more intuitive interactions particularly for novice meditators.

2.5.4 Design for Social Wellbeing

A powerful determinant of mental wellbeing is the human need for positive and stable social relationships. Thus, a significant body of HCI work has sought to support, augment and extend intimate experiences (see recent review by Hassenzahl et al., 2012). Many of these designs address the sensual character of intimacy (e.g. touch, hugging, warmth); make the presence of others apparent; or mediate social interactions using i.e. Skype or online social networks.

For promoting social wellbeing, we find for instance the design of robots as social companions for children (e.g. *iCat* for playing chess, Leite et al., 2012) or care home residents (e.g. *Matilda*, a robot that can dance, tell jokes, or play Bingo, Khosla et al., 2013). A prominent example is *Paro* (Wada & Shibata, 2007), a fluffy robotic baby seal (Figure 20) that is equipped with sensors and motoric abilities allowing it to be responsive if talked to or touched. It was designed to engender pleasure and relaxation for elderly people in geriatrics services in Japan. Evaluative

studies showed how interactions with Paro decreased residents' stress levels, increased their mood, and communications with other residents and care givers.



Figure 20. The Paro¹⁸ seal robot.

To support a sense of social connectedness between long-term hospitalised children, their parents and peers at school, Wadley et al. (2014) introduced the *Presence App*. The App visualises activity levels in remote locations using a 'lava lamp' metaphor and offers photosharing functionality. This rather ambient form of mediating a presence between separated places and people was preferred to more direct communication that may disrupt school routines or risk exposing the hospitalised child (i.e. if their appearance had changed due to illness). A field trial revealed frequent uses and a general liking of the App by children and demonstrated a sense of social connectedness. Yet, constrained communication possibilities felt insufficient to parents, who wished for richer information about their child.

Another prominent approach to computer-mediated communication and the provision of social and emotional support are social network sites (SNSs). These can be standalone wellbeing support communities such as *BigWhiteWall*¹⁹, *BeatBullying*²⁰ or *Time-toChange*²¹, as well as uses of, or implementations within, wider SNSs such as Facebook. Andre et al. (2011) for example introduced the social network tool *Healthii* that allows the person to express their wellbeing on Facebook or Twitter through a four digit code (e.g. twitter #healthii{1231}) representing the four discrete dimensions: Busyness, Enjoyment, Stress, Health (values: 1 = not, 2 = quite, 3 = very). The tool, which was deployed in a work setting, is sought to convey a rich, yet lightweight sense of wellbeing when posting a status. The required coding and decoding of

¹⁸ Images from <http://artificialbrain.net/wp-content/uploads/2013/06/PARO-therapeutic-robot-seal.jpg> [Last retrieved 16.06.2014] and <http://www.nytimes.com/2010/07/05/science/05robot.html?pagewanted=all> [Last retrieved 13.09.2014]

¹⁹ Online mental wellbeing service, <http://www.bigwhitewall.com/landing-pages/default.aspx?ReturnUrl=%2f> [Last retrieved 15.06.2014]

²⁰ Advice and help by online counsellors for adolescents and children that experience bullying <http://www.beatbullying.org/> [Last retrieved 15.06.2014]

²¹ Online service to challenge mental health stigma and mental health discrimination, and for organising community activities and events <http://www.time-to-change.org.uk/> [Last retrieved 15.06.2014]

wellbeing states was found to increase self-reflection and to also raise awareness about a person's wellbeing in the community of colleagues, thereby inviting opportunities for social and emotional support.

Investigating the relationship between people's uses of Facebook and their social wellbeing, Burke et al. (2010) found that directed communication with friends such as leaving wall comments or liking their photos related to greater feelings of social bonding and less loneliness, whereas users who primarily consumed contents of others (e.g. read stories about their friend's activities) reported less social bonding and greater loneliness. Thus, although Facebook use generally correlated with greater overall wellbeing, the quality of interactions within SNSs determined if and how social bonds were maintained or strengthened.



Figure 21. The Lovers' box: closed and opened with a screen visible at the inside.

Finally, I present the *Lovers' box* (Thieme et al., 2011) as a design that invites communications that are directed at a particular significant other and is intended to go beyond subtle expressions of intimacy as it requires individuals to be active co-creators of their experience. It is an interactive artefact that resembles an old fashioned looking jewellery box (Figure 21), yet incorporated technology allows couples to create and reciprocally exchange video messages with their partner. Findings from an exploratory study revealed how the creation and display of embedded highly personal, gift-like videos felt pleasurable, invited reflections about the relationship (affirming their identity as a couple), and led to conversations about personally meaningful experiences that enabled intimacy to grow.

Technology can initiate, mediate or recreate social interactions. It can help lower barriers to become part of a community, offering opportunities to feel socially accepted and supported (particularly in the context of mental health); and has the potential to bring individuals who care about each other closer together.

2.5.5 Approaches to Designing & Evaluating Mental Wellbeing Technology

Design for mental wellbeing is a very new, under-explored research area within HCI. Since the technology examples presented in Sections 2.5.1-2.5.4 are wide ranging in the terms of their purpose, target group and in their design and evaluation methods, the following only gives close consideration to approaches for design in hospital settings; for working with vulnerable populations; and presents evaluation criteria that are more specific to ‘positive’ mental health.

Two designs were introduced for use within hospital services: *Tales of I* and the *PresenceApp*. Due to the clinical context and the ethically sensitive nature of involving people with Dementia or ill children in design processes, these were instead conducted with hospital staff and other relevant stakeholders such as teachers or the parents of hospitalised children. As described in Section 2.3.4, such collaborations with health and care providers commonly involves design workshops and interviews to gain rich insights into existing practices and are required for negotiating compromises between varying perspectives, expectations and needs presented by different stakeholders (including researcher/designer); and also to fit within the constraints of these often highly regimented, institutional settings.

Within participatory design approaches and particularly for engagements with vulnerable populations, the use of art and craft materials often form a central practice (see further Section 4.3.2). I presented examples of making – as a form of hobby-based creative activities rather than expert craft or DIY – for instance in the digital portrait workshops with the women survivors of domestic violence (Clarke et al., 2013). Making enables people to feel more comfortable when sharing something about themselves and their lives, either as they are involved in the act of making, or staged through the pieces they create (Marshall et al., 2014); it thus presents a sensitive approach to both gaining an empathic understanding of their personal experiences and to inform technology design.

As part of participatory processes, creative engagements may also involve the completion of ‘probes’ informed by Gaver et al.’s (1999) Cultural Probes. Wallace et al. (2013) for example designed a set of ten empathic design probes specifically to foreground the biographies of a person living with Dementia and their care giver. These bespoke probes creatively pose questions to participants as a means to scaffold reflection and dialogue related to the person’s sense of self, self-worth, and key experiences and people in their life. For example, the *Self-Seeding* probe presents a seed packet with plant labels asking: “*If you could turn your qualities, personality traits or idiosyncrasies into seeds that could be planted and grown,*

what would these be?" (p.2620). Invited responses to these were found to sensitively and creatively enable intricate perspectives on the person's life and personality.

Since research in this area is still new, evaluations are largely exploratory and qualitative, informed mostly by interview and observational data. While rarely incorporated in evaluations of mental wellbeing designs in HCI (for exceptions see i.e. Isaacs et al., 2013), there are a variety of quantitative assessments that find increasingly application in Healthcare and Psychology to assess positive mental health. These include for example the *WarwickEdinburgh Mental Well-Being Scale (WEMWEBS)*, Tennant et al. 2007), a positively worded measure to assess peoples' general mental wellbeing; Ryff's *Psychological Well-Being Scales (PWBS)* (Ryff & Keyes, 1995); Keyes' (1998) *Social Well-Being Scale (SWS)*, as well as scales to measure spirituality or mindfulness (e.g. *Cognitive and Affective Mindfulness Scale-Revised (CAM5-R)*, Feldman et al., 2007).

2.5.6 Summary & Remaining Challenges

Extending the focus on positive mental health as a combination of emotional, psychological and social wellbeing I introduced a variety of HCI designs that demonstrate potential in promoting mental wellbeing. Presented examples highlighted the interwoven nature of in particular the hedonic and eudemonic conceptualisations of wellbeing and identified wellbeing factors. For designs to be pleasurable and to nurture positive feelings of happiness, it was recognised that interactions with them should be within the abilities of the person; invite curiosity and imagination; address all human senses; and fulfil a person's wider needs. Moreover, while positive emotions can result from engagements with activities described in the eudaimonic tradition such as meeting friends or engaging in re-creational activities, vice versa, such short-term gratifications can play a vital role in motivating the person to commit to and try achieve longer-term, or more challenging tasks, on the path to realising their true potential (cf. Beiser, 1974; Diener 1984). This places emphasis on the importance of pleasure and happiness for motivation to learn, manage difficulties or change for the better.

I further described how technology can be employed to facilitate self-awareness, internal reflection and social performances of self; all of which hold promise for supporting the person in their construction of a sense of self. Yet, our understanding as to how technology can be designed to support the interpretation of life stories and help the person in forming a positive self-image that is marked by stability and continuity is largely under-explored. Associated challenges relate to questions such as: what kind of information about the self is meaningful and important in gaining a positive self-perception, and what role can technology play in this; or, in

an era where technology allows for the constant capturing and revisiting of a multitude of personal data, how does this impact on processes of forgetting certain life events and opportunities to re-interpret or adapt these later in life?

While there have been early examples of technology designs demonstrating potential for supporting mindful awareness, more research is needed to explore how user engagements develop over time, and how such technologies could be employed as training wheels for promoting mental wellbeing more specifically. Although not described through existing digital designs, mindfulness and mental balance can positively impact on a person's ability to stay centred in their life, be resilient to everyday stress, and kind to self and others.

I have further presented examples as to how technology can support social wellbeing by mediating social interactions; enhancing a sense of social connectedness as well as intimate experiences. Technologies in this regard can be wide ranging including companion robots; interactive physical artefacts; and a variety of communication interfaces. While these can help create opportunities for social exchanges and thereby have the potential to strengthen social ties and invite emotional support, they are challenged by questions such as: how can technology be designed to not only increase frequency and access to others, but ensure that mediated interactions are sufficiently meaningful and characterised by a true sense of caring instead of creating an illusion of togetherness that may not fulfil a person's need for relatedness (cf. Turkle, 2011); how to create opportunities for social exchanges whereby individuals feel comfortable to mutually disclose personal information; or what are the potential risks of mediated social interactions taking over rich face-to-face contact?

Finally, whether technology has the potential to enhance a person's social and emotional wellbeing and to positively enrich their self-concept is informed not only by offered technology features but the social and emotional context in which interactions are situated, and thus, the kind of practices in which the technology becomes embedded.

2.6 Conclusion

In this chapter I introduced the literature describing two main perspectives on promoting mental health and wellbeing and how these have shaped existing understandings and designs in HCI. At first I presented a pathology-informed definition of mental health as absence of mental illness, and described how technology has been employed to increase access to, and improve the effectiveness of, important psychotherapeutic treatments. I highlighted how, due to ethical constraints for working with vulnerable people, there has been little involvement of individuals with mental health problems in design processes, bringing importance to

collaborations with mental health professionals as proxies. Moreover, existing technology interventions often closely follow the format of traditional therapeutic approaches to justify their potential benefits and receive approval for deployments within clinical contexts, which can limit the scope for technology innovation in this area. The majority of existing systems are further targeted at outpatient services and adults with mild-to-moderate symptoms, with less attention being given so far to clients with more severe and complex mental health problems and hospital inpatients, who present often the most vulnerable and challenging to treat groups. In addition, few projects consider cognitive limitations and literacy restrictions in their design.

Second, I introduced formulations of hedonic and eudaimonic mental wellbeing in Western Psychology and the Eastern Buddhist concept of mental balance, describing important factors that contribute to positive emotions, psychological functioning and social wellbeing above and beyond the treatment of mental illness-symptoms. I outlined how mental wellbeing technology can be designed to enable enjoyable experiences; support individuals in internal and social identity performances to construct a positive and strong self-image; provide tools for learning and practicing mindfulness meditation; and help form and maintain important social ties. To continue advancing design and research in HCI on mental health, I argue that approaches of both perspectives on *treatment of mental illness* and *promotion of mental wellbeing* should be combined to address important challenges for improving mental health and supporting the prevention of, and recovery from, mental illness more holistically.

The research presented in this thesis investigates the role and potential of technology design in promoting the mental health and wellbeing of a group of women, who had complex mental health problems, a mild-to-moderate learning disability, and who lived as inpatients in the medium secure forensic hospital services in the UK. To this end, the following Chapter 3 describes my approach to gaining an initial understanding of the design context. In Chapter 4, I then summarise identified design requirements; suggest sensitive approaches for design in this context; and in response, introduce the design concept of the Spheres of Wellbeing.

CHAPTER 3

Understanding the Design Context

3.1 Introduction

In this chapter, I present my approach to Experience-centred Design (ECD) in this context. ECD brings emphasis to the importance of building relationships between people (researcher and researched) and regards knowledge as resulting from a process that creates dialogue, enabling researchers to see the world from another's point of view. To gain a rich understanding of a person's experiences, ECD requires considering individuals holistically and suggests engaging with them within their everyday life. It also entails a commitment to respect researcher and researched as differently placed centres of value in the design process, where the researcher/designer brings in her own values, interests and sensibilities; with design being ultimately the result of co-production (Wright & McCarthy, 2010). In line with ECD, this chapter describes how I developed my relationship with different staff at the hospital, and how my initial understanding of this design context was informed through our engagement. Consultations with hospital staff provided rich insights into the mental health condition of the women, recommended treatments, and some of the unique requirements for organising their care within the secure environment. All of these were central to informing and iterating the concept of the Spheres of Wellbeing, which I then describe in Chapter 4.

3.2 My Collaboration with Hospital Staff

The Spheres of Wellbeing project came about through a hospital visit by one of my supervisors, who was shown around a specialist National Health Service (NHS) Foundation Trust that provides care and treatment for people with a Learning Disability, as part of a larger research project that addresses issues of social exclusion through the design of digital technology. During his visit, my supervisor met with staff nurses working on the medium secure unit (MSU) of the hospital, who introduced him to the particularly challenging and severe condition of the female service users. Inspired by this visit and conversations as to what role technology could play in helping to increase the self-esteem of these women, one of the Staff Nurses came to attend an open research event at our university research lab in Newcastle to explore opportunities for a joint collaboration. During this event, I was showcasing one of my previous research projects (the *Lovers' box*; Thieme et al., 2011), through which we were drawn into conversation that revealed our shared interest in mental health and wellbeing. This marked the starting point of a new, long-term collaboration.

To continue exploring ideas for potential technology design and research, the Staff Nurse established contact with the Research and Development (R&D) Manager of the hospital, who was responsible for managing collaborations with academic partners. In addition to her role as a research coordinator, the R&D Manager was a trained Cognitive Behavioural Therapist who had been working in this particular women's service for more than 15 years. Due to their personal experience of working with, and concern for, the women, both the Nurse and R&D Manager showed great interest in facilitating, and contributing to research that could help improve the circumstances of the women. As a result, they both acted as key enablers in the planning of the project and took on official roles in the later conduct of the research as Research Nurse and, for the R&D Manager, as Local Investigator (cf. Thieme et al., 2013b; 2014b).

All my initial visits to the hospital were organised and led by the R&D Manager, and benefited from her good relationship with other hospital staff, who she selectively invited to join one or more of six meetings that were held at the hospital. Overall, these included four Staff Nurses working on the MSU; a Ward and a Clinical Nurse Manager; a Consultant Clinical Psychologist; a Safety Manager; three Research Staff; and the Medical Director of the hospital. Access to the target research group was constrained at this stage due to the vulnerability of the women and related strict safety and ethical requirements and approval processes. These restrictions meant that my understanding of the design context was required to be largely informed through my collaboration with hospital staff, who were sharing their experiences of working with the women and their understanding of their interests, motivations and needs. The Human-computer interaction (HCI) research team for this collaboration included me as the lead and Chief Investigator of this project, who has a background in Media and Communication Sciences and little prior experience of working within healthcare settings; and my supervisory team, who have backgrounds in Psychology, Computing Science, Fine Art, Social Science, or Clinical Psychology. My supervisors and I regularly discussed my understanding of this particular research context, and they contributed valuable ideas and helped iterate concepts for the design and evaluation of this project. Moreover, the research team was extended for the fabrication and technical development of the Spheres by two Designers and five Software and Hardware Engineers.

Especially during my initial visits to the hospital, one of which was accompanied by one of my supervisors, we spent considerable time explaining the field of HCI and common research practices to healthcare professionals. To help create and foster an understanding of the opportunities offered by digital technology, we gave informal presentations on laptop computers to introduce staff to examples of previous research projects that were characteristic

of our person-centred, empathic approach to design (e.g. *Tales of I*, Wallace et al., 2012), and described the value that these interventions had brought to the respective settings. Discussing these and other examples of relevant HCI technologies (e.g. *Magic Land*, Pykhtina et al., 2012) further allowed me to present my own vision for technology design in this context. I explained to the staff my motivation to create something that would be perceived less like a formal therapeutic or medical intervention and instead felt personal and unique to the women, aiming to reduce stigma and to empower the individual.

Presentations of previous designs, and also sketches and early prototypes of the Spheres during the design concept development (see further Chapter 4), provided staff with something concrete to critique in terms of their suitability for the women and their secure care environment. The Staff Nurses described examples of the extremely challenging behaviours of the women to explain their concerns both for the safety of the technology in terms of its size, weight, and material composition; and for the complexity of the proposed interaction in light of the women's restricted emotional and cognitive abilities. To help ameliorate these concerns and promote staff buy-in into the research, the R&D Manager, who accompanied all meetings and with whom I worked most closely throughout the project, played a fundamental role. As a well-respected colleague and expert of this setting, the R&D Manager frequently assured Staff Nurses and Clinical Managers alike that she would carefully oversee all research activities and ensure that I would adhere to the safety regulations and procedures in place. Observing her interactions with other staff, I came to understand that on the grounds of her personal commitment to this project, other healthcare professionals would make time for attending our meetings and were more open to supporting and building trust in the project.

Moreover, having been very familiar with the hospitals' overarching care model and practices, the R&D Manager helped to more effectively communicate the goals of the project and potential value of my work to higher level Clinical Managers, who wished for the technology to fit with, and positively contribute to, important practices of *person-centred care* and the women's therapy goals. To help me understand the women's mental health problems and their recommended treatments, hospital staff would point me towards relevant literature and share with me materials that they commonly used in therapy (e.g. an exercise manual by Christensen & Christensen, 2009), or to monitor the women's mental health (e.g. the Recovery Star²²). In talking me through and discussing the qualities of different therapeutic methods (see Sections 3.5.1-3.5.2), we would brainstorm and iterate early design ideas. To further address issues

²² The Mental Health Recovery Star is a widely used measure to assess how adults manage their recovering from mental illness <http://www.outcomesstar.org.uk/mental-health/> [Last retrieved 01.02.2015]

around research governance and ethics in the preparation of my application for ethical approval (see Section 5.3), I frequently consulted the R&D team at the hospital.

The remainder of this chapter presents a detailed account of my understanding of different facets of this design context that evolved through my consultations with hospital staff and the literature; and also my personal experiences of visiting the MSU and familiarising myself with practices in learning certain therapeutic skills. I then introduce the concept of the Spheres of Wellbeing as design response to this context in Chapter 4. The Spheres are a set of analogue and digital templates intended to get completed through a creative process inviting each woman to personalise them, which I outline in Chapter 6. Chapter 5 describes my process of gaining ethical approval for both this co-creative involvement with the women, and for deploying and evaluating the Spheres within them and hospital staff. Chapter 7 and 8 present the findings of this creative process and the evaluation of the Spheres. Figure 22 shows an overview of my approach to technology design and research in this context.



Figure 22. Overview of my approach to technology design and research in this context.

3.3 Women in Medium Secure Forensic Services

During my visits to the hospital, I was shown around the MSU, which was a 36-bed new build that was developed to create a safe and airy space including large windows for daylight and views outside (Figure 23), with the different parts of the unit taking the form of discrete flats.



Figure 23. Corridor with large windows and access secured doors (image by the hospital).



Figure 24. Lounge area with large chairs and heavy furniture (image by the hospital).

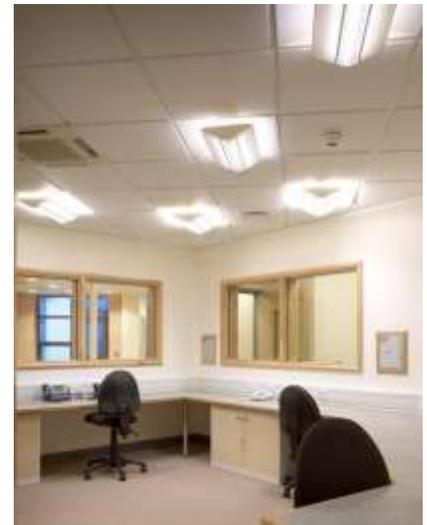


Figure 25. Staff office with a view pieces into the flat (image by the hospital).

The women's flat comprised six bedrooms with ensuite toilets and showers that stretch across a corridor. The flat further accommodated a communal bathroom; a shared quiet room; a living room area with large chairs and a TV installation (Figure 24); as well as a dining table and an integrated kitchen. Due to some of the challenging behaviours of the women, which included aggressive behaviours and self-harming (see Section 3.4.1 for detail), all furnishing on the flat, including any tables, shelves, cupboards or beds were either safely attached to the floor, or mounted against the wall. Free standing furniture was large and very heavy, which staff explained impeded them from being moved around, or picked up easily.

The staff office was located at the entrance to the flat, surrounded by glass windows, to allow for a constant observation of the unit (Figure 25). Next to it was a high dependency unit (HDU), which is a low-furnished bedroom. The ward staff explained how this area is sought to provide space for more intensive observations and care for individual women, who may be

agitated and at risk of unsettling their peers (if they were not separated). Adjoining the HDU was a seclusion room, which was only equipped with soft furnishing that offered the women a safe environment and space for privacy, solitude and the de-escalation of aggressive behaviour. Exclusively built from highly padded furnishing, this environment was designed to minimise the risk of the women hurting themselves and others.

Entering into this ward environment, I did not only attend to the layout and furnishing of the service, but also noticed a high level of noise that resulted from loud sounds or conversations that would reverberate across corridors and were often audible behind closed doors. Moreover, for each door that got opened or locked, there was the rustling of keys, while body-worn alarm systems by staff would frequently vibrate, and at times be triggered, indicating an incident and causing them to hurry to the person who had requested help. All of this contributed to the perception of a dynamic environment that left little space for calm.

Exploring reasons for the women's admissions to the MSU in consultations with the R&D Manager and the literature revealed that while the majority (67%) of female offenders with Intellectual Disability²³ referred to these services are diagnosed with a mental disorder, many women are not admitted for offending behaviours, but demand secure care due to severe self-harming behaviours, or aggression towards other people or property (Fish, 2013). The Research Nurse further explained to me that the women's specific circumstances of requiring secure treatment meant a general loss of their independence and the extent to which they can make own choices. For example, being confined to the hospital environment limited how often the women could have contact with the people who are important to them, such as family, causing feelings of loneliness and social isolation; how they could spend their time; or who they could choose as friends (cf. Clements et al., 1995; Owen et al. 1998). Current care practice guidelines therefore frequently highlight the importance to regard the women as active contributors to their care with a focus on engagement, collaboration and education (e.g. Aitken, 2006; Department of Health, 2011; Hall & Duperouzel, 2011).

3.4 Mental Health and Cognitive Abilities of the Women

The hospital staff explained that the majority of the women in the MSU have a concurrent diagnosis of Borderline Personality Disorder (BPD) – or a similarly severe disorder that is characterised by profound emotion regulation difficulties – and a mild-to-moderate Learning

²³ Intellectual Disability is a wider term for intellectual deficits than LD, replacing previous terms such as Mental Retardation and others emphasising cognitive deficits to begin in the developmental period (APA, 2013).

Disability (LD). The following presents insights into the characteristics, prevalence and origin of BPD and LD, as informed by the literature and experiences by the staff working on the MSU.

3.4.1 Characteristics of Borderline Personality Disorder

BPD is a condition that is predominately associated with severe difficulties in regulating, modulating and tolerating emotions (Yen et al., 2002). The inability of people who suffer from BPD to manage particularly intense negative emotions means that they tend to behave impulsively, display anger outbursts and violent behaviours, and often engage in self-harming behaviours (Lieb et al., 2004; Lew et al., 2006; Linehan, 1993a; b). They commonly also exhibit a variety of cognitive disturbances that disrupt the development of a strong sense of self, all of which impacts upon their ability to form and maintain social relationships (Palmer, 2002).

3.4.1.1 Emotional and Behavioural Dysregulation

Difficulties in regulating emotions are characterised by a very high sensitivity to emotional cues; a person's inability to act in a mood-independent-manner; to refocus attention in the presence of strong emotions; and to self-soothe physiological arousal induced through strong emotions (Linehan, 1993b). Individual's suffering from BPD, also experience emotions more intensely (Yen et al., 2002), and their mood tends to change rapidly and fluidly between intense dysphoric emotions – such as feelings of shame, panic, rage or sorrow – to phases of euphoria in the course of a single day. Such continuous shifts between one reactive mood state and another are often described to lead to feelings of irritability, depression and anxiety (Lieb et al., 2004). In attempting to regulate particularly intense negative emotions, BPD sufferers tend to engage in behaviours which promise immediate relief or distraction, such as inappropriate outbursts of anger, impulsive behaviours and acts of self-harm (Linehan, 1993a). Self-harming behaviour is an intentional injury to one's body, which can involve cutting and scratching, ingesting objects, burning, or self-neglect. Self-harm can serve as a coping mechanism to physically release frustration, but it can also be a symptom or disclosure of distress, a form of self-punishment, or a means to take control over one's body (Fish, 2013).

In conversations with Staff Nurses, they too described how the women's intense experience of especially negative emotions contributes to them feeling low in mood and helpless, which impacts their motivation to engage with therapy. Staff also talked about selfharming and, at times, aggressive behaviours of the women, which they highlighted as a key safety concern. For example, they were sharing stories of one woman inserting for instance even the smallest pieces of metal under her eye-lids for self-harm, and described cases of staff members being verbally or physically assaulted. To highlight the seriousness and severity of

some of these incidences, they explained how, in the past, some of these attacks had led to staff being hospitalised and traumatised. In light of the women's challenging behaviours, staff therefore emphasised the need for the technology and any materials used in their fabrication, to be robust so as to prevent access to any sharp pieces or batteries. To get a sense of the kind of materials that could be used, staff showed me examples of curtains, blankets, cushions and soft padded mattresses that were specifically developed for secure and prison services; their fabrics and workmanship make them particular resistant to being ripped or damaged.

3.4.1.2 Cognitive Dysregulation including Identity Disturbances

Individuals with BPD can also exhibit a variety of cognitive disturbances. These include nonpsychotic thought distortions, whereby the person has an exaggerated sense that she is or has been bad, or believes that she does not deserve to be treated with kindness, as well as experiences of depersonalisation, dissociation or delusions (Lieb et al., 2004; Linehan, 1993a). *Depersonalisation* means that while the individual is aware of herself, she feels she has no control over her situation (APA, 2004). The term *dissociation* describes a mental process through which pieces of a person's memories, related feelings, thoughts, actions or her sense of self become disconnected in order to temporarily escape from certain mental fears or pains that surround certain experiences (Grohol, 2010); and *delusions*²⁴ are by definition false beliefs that are held with conviction despite contrary evidence. These disturbances are usually brought on by stressful situations (Linehan, 1993a).

Along with these psychotic and non-psychotic dysregulations, BPD sufferers tend to have a persistently unstable self-image (APA, 1994, p.654; Lieb et al., 2004). The development of a person's identity requires emotional consistency and predictability in their interaction with other people (Linehan, 1993b). However, unpredictable emotional responses, mood inhibitions and cognitive inconsistencies, disrupt the development of a person's sense of self; this causes self-perceptions that are often described as feelings of an *emptiness of self* (Linehan, 1993a). In conversations with the different hospital staff including Staff Nurses and Clinical Managers, they too described a tendency of the women to hold strong beliefs that they do not deserve any kindness and, at times, feel ashamed or guilty if they comfort themselves; highlighting the importance of the women learning to *self-soothe* psychological arousal.

3.4.1.3 Chaotic Inter-Personal Relationships

A stable sense of self and the ability to appropriately regulate emotions are a key requirement of productive social interactions. Difficulties in maintaining stable relationships can result from

a profound fear of abandonment, which can manifest itself in desperate efforts to avoid to be left alone. Such difficulties are further moderated by the quality of past or existing close

²⁴ Stedman's Medical Dictionary (2006). Delusion. 28th Edition, Lippincott Williams & Wilkins. [Last retrieved 20.02.2012 from dictionary.webmd.com/terms/delusion]

relationships that may be characterised by repeated arguments, breakups and other behaviours that can nurture feelings of anger, fear and other highly emotional responses (Lieb et al., 2004; Linehan, 1993b).

Although hospital staff explained to me that the women's relationship with their families may have been a confounding factor that contributed to their mental health problems, they emphasised that their families are in general of great importance and that they often wished for more opportunities to interact or feel connected with them, which presents an important consideration for technology design. Staff further explained how the women's inter-personal difficulties impacted on how they engaged with other women, describing for instance strong feelings of jealousy amongst the women if one received more staff attention than another; and also difficulties of the women to detach from the staff. An awareness of potential inter-personal difficulties thus requires careful consideration for my engagements with the women and for establishing a relationship with them as part of the research.

3.4.1.4 Origin, Prevalence & Severity of Borderline Personality Disorder

To understand the origin of BPD, the *biosocial theory* (Millon, 1987), was found to provide a useful avenue (Palmer, 2002). According to this theory, the mental disorder originates in: (i) a person's biological predisposition to emotional vulnerability, and (ii) the social learning influences of growing up in an environment that is characterised by a pervasive pattern of invalidation (Linehan, 1993a; Swenson et al., 2002).

In invalidating environments, responses of others (e.g. parents) towards the private experiences of a growing child or adolescent are often inappropriate, erratic, insensitive, or involve extreme forms of over- or under-reactions, making it difficult for the child to learn adaptive emotion regulation skills (Linehan, 1993b). Additionally, in these environments it is often emphasised for the child or adolescent to be able to control their emotions, particularly negative ones, which reinforces emotional escalations (Swenson et al., 2002). Painful experiences are often trivialised and negative affect attributed to internal traits of the individual (e.g. a lack of discipline or failure in taking a positive outlook on life), while strong positive emotions are dismissed as impulsivity, or lack of judgment. A child may also experience

behavioural regulation through restrictions in their demands, punishments or gender discriminations. Punishments can range from verbal criticism to neglect and physical and sexual abuse (Linehan, 1993b). It is estimated that about 76% of women suffering from BPD have a history of sexual abuse in childhood (Linehan, 1993a, p.18). Such invalidating developmental circumstances, lead the individual to continuously search for clues in the environment that inform their behaviour, through which they develop an overdependence on others. Besides, the solving of problems in life is often oversimplified, making it difficult for them to set and achieve realistic goals (Linehan, 1993b).

As a result, BPD often co-occurs with other major disorders such as depression, panic disorders, post-traumatic stress disorder, eating disorders, obsessive-compulsive disorder, or substance abuse (Lieb et al., 2004; Simpson et al., 1998, Swenson et al., 2002). In addition to the severe psychosocial impairment and morbidity caused by the disorder (McQuillian et al., 2005), it is also associated with extremely high rates of suicide (up to 10% of all clients) (e.g. Fleischhaker et al., 2011; Soler et al., 2009). BPD is also far more common in women (70-75%) than it is in men (Simpson et al., 1998; Swartz et al., 1990). Moreover, compared to their male counterparts, women with mental health problems in secure services are reported to be involved in more incidents of aggression (Alexander et al., 2006) and present as a much more vulnerable and difficult to treat group due to a higher prevalence of self-harm (Fish, 2013).

3.4.2 Learning Disability

In addition to mental health problems, hospital staff explained that all the women had a mild-to-moderate Learning Disability (LD), which is not a mental illness, but a lifelong disability that is caused by problems during brain development, either before a baby is born, during birth, or a severe illness in early childhood. The LD impacts on a person's attention span, their ability to learn new things and to understand complex problems (cf. MENCAP, 2012); all of which complicate the development of a sense of independence and often lead to experiences of situations that may feel emotionally provocative or frustrating (Chilvers et al., 2011).

In meetings with hospital staff, we frequently talked about the need for the technology to be accessible to the women and to take full account of their LD. In this regard, staff advised avoiding the heavy use of text, which often felt overwhelming to the women and led to disengagement. If any written information was to be presented as part of the research (e.g. information and consent forms), staff instructed me to use easily accessible language, ideally supported by pictorial prompts, and to take time to carefully and repeatedly explain new concepts to each woman. Recommendations for designing therapy contents for individuals with

an Intellectual Disability (Lew et al., 2006; Morrissey & Ingamells, 2011; Robertson, 2011) further suggest making use of physical forms, materials and concepts that are very visual and versatile (Inglis & Cook, 2011). Despite the LD, staff also explained that the women were generally computer literate and enthusiastic about technology, describing them as confident laptop users who frequently played and downloaded computer games.

3.5 Dialectical Behavioural Therapy Treatment

The hospital staff further told me about a specialist talk-based psychotherapy treatment for BPD called Dialectical Behavioural Therapy (DBT), which was developed by Marsha Linehan (1993a; b) and, as the therapeutic model for the women's care pathway, was in the process of being introduced to the low and medium secure services of the hospital. DBT is a very comprehensive treatment that combines a variety of established Western therapeutic concepts and methods including Cognitive Behavioural Therapy (CBT), with dialectical thinking, and concepts and techniques borrowed from Eastern spiritual practices (primarily from Zen Buddhism), which resonates strongly with current trends in mental health care (Morrissey & Ingamells, 2011; Swenson 2000; Swenson et al., 2002).

The term 'dialectical' in the therapy refers to the persuasive dialogue between therapist and client to facilitate change, and also reflects a philosophical perspective that emphasises the consideration of reality as a whole and its parts as being interrelated (Linehan 1993a; b). It suggests that the learning of a new behavioural skill is not easily separated from the concurrent learning of other related skills, and can either be hindered or supported by the person's environment. Reality is regarded as dynamic, whereby change results from finding syntheses of internal opposing forces, as opposed to extreme or dichotomous thinking. The fundamental dialectic in DBT is the syntheses between a focus on *accepting and validating* the person through empathically acknowledging their feelings, thoughts and behaviours, and simultaneously motivating her to *change* for the better by reinforcing the practice of taught skills (Baer, 2003; Linehan, 1993b; Palmer, 2002; Verheul et al., 2003; Williams, 2007).

DBT usually encompasses a combination of weekly individual therapy sessions, during which personal or pressing problems are addressed (e.g. life-threatening behaviours, childhood trauma) and advice is given as to how learned skills can be best applied (Linehan, 1993b; McQuillan et al., 2005; Soler et al., 2009). Individual therapy is accompanied by weekly group skills training sessions, during which individuals support each other in the acquisition of the skills they need. DBT skills training teaches the mastery of four key skills: (i) *emotion regulation*, as the ability to recognise, experience and modulate emotions; (ii) *interpersonal effectiveness*,

as the ability to be more assertive towards others and to refuse unwanted requests; (iii) *distress tolerance*, as the ability to tolerate painful emotions without impulsivity; and (iv) *mindfulness*, as the ability to control attention, be more aware of own experiences and to let go of judgments (Linehan, 1993b). To master these skills and to establish behavioural control in the long run requires their learning, continued practice and application (Lew et al., 2006; Lieb et al., 2004; Swenson et al., 2002), which has been found to increase an individual's ability to relax and cope with distress, to reduce impulsivity and incidences of self-harm, and to improve their overall recovery process (Linehan, 1993a; Soler et al., 2009; Swenson et al., 2002).

The four skills can further be distinguished in terms of those that promote *change*, such as improved emotion regulation and inter-personal effectiveness, and those that promote *acceptance* including mindfulness and distress tolerance (Soler et al., 2009). Although DBT has a strong orientation towards preventing individuals from self-harm and suicide attempts, the overall purpose of the programme is to help clients create a sense of a life that they feel is worth living (Dimeff & Linehan, 2001; Linehan, 1993b).

In my conversations with higher level clinical managers, they proposed and strongly value the idea of developing a technology that could build on the concept and practices of DBT to fit with the women's therapy goals, their new care pathway, and the person-centred care ethos of the hospital. In this regard, my reading of the literature on BPD and the severity of the women's mental health problems described by the ward staff suggested a focus particularly on the promotion of acceptance skills that support the women in *tolerating distress* and practices of *mindfulness*, that are at the heart of all DBT skills (Linehan, 1993b; McQuillan et al., 2005).

3.5.1 Distress Tolerance Skills

In distress tolerance skills training, the person learns how to accept and tolerate emotional distress, particularly when trying to overcome crisis situations where they may not feel that change for the better is possible yet (Soler et al., 2009). To survive such crisis situations without returning to behaviours that worsen their situation such as hurting themselves (Clayton, 2010), the person learns how they can *distract* themselves by engaging in activities that offer visual or auditory stimulation, or strong distracting sensations (e.g. holding an ice cube in ones hands). At times, the person may also simply try to leave a distressing situation, either physically or by blocking it from their mind. Other strategies include *self-soothing*, which is the practice of being comforting, kind and gentle to oneself; trying to relax and accept the situation as it is; trying to *create or find meaning*; engagement in *prayers*; or *muscle relaxation* training such as breathing exercises or attempts to smile (Linehan, 1993b).

Discussing different methods to teach distress tolerance skills and exploring various means for visual and auditory distractions, the ward staff told us that they would often invite the women to do something creative, to listen to music, watch DVDs, or play computer games. Members of the women's clinical care team responsible for the delivery of DBT at the hospital further explained practices of 'safe place imagery' for taking the women's minds off worrying thoughts. For this activity, the women were encouraged to imagine a place where they feel at calm, peaceful and safe. This could be a place that they have seen, where they have been before, or something they simply imagine. While having their eyes closed and being brought into a relaxed position, they were then asked to visualise this place. For example, if this imagined place presented a beach, the women would be asked to focus on how they imagine 'the sand feels on their skin', 'what colour the sky is', 'to think about the smell of the sea', or 'the feeling of wind blowing through their hair'; and eventually they would be invited back into the 'here and now' (cf. Vivyan, 2009).

3.5.2 Mindfulness Skills

In Chapter 2, I described the general concept of mindfulness. This section extends on how mindfulness is taught as part of DBT, expanding on particular challenges and opportunities for people with BPD and LD.

Mindfulness can be cultivated in many different ways, but usually is practiced through formal meditation exercises that guide the individual in how to enhance their awareness (Dunn et al., 1999). Initially, these are often concentration-based and direct the person to focus their attention on a specific stimulus, such as their breathing (Baer, 2003), and to redirect their attention to this stimulus, should they get distracted (Kabat-Zinn, 2009). To become more aware of oneself, however, does not imply that the individual becomes more involved in the content of their life difficulties, but that they are more attentive to their direct experiences. For example, to bring mindful attention to the body does not mean to *think about* the body, but to *be aware* of the sensations in the body (Williams et al., 2007). For individuals with BPD such exercises, whereby they learn to not to get distracted by their thoughts or current mood, are of fundamental importance as they often struggle with being detached from, and tend to rather be overwhelmed by, their experiences. As such, mindfulness skills were found to be antithetical to impulsive, violent and mood dependent behaviours (Chödrön, 2002; McQuillan et al., 2005), accounting for their success in the treatment of a variety of physical and mental illnesses such as chronic pain, depression, stress, anxiety or fatigue (CMRP, 2012; Robertson, 2011; Teasdale et al., 2000). Moreover, since mindfulness does not require cognitive restructuring skills, it was

found to particularly benefit individuals with LD, enhancing their emotion regulation skills and reducing aggression and injury (Chilvers et al., 2011; Morrissey & Ingamells, 2011; Singh et al., 2008).

In discussions about mindfulness and how technology design could support practice, members of the women's clinical care team responsible for the delivery of DBT, shared with me examples of activities and materials that they commonly used. Since, at the time, there wasn't a published DBT manual that had been adopted for individuals with LD, therapists adopted supplementary resources such as the easy-to-read DBT self-help materials by Vivyan (2009) and a book entitled '*Dialectical behavioral therapy skills, 101 mindfulness exercises and other fun activities for children and adolescents*' (Christensen & Christensen, 2009) that provides short, accessible text descriptions of the DBT skills, and offers a variety of everyday exercises for performing mindfulness (e.g. complete a puzzle; eat Jelly Beans and bring awareness to different flavours). Staff explained that one of the exercise that was commonly taught to the women is the 'mindfulness of breath', whereby the women were asked to sit comfortably and to gently bring their attention to their breathing, and to observe each time when they breath in and out how their chest rises without trying to alter their breathing.

In addition, and since I myself was entirely unfamiliar with mediation practices such as mindfulness, I attended an eight week *mindfulness-based stress reduction* (MBSR) course through which I was introduced to different concentration exercises. As a complete novice, I struggled especially initially to be attentive over longer periods of time and noticed how I was frequently distracted by other thoughts coming to my mind. This made me realise that learning mindfulness was less intuitive and more difficult than I anticipated. While I was taught to take a non-judgemental stand, I found myself frequently questioning whether I was performing the practice 'correctly' and what outcomes I could expect from it. I further noticed that a lack of feedback on my performance and the fact that the effects of my engagement did not show immediately challenged my motivation to continuously make time for practice within daily routines, requiring considerable self-discipline. It was only towards the end of the course that I realised I was much calmer and kinder in how I responded to other people, which gave me a sense as to how this approach can be beneficial in finding balance and becoming more resilient to difficulties in everyday life.

3.6 Hospital Culture and Organisation of Care

Through my interactions with different hospital staff, I recognised that there is, as with most hospital setting, a clear management hierarchy and a strict and explicit requirement to follow

guidelines for care to ensure consistency and stability of approach, and maintain client and staff safety. Moreover, the R&D Manager explained how the introduction of a new therapeutic intervention such as DBT is a major undertaking for the hospital and indicated a desire to improve quality of care despite operating in a time of national austerity and NHS cost reduction measures. The hospital was also developing a model of integrated therapies whereby psycho-educational elements of treatment are delivered by a multi-disciplinary team (MDT) comprising of qualified and unqualified learning disability and mental health nursing staff, who are supported by psychiatrists, psychologists and allied health professionals (i.e. Occupational Therapists). These professionals often have different skill sets and levels of clinical or administrative power, needed to manage, shape or alter practices (Taneva et al., 2015). See Appendix B.2 for short descriptions of the professions of the hospital staff who were involved in this research.

For all care pathways in the hospital there is an overarching ethos of *person-centred care*, which puts the needs of service users foremost and seeks to promote their active involvement in decisions around their treatment (Nay et al., 2009) with the aim of improving the quality of care (Darzi, 2008). To regard the women as active contributors to their care was described by the ward staff to be particularly important due to their mental health problems and disability as well as their specific circumstances of requiring secured treatment, confining them to the hospital environment. As part of hospital care guidelines, staff therefore ensure that the women have at least 25 hours of ‘meaningful activities’ each week. These activities are defined as ones that have an intellectual, creative, and social dimension; those that involve the kind of planning, thinking, and discovery that brings balance and satisfaction; and that facilitate the cultivation of relationships amongst the community of women (CQUIN, 2008).

The R&D Manager further explained how the 24-hour care that the women receive gets delivered from a large team of Staff Nurses and Support Workers, who work shifts. Their shift patterns vary and include internal rotation from days to nights, and between the male and female flats on the MSU. Since the particularly challenging behaviour of the women (i.e. high frequency of incidents) contribute to staff stress and burnout (Fish, 2013), these rotations are coordinated by the Ward Managers to allow for periods of respite for the staff from having to respond to the demanding needs of the women. The multitude of staff involved in their care further gives rise to a very socially dynamic environment, adding complexity to the introduction and management of any new technology and care practices to the service.

3.7 Summary

Having been restricted in direct access to the women at this stage of the research, this chapter described how my understanding of the design context was informed by my interactions with healthcare and research professionals at the hospital; a process that focused on mutual learning and gaining a first understanding of each other's work practices as well as interests in, and concerns for, technology design. It enabled insights into some of the challenging mental health and behavioural difficulties of the women, recommended psychosocial treatments, and some of the constraints of their secure care; which were complemented by my own experiences of bring on the MSU, learning therapeutic practices such as mindfulness, and readings of relevant literature. Chapter 4 begins with a summary of identified design requirements. I then propose sensitive approaches to design in this setting, before describing the design process and introducing the design concept of the Spheres of Wellbeing.

Design Concept of the Spheres of Wellbeing

4.1 Introduction

This chapter begins with a summary of the design requirements for technology in this context, which were informed by my collaboration with healthcare and research professionals at the hospital; my own experiences of the setting; readings of relevant research literature; and discussions with members of my research team. Following, I describe how the continued dialogue with hospital staff helped determine sensitive approaches to design, and for working with the women. Responding to this and my own intentions for the technology to be perceived as a meaningful personal possession, I outline how the technology concept evolved, and how hospital staff contributed to a first evaluation and iterations of the proposed design. I then introduce the Spheres of Wellbeing, which are a set of three artefacts that collectively respond to qualities of physical and digital design, creativity and aesthetic appeal, ownership and personal significance, to invite the women to engage in therapeutic and mental wellbeing enhancing activities. Moreover, giving consideration to the importance of actively and sensitively involving the women into the co-creation of their artefacts, the Spheres' present a collection of digital and analogue templates, intended to be completed by each woman through a series of creative engagements. I describe the process of personalising the artefacts (by the women themselves) in more detail in Chapter 6.

4.2 Identified Requirements for Design

My collaboration with hospital staff and close readings of the literature enabled me to gain rich insights into some of the complexities of this design context. I came to understand that at the heart of the women's mental health problems and their impulsive and, at times, extremely

challenging behaviours are strong deficits in emotion regulation abilities, which contribute to cognitive disturbances that disrupt their sense of self; hinder the formation and maintenance of stable inter-personal relationships; and impact their motivation to engage in therapy. The severe psychosocial impairment that the women experience is further associated with very high rates of self-harm and incidents of aggression. To both safeguard the women and to protect other people and/or property from damage, it is required for them to be cared for within a secure and highly structured environment.

In this context, hospital staff had described the importance for the women to learn the ability to tolerate distress and to self-soothe psychological arousal by being kind towards and comforting oneself. In addition, due to their emotional difficulties that typically stemmed from a personal history of abuse and neglect, they are in great need of developing a positive selfimage (in contrast to their predominant self-perceptions of failure), and self-esteem. Their confinement to the hospital environment, and associated experiences of loss of independence and contact time with significant others outside the service, further highlight the need to regard the women as active contributors to their own care and to engage them in personally meaningful, intellectual and creative activities that facilitate the cultivation of positive relationships and assist in creating a life that they feel is worth living.

In response to the mental health problems of the women and the introduction of Dialectical Behavioural Therapy (DBT) to their care pathway, the clinical care team of the women also proposed for the technology to respond to therapeutic practices, and the personfocused and validating ethos of this specialist psychosocial treatment. Moreover, due to strict safety and security protocols and procedures on the MSU that generally prohibit the use and possessions of any objects that could be of danger to the women, hospital staff frequently emphasised the importance for the technology to be robust and safe to use.

Finally, while the women were described as enthusiastic and literate computer users, their mild-to-moderate LD required careful attention and the interactions designed needed to be accessible and engaging to them. To this end, it was recommended by the staff and in the literature to make use of physical forms, materials, and concepts that are very visual and versatile, to avoid heavy use of text, and to present new information carefully and repeatedly.

4.3 Sensitive Approaches to Design in this Context

This section explores sensitive approaches to design in this setting. Considerations of careful approaches to participation and technology design that are respectful of the person's abilities and avoid risks of stigmatisation are of general importance, and increasingly discussed in the

field of HCI, due to a growing body of research that engages with ethically sensitive and emotionally challenging contexts (Branham et al., 2014; Thieme et al., 2014a; Vines et al., 2013). These include for instance domestic violence (e.g. Clarke et al., 2013); homelessness (e.g. Le Dantec et al., 2011; Woelfer et al., 2011); bereavement (e.g. Massimi, 2013) and end of life care (e.g. Ferguson et al., 2014; Massimi et al., 2014); care for people living with cancer (Skeels et al., 2010); and children with special needs (e.g. Durrant, 2014; Frauenberger et al., 2012; Keay-Bright, 2012). In such contexts, researchers are challenged with identifying sensitive strategies for involving vulnerable populations in design or research activities without risking stigmatisation, upsetting the participant, or putting too much pressure on them. Moreover, such difficulties are amplified when working with people with special needs, who often struggle to express themselves and their ideas if they are given too little structure or boundaries within which to work (Frauenberger et al., 2012). The following proposes sensitive strategies for working with the women and for the design specification of the Spheres that build on qualities of creativity, beauty, personal significance and ownership for engaging this very vulnerable group in therapeutic and mental wellbeing enhancing activities.

4.3.1 *Supporting Therapeutic Strategies of DBT*

One important and prominent approach in the treatment of mental health problems is the support of well-established therapy models (Coyle & Doherty, 2009; Doherty et al., 2010a). A review of the literature revealed that Dialectical Behavioural Therapy (DBT), which was recommended by the women's clinical care team and introduced to their care pathway, is one of the few specialist intervention whose effectiveness in treating Borderline Personality Disorder (BPD) has been evidenced in controlled clinical trials (e.g. Bohus et al., 2004, Soler, 2009; Verheul et al. 2003; pilot by Fleischhaker et al., 2011); was shown to be successful in early studies with individuals with Intellectual Disability in forensic services (e.g. Lew et al., 2006; Sakdalan et al., 2010); and is effective for a variety of other severe mental illnesses (e.g. *Binge Eating Disorders*, Safer & Jo, 2010; *Deliberate Self Harm*, James et al., 2008).

Building the technology on the principles of this therapy did not only have the potential to benefit the mental health and wellbeing of the women, it also meant that the design would align well with existing hospital care practices. This was an important concern, since any trial of new technology for use within clinical care contexts and by vulnerable populations requires approval by healthcare professionals. Thus, to position the design of the technology in relation to DBT therapy (instead of mental wellbeing alone) greatly assisted in articulating the purpose and potential value of the design to members of the women's care team and their clinical

managers. In this regard, building on established clinical models and the ethos of person-centred care played an important role in demonstrating the (potential) value of the proposed intervention to them.

4.3.2 Creative Engagements & Beauty

To engage particularly vulnerable populations in research activities and technology design, creative engagements have proven to be a sensitive approach (cf. Marshall et al., 2014). The creation of art is also an established component of many activities in adult prison services, offender institutions and secure probation units (Liebmann, 1994). It provides a positive opportunity for reflection and non-verbal self-expression helping the individual to better understanding themselves, and helping others to find a *way in* to the person. Active, physical and creative engagements can support the construction of a safe environment in which the individual is distracted from personal distress or destructive behaviours, and can engage in activities that are perceived as stimulating, enjoyable and relaxing (Dalley, 1984; Liebmann, 2008). Such activities promote creativity and self-esteem through the learning of new skills and self-discovery of unknown strengths and new possibilities (Liebmann, 2008). In addition to the beneficial experiences of the process, the output (objects made) can serve to increase self-esteem through praise by others, providing a sense of achievement and satisfaction, and offering opportunities for creating meaning and purpose in life (Dalley, 1984; Ryff, 1995).

In discussions with hospital staff, whereby one of my supervisors and I talked them through examples of creative participant engagements from previous research projects (e.g. *Personhood Probes* by Wallace et al., 2013), they explained how they regarded creative making activities to be a valuable tool for engaging the women. However, our conversations about 'design probes' or probe-like activities, which often involve a certain complexity in the questions that they seek to invite reflection on, helped clarify that the women's engagements in any such activities needed to be achievable for them so as not to risk upsetting them, or nurturing self-perceptions of being failures. Instead, any creative activities should be appropriately designed with regard to the abilities of the women to enable creativity and foster positive and empowering experiences.

Describing the sort of activities that the women commonly engage in as part of arts practices or Occupational Therapy, and that are considered as safe and manageable in terms of their complexity, hospital staff referred to activities of 'card making' and the use of 'colouring books'. However, with regards to the colouring books, they raised issues about their age appropriateness, as these are often designed for children, and the extent to which they offer

stimulation, describing how the women often get bored of the activity quickly. Thus, to involve the women successfully in any form of creative engagements as part of the research, I came to understand that this likely requires a careful scaffolding of the activity and, responding to their LD, should include the use of a variety of sensory and tactile materials to offer stimulation and facilitate self-expression.

Moreover, considering the need for the women to learn the ability to soothe themselves, as they hold strong beliefs that they do not deserve kindness and, at times, feel ashamed or guilty if they comfort themselves (Linehan, 1993b), an additional requirement is highlighted in that the women require assistance in seeing themselves as beautiful and to help enhance their self-concept. To convey to people that they are valued as a person and deserve beautiful things in their life, Wallace et al. (2012) highlighted the need for technology design to be interesting and beautiful, and, where craftsmanship is involved, that it is well made. This suggests that aspects such as aesthetic appeal can be utilised as a means for encouraging people to engage with technology (e.g. Norman, 2004) and for validating the person.

4.3.3 *Personal Possessions and the Self*

For a number of years, members of my supervising team and I were exploring how interactions with technology can become personally meaningful to the individual, and to this end, we considered the importance of physical artefacts for self and wellbeing. Partly, this was also motivated by recent research investigating the role of heritage-based interventions in positively contributing to the mental wellbeing of hospitalised patients. For example, in the *Heritage in Hospitals* project (Ander et al., 2012), museum loan boxes containing heritage objects were brought into hospitals to facilitate one-to-one object handling sessions with patients in an acute ward. These engagements, described as ‘object therapy’ (Chatterjee et al., 2009), were reported to have been enjoyable, interesting and stimulating to patients, to have distracted them from their illness; and to have given them a sense of continuity of, and connection with, life.

Inspired by this research and driven by curiosity about the potential of antique artefacts to impact on wellbeing and the values that people attach to objects more generally, I participated in and evaluated a 3-day course called *Thinking Objects* that was designed and led by Lindsay-Allason Jones²⁴. During this course participants were invited to explore, handle and reflect on their relationship with ancient artefacts and their personal possessions (Thieme et

²⁴ Lindsay Allason-Jones was until recently the Director of the Centre for Interdisciplinary Artefact Studies (CIAS), Reader in Roman Material Culture and Director of Archaeological Museums for Newcastle University. The Thinking Objects course was originally developed by her as an educational strategy for teaching archaeology and museum studies students how to identify objects, explore and question their meanings (Allason-Jones, 2011).

al., 2013a). Findings from an evaluation with a group of 5-8 participants (see Appendix A for detail on course format, evaluation methods and findings) revealed how they felt intellectually stimulated to reflect on a range of aesthetic, functional and more personal qualities of the artefacts; enjoyed the sensual exploration of their materiality; and particularly liked to share each other's stories about their experiences with certain objects. The storytelling aspect was found to have enabled interesting insights into the personalities of the course attendees, and increased participants' awareness of the unique and rich biographies behind their personal possessions through which they manifest their experiences and aspects of their self.

This finds confirmation with Miller (2008), who illustrates in his anthropological account, *The Comfort of Things*, how people's possessions and the way they construct their material world become an outward expression of their personality. He highlights how a lack of personal possessions can reflect an emptiness within the person. Turkle (2007) considers objects as companions in people's emotional lives and as provocations of thought. She describes how people often feel at one with their objects, how they think with the objects they love, and how they love the objects that they think with. Belk (1988) also argues that personal possessions can become extensions of a person's self, through which they define, express, and remind themselves of who they are. Through possessions, people can connect to important loved ones, places, and experiences that give their life meaning; all of which can help strengthen their sense of self (McCarthy, 1984). In other words, invited explorations of peoples' relationships to objects offer opportunities to internally or socially construct, maintain or reconstruct parts of their identity, to express individuality and distinguish themselves from others; which is a human need and key component of mental wellbeing (Belk 1988; Galvin, 2012).

Physical artefacts have the added advantage that through their form they offer a richness of material attributes (e.g. they can be touched, held, or smelled) that address all human senses (e.g. Overbeeke et al., 2003). Furthermore, Banks (2011) described how the physical can feel more precious because of a fragility that is associated with it getting lost or damaged. Digital possessions on the other hand can be easily duplicated or shared, they can be animated and used to invite new experiences that may not be possible through physical objects. Wallace et al. (2012) demonstrated through *Tales of I* how possessions do not need to be limited to a physical form and highlighted the importance of a connection to content and associated sentimental value. According to Belk (1988) an object (in its widest sense) can become personally meaningful and an extension of self through: the person controlling and mastering

it; in creating or changing it; in having knowledge about the object; and contaminating the object through personal use, or by giving it a place in one's life.

In summary, personal possessions, whether they present as physical or digital can be used to initiate narrative storytelling through which facets of a person's identity can be performed. A focus on creating and telling stories that reflect positive memories and experiences can feel empowering to the person, and promote the construction of a strong self-image. The role of personal possessions therefore deserves consideration in the design of mental health and wellbeing interventions, particularly in contexts where the individual is often deprived of such personal possessions, as is the case of the women living on the MSU. Due to safety restrictions and their risk behaviours of self-harm, the women tend to be surrounded by only a few objects that could tell a story about them or connect them to things outside the unit (e.g. posters and pictures on the wall). This deprivation of things that are unique to each woman, reduce opportunities for self-expression and personal affirmations of their individuality (Galvin, 2012; Miller, 2008; Wallace et al., 2012).

4.4 The Spheres of Wellbeing

To support developing the technology design concept for this specific research context, my meetings with members of the women's care team involved informal brainstorming activities and evaluations of initial sketches and early prototypes (see Figure 29, 32 and 35).

In brainstorming activities with hospital staff, they typically explained their ideas for the technology by describing how they commonly engaged the women in therapeutic practices and by discussing the kinds of activities that they felt the women enjoyed doing. For example, one staff member remarked on high levels of concentration that some of the women exhibit when completing jigsaw puzzles and the calming effect that this can have on them, suggesting the development of an interactive jigsaw application to help take their minds of potentially troublesome thoughts or feelings. Others suggested building more strongly on the women's interest in computer games, proposing the creation of a game environment that would invite the women to take virtual bricks out of a brick wall, one-by-one, until a beautiful image would unfold behind it as an incentive. This activity was envisioned to help distract and teach the women mindful awareness skills by focusing their attention on one thing at a time. Simultaneously, staff valued its underlying metaphor of encouraging the women to address their problems step-by-step and to work towards a brighter future.

Examples such as these provided a clearer understanding of the kinds of activities and materials that hospital staff utilised to engage the women, and for therapy. As a technology

designer for this context, however it was important to me to create a technology whose proposed interaction would go beyond a digital translation of existing therapeutic activities, and that was perceived as personal and unique to each woman. Discussing previous examples of *Lovers' Box* and *Tales of I*, I explained to the staff ideas for a more personal design, proposing for the technology to be tangible rather than a built-in, standalone installation.

Considering that the women were under constant observation, I argued that a physical artefact would allow them to interact with it away from others, offering space for privacy. While hospital staff frequently emphasised in their responses the importance for the technology to be robust and safe enough to be used in this way, they agreed that a tangible design might help the women build a more personal relationship with the technology, and that it meant they could keep it when leaving the ward. The latter was a key concern by some of the staff, who assumed – should the women truly enjoy their interactions with the technology – that an inbuilt installation on the MSU may interfere with their motivation to transition from the MSU to the lower secure services.

The concept of the Spheres of Wellbeing was developed in response to these engagements with hospital staff and previously identified requirements for the design, and also my understanding of sensitive approaches to designing for, and working with, vulnerable populations (Section 4.3). The term 'Spheres', however, is not intended to imply a specific physical form (although the Mindfulness Spheres is distinctively spherical in shape) but rather 'Sphere' serves as a descriptive label for the design spaces they explore. The Spheres is a collection of three artefacts: the *Mindfulness Sphere*, *Identity Sphere*, and *Calming Sphere* that are specifically designed to complement the psychotherapy and promote the mental wellbeing of a group of women, who are living in medium secure hospital services and are suffering from severe mental health problems and a mild-to-moderate LD.

As a collection, the Spheres bring together qualities of both physical objects and digital technology with the aim to invite engagements in therapeutic and wellbeing enhancing activities that are less associated with often generic, more formal therapeutic or medical practices, and instead felt as personal and unique to each woman; thereby reducing stigma and lowering motivational barriers. To enable the formation of a more intimate relationship with the Spheres, they are designed as possessions that are safe for the women to use in private; that are theirs to keep and use at their own discretion (rather than enforced engagements); and that offer space for personalisation by each woman to support a more meaningful appropriation to assist in building a positive self-image.

Since the design concept of the Spheres is primarily informed by hospital staff and the research literature, the importance to identify a sensitive approach to support the women in actively contributing to and taking ownership of these artefacts became very apparent. To this end, the design specifications of the Spheres took a creative process as a starting point, whereby each woman personalises her set of Spheres through a series of creative activities. As such, the Spheres present a collection of digital and analogue *templates* that are *completed* through these co-creative engagements.

While most conventional mental health technologies embrace technical attributes and devices (e.g. a mobile phone, PC screen), the physical form of the Spheres is intentionally designed to foreground a symbolic relationship between the artefacts and embedded personal content or associated sentimental value, to enable the women to more deeply connect with them (cf. Banks, 2011). Their physical design is ornate and reflects aspects of conventional femininity to assist the women in seeing themselves as beautiful and to validate that they deserve to possess nice things in their life (cf. Wallace et al., 2012).

Considering limitations in the emotional and cognitive abilities of the women, interactions with the Spheres are designed to be of little complexity, but highly visual and sensual. Moreover, the three artefacts are intended to complement each other in the roles they potentially play in supporting different facets of the women's mental health and wellbeing. The following subsections present the basic design concept and underlying rationale of each Sphere, supplemented by initial, evaluative feedback by hospital staff assessing their suitability for use by the women, both in terms of artefact safety and as a complement to their care. I then briefly outline the process of personalising the Spheres with the women, which is described in more detail in Chapter 6.

4.4.1 *Mindfulness Sphere*

The Mindfulness Sphere was conceived to cultivate mindful awareness by inviting the women to bring focused attention to the rhythm of their heart and how individual heartbeats unfold moment by moment. This Sphere is a tangible, interactive artefact that is designed to have the appearance of a crystal ball that, upon touch, assesses and reflects a person's heartbeat through colourful lights. This is envisioned to cultivate a new, experiential way of bringing awareness to this bodily response (cf. Kabat-Zinn, 2009; Thieme et al., 2013b).

The idea for this Sphere arose in discussions with the R&D Manager, where she described variety of strategies offered to the women to distract themselves. One of which include exposing the women to cold sensual experiences by holding ice cubes or touching cold

surfaces such as metal. The conversation further unfolded around concepts of embodiment and observed difficulties of the women to open their hands when feeling tense. Joint explorations into ideas as to how the women could be motivated to open their hands to touch cold surfaces such as metal were then associated with the potential to assess their heartbeat. Since the inclusion of biofeedback was considered particularly valuable by the R&D Manager and other hospital staff that she and I spoke to over time, the concept was developed further.



Figure 26. Held Mindfulness Sphere and the visual feedback it presents.

4.4.1.1 Artefact Design, Configuration and Safety

The Mindfulness Sphere is 12cm in diameter and is made from transparent resin, which gives it a smooth and glossy surface, and allows for the encapsulation of decorative pieces that remain visible to the eye (see Figure 26). The decorative detail inside the Mindfulness Sphere is intended to hold the women's attention and to invite interest in closer examination. Resin was chosen as a material following discussions with clinicians, who preferred its robust, solid surface to softer silicon, which can be destroyed with one's teeth (i.e. to get to the electronics inside). Small copper disks were crafted as ornate connectors to the Sphere. These disks are securely attached to the left- and right-hand-sides of the crystal ball (for details on the fabrication process see Appendix B.6).

When a woman holds the Sphere, with each hand making contact with a single disk (Figure 26), the Sphere senses her heartbeat using Electrocardiogram (ECG) readings. The Sphere houses custom ECG detection electronics that enable it to sense and calculate the women's heartbeat after only a few seconds of holding the artefact with both hands. Any detected signal is then translated into a visual representation through 6 multi-colour LEDs that fade-in and fade-out with every heartbeat. Moreover, the frequency, intensity and colour of each LED can be controlled separately allowing for the creation of a constantly changing appearance of the visual feedback.

The bottom of the Sphere is designed as a small, round plastic drawer that can be taken out to access the electronics at the inside of the Sphere. To minimise the risks voiced by safety personal at the hospital that the women may try to access the electronics and the use of this for self-harm, I decided to use small button head cap screws embedded inside the drawer that require specialist tools to remove them (Figure 27). At the centre of the drawer is an indentation for a power socket that enables the safe charging of the built-in battery when the artefact is placed on its custom designed plastic stand (Figure 28). The cable used for charging is composed of an audio jack and USB connector that simultaneously allows the installation of software updates and access to any data that is logged by the electronics of the Spheres (e.g. an extended iPod shuffle generation 1 and 2 charger).

4.4.1.2 Opportunities for Mindfulness Practice, Self-Knowledge and Acceptance

The Mindfulness Sphere invites the women to direct their attention to their heartbeat and to carefully observe its rhythm and individual beats as they arise moment by moment (KabatZinn, 2009; Linehan, 1993b). This design, which offers the opportunity for the women to intimately connect to their body, is intended to serve as a conduit for the experience and expression of emotion. In scaffolding a gentle awareness of the beats of their heart, the women may develop more appreciation and self-kindness for their body (Crump & Fraser, 2011) and become more comfortable with themselves (Williams et al., 2007).



Figure 27. Bottom of the Sphere showing the small button head cap screws and the indentation in the middle for the charging plug.



Figure 28. The Sphere being placed on top of its custom stand for charging.

To promote continued awareness and to invite a curious re-direction of attention to the Sphere and meditation exercise (Baer, 2003; Dunn et al., 1999; Kabat-Zinn, 2009), if the women's attention has been taken away, the Mindfulness Sphere is configured to change colour at 30 second intervals. The 30 second interval was decided upon following a series of tests amongst members of the research team, who provided feedback on different interval durations

(e.g. 10, 20, 30 or 60 second intervals) and expressed a preference for the 30 second configuration, as it enables slow colour transitions that were described as ‘calming’ while not too slow to be perceived as almost ‘unnoticeable’. Moreover, the LED lights could individually be configured to represent a wide range of colours including light or bright colours such as orange, purple or turquoise, instead of red, blue and green alone; and that would help counter common meanings behind certain colours (e.g. red and green lights could respectively be interpreted as an unhealthy or healthy heartbeat).

Thus, this Sphere is envisioned to provide the women with a visual stimulus and interaction that allows them to non-judgmentally observe their own heartbeat as a means to engage them in practices of mindfulness and to feel in touch with their body. The Mindfulness Sphere is further anticipated to become a tool that the women can use in conjunction with and to potentially extend existing therapeutic DBT practices related to mindfulness. Moreover, due to the design’s emphasis on materiality and a connection to the body, I was hoping that such engagements would feel more stimulating and personal than the completion of other, more formal therapeutic ‘homework’ activities; intending to reduce mental health stigma and lower motivational barriers to engagement in these important exercises.

4.4.1.3 Biofeedback: Opportunities for Self-Awareness and Regulation

As a form of biofeedback, the Mindfulness Sphere also allows the women to self-monitor their level of arousal, which can be particularly valuable for individuals with BPD, who often have difficulties in analysing their own emotions (Linehan, 1993b). Thus, through the biofeedback functionality of this Sphere, the women can learn how to regulate a proxy of their self (Reynard et al., 2011; Yen et al., 2002), their heartbeat, which can increase trust in their own emotions and behaviours (cf. Lew et al., 2006). Self-regulation skills are crucial for mental health as they include the ability to override or sacrifice immediate impulses or rewards in order to focus on achieving long-term goals. Self-regulation abilities can be improved and strengthened through practice (Reynard et al., 2011). For example to achieve a slow and calm heart rate associated with relaxation and reduced psychological distress (cf. Linehan, 1993b; Robertson, 2011), the women can apply various relaxation strategies, such as paced breathing (e.g. only 5-6 breath per minute, Henriques et al., 2011), mindfulness, or listening to relaxing music (e.g. White, 1999). Potential success in regulating not only one’s attentional focus, but one’s heart rate, can provide a sense of positive reinforcement that ‘change’ is possible.

Additionally, the Learning Disability (LD) of the women means that there are limits to their understanding of how to best practice skills in order to gain more control. Whilst the women often seek behavioural feedback, they are highly sensitive towards feedback that is

negative or contaminated by other people's judgments (Linehan, 1993b). By depersonalising the feedback through the use of an object, the potential for inter-personal conflict and emotional hypersensitivity is reduced, making the feedback perhaps easier to accept.

4.4.1.4 *Feedback on the Design Concept by Hospital Staff*

When I presented the concept of the Mindfulness Sphere, together with design sketches and examples of different sizes, weights and inside components for this ball-shaped artefact (e.g. Figure 29), in meetings with staff members of the women's clinical care team and a Safety Manager at the hospital, they predominantly raised concerns about the material composition and the relatively heavy weight of this Sphere. Whilst solid resin was preferred for the fabrication (above softer materials) in terms of safely encapsulating smaller or sharp pieces, we agreed that all staff working with the women on the MSU had to be made aware of the risks related to the Sphere being thrown at somebody, or broken into smaller parts. Despite these concerns and associated requirements to supervise the use of this artefact by some of the women, members of their clinical care team were positive about the design and considered the artefact to be a suitable addition to DBT practices, and to fit within the overall hospital agenda of person-centred care. They appreciated the physicality of this Sphere, particularly for women with LD, as it provides them with something that they can turn to, pick up and hold, and that would present them with a 'visual reminder of their therapy'. Some further regarded the Sphere as a *way in* to introduce conversations about the concept of mindfulness to the women, but emphasised the need to carefully show and explain how they can use this artefact in a mindful manner.



Figure 29. Examples of materials such as crystals which were proposed for decorating the plastic container that houses the electronics inside the Mindfulness Sphere; and an early sketch of the artefact.

4.4.2 Identity Sphere

Engagements with Identity Sphere are intended to strengthen the women's sense of self by promoting a more positive self-perception and raising their self-esteem. Through interacting with this Sphere, which displays short personalised videos that are co-created by each woman, the women can connect to positive aspects of their self and reminisce or reflect on things that are meaningful in their lives, which can act to reassure to them and provide them with a means to build a positive self-identity (Belk, 1988). The Identity Sphere also offers them the opportunity to express individuality and distinguish themselves from others, which is a basic human need and crucial component of people's mental wellbeing (Galvin, 2012). As a vehicle to articulate their identity, this Sphere can be used as a trigger for sharing memories and stories with others, which enables social performances and affirmations of their identity.

The idea for this Sphere is closely informed by, and builds on previous designs and research of *Tales of I* and *Lovers' Box*, whereby videos of personally meaningful content served as a means to help define the person (or relationship) and to reconnect to aspects of their self. Both of these designs were also very well received by the hospital staff (Thieme et al., 2013b).

4.4.2.1 Artefact Design, Configuration and Safety

The Identity Sphere takes the form of a leather purse (Figure 30), which reflects a rather intimate, personal possession. The leather casing serves multiple purposes. As a material it is tear proof, can be turned into any shape, dyed in various colours and specifically tooled to allow for unique ornaments, thus providing rich opportunities for personalisation to the preferences of each woman. Smaller pockets inside the purse also enable the inclusion of analogue materials, such as photos.



Figure 30. Example of an Identity Sphere: closed and opened to scan a QR code.

The Identity Sphere safely encases a small and thin Android smart phone (Sony Ericsson Ray), which is a compact multi-functional digital technology that can be adapted for multiple purposes. To guard against access to the digital technology, the screen of the phone is covered by a customised, transparent Perspex sheet; and the phone body is moulded into the leather, which then is tightly stitched and glued together (Figure 31). The leather casing has only one small opening to allow for the power plug to recharge the artefact (see for details Section 5.7 and Appendix B.6). Demonstrating different versions of early prototypes (see Figure 32), a Safety Manager at the hospital was consulted on the materials and fixing methods to ensure that the artefact design was robust and safe enough for the women to use. The Safety Manager further requested the removal of all traditional phone functionalities (e.g. taking calls, SMS), which had the potential to conflict with hospital regulations.



Figure 31. Shows the transparent Perspex Sheet that protects the phone screen, with the device being moulded into the leather cover, and its individual layers being stitched and glued together tightly.

This Sphere is activated by pressing a single button at the top of the purse, which puts it in a mode that allows it to recognise Quick Response Codes (short QR codes²⁵), which are used as fiducial markers. Recognition of a QR code triggers the playback of short personalised videos on the screen inside. Once triggered, the video plays and loops until the button gets pressed again to turn it off. The QR codes are embedded in the centre of circular images, so called *mandalas* (Figure 33), which are printed as paper stickers. I chose Mandalas²⁶, as they are designed to captivate through their beauty. Moreover, the colouring of a Mandala is understood as a personal process that reflects, and helps to explore the person's inner self and emotions at the time of creation. As such, they are intended to serve as a symbolic self-portrait that the women might wish to keep and look at.

²⁵ The QR code is a small optical label containing information that is machine-readable. In contrast to conventional bar codes, it has a much higher capacity to encode data, can be printed in smaller sizes and, through its position detection patterns, is readable in any 360 degree orientation. It was released in 1994 by DENSO WAVE in Japan. [last retrieved 19.05.2014 from <http://www.qrcode.com/en/>]

²⁶ The word *mandala* means a *circle*, if simply translated from the Indian language of Sanskrit that represents the universe in Hindu and Buddhist symbolism (Oxford Dictionary Online). [last retrieved 11.02.2014, <http://www.oxforddictionaries.com/definition/english/mandala>]



Figure 32. Examples of two early prototypes of the Identity Sphere testing different shapes and methods for safely incorporating phone technology inside a leather cover.

Since the colouring process in itself is often described to create deeply calming, remarkably soothing and nourishing experiences (Art Therapy, 2008; Wrong, 2011), the creation of mandalas is often used in the management of symptoms of depression and traumatic stress (Robertson, 2011).



Figure 33. Mandala images that were coloured by the participants of this research.

Following discussions with members of my research team about how these Mandalas could be kept safe, we chose to print the women’s mandalas as stickers that can be removed easily and reprinted if destroyed. The opportunity to reproduce these images is particularly important, since staff were telling me that due to the women’s cyclic mood, cognitive distortions in their self-image and impulsivity, they might treasure something at one point in time, but can reject and destroy it at another. As the result of feelings of self-hatred, the staff explained that the women may try to break objects that they otherwise value, meaning that certain objects (e.g. personal photos) can become damaged and lost forever. Motivated by this dynamic, the women

are provided with multiple copies of their mandalas that can be easily reprinted, while the digital videos they trigger are preserved (Thieme et al., 2013b).

4.4.2.2 *Space for Internal Validations and Performances of Self*

The videos for the Identity Spheres are co-created with each woman to reflect their individual interests and represent enjoyable and meaningful experiences, as well as to reference other people who are of personal significance to them. With this in mind, the Identity Sphere is designed with the intention to become an extension of the person's sense of self, through which the women can construct, maintain or re-construct their identity. These videos may include places the women have been to, individual experiences, or meaningful people in their lives; all of which are important parts of the self, contributing to, and reflecting their identity. Thus, as a vessel for videos relating to facets of the women's identity, interactions with this Sphere seek to connect them to positive aspects of their self and invite them to be reminiscent of things that are meaningful to them, which are envisioned to help strengthen their sense of self. Furthermore, the women are left with the choice as to where they would feel most comfortable placing their mandala sticker images within their personal space. Such acts of decorating, for instance, the furniture or walls in their bedroom, present a form of self-expression that may not only change the women's relationship with their hospital environment; their visibility can further invite identity performances towards members of staff or other women on the unit (cf. Galvin, 2012; Miller, 2008).

4.4.2.3 *Feedback on the Design Concept by Hospital Staff*

In conversations with hospital staff, they shared their belief that – due to the women's general literacy in, and enthusiasm for, technology use – they are likely to be intrigued by the interplay of the Identity Sphere with the QR codes. One of the Staff Nurses further recognised that the Identity Sphere could create opportunities for the women to self-soothe emotional arousal without needing to have staff support available with them as a source of reassurance; this has been highlighted to be particularly important when the women move on from the medium to lower secure services, where opportunities for staff support are more limited. Moreover, since each mandala with its embedded QR presents a unique visual key to a video that can only be identified and played back by its corresponding Identity Sphere, the women can choose if they wish to share their videos with members of staff and the other women, or if they would prefer to watch and keep them in private. This concept around the ownership of the artefact has been particularly valued by the staff, who explained to us that the women – due to the risks they present to themselves and others at this stage in their lives – have only few precious possessions

that they are allowed to keep, or that they can have to themselves without the ward staff or the other women having access to them as well.

4.4.3 *Calming Sphere*

The Calming Sphere (Figure 34) was designed to be a simple bead bracelet that the women could hold onto during times of emotional distress. The concept of this Sphere came about in discussions with a member of the research team, to whom I explained the project and suggested to create something non-digital as a complement to the two hybrid digital-physical Spheres, as a means to reduce complexity and to avoid the risk of overwhelming the women. In response to my proposal of a rather tactile design that was easily customisable for each woman and would provide them with a gentle means for practicing self-control and distraction, the research partner suggested leveraging the concept of non-secular worry beads or prayer ropes. As a selection of beads, these are rolled between the fingers one after the other along a string, which, in some religious practices, is used to help keep track of prayers (Arettam, 2000). The regular, repetitive activity can help release inner tensions or help structure thoughts. Moreover, since the beads physically offer something to hold onto they can act as a symbol of safety and calm in the turbulent journey of people's everyday lives (Durbin, 2009).

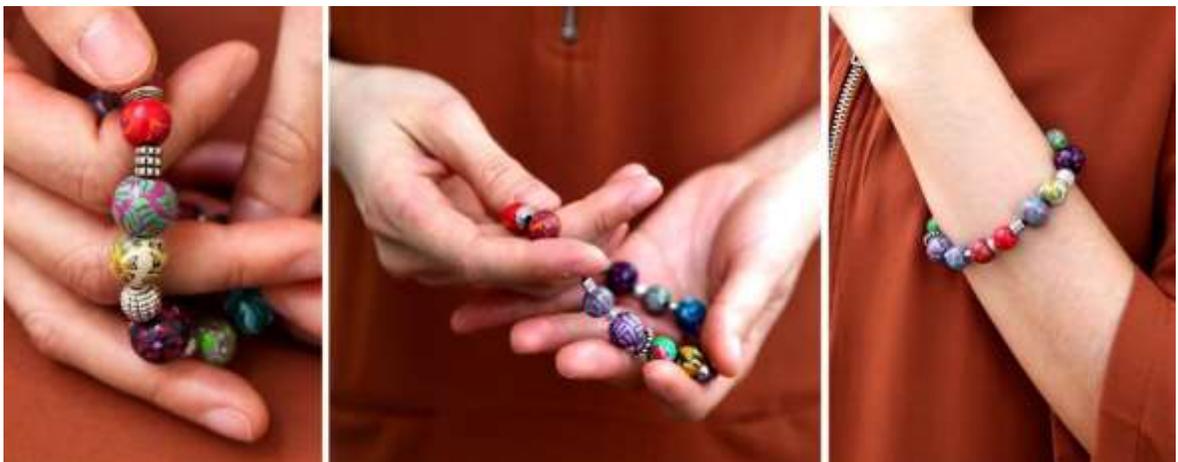


Figure 34. Example of a Calming Sphere made of beads created by each woman.

The beads can be made from any material, with the number of beads depending on historical, religious and cultural origins (e.g. Buddhist/Hindu: 27 or 108). More contemporary prayer beads include, for instance, the Scandinavian *Pearls of Life*, an 18-bead bracelet created by Swedish Bishop Martin Lönnebo that is commonly used for spiritual exercises, self-control, relaxation and reflections about life, with each pearl being associated with a certain meaning (pearls of silence, love, etc.). As in the tradition of mindfulness practice, the pearls are not about *doing*, they are about *being* and are sought to help the person focus through touch

(Lönnebo et al., 2007). As a piece of jewellery, this Sphere also constitutes an intimate artefact that the women can wear on their body (cf. Olivier & Wallace, 2009), which may assist them in seeing themselves as looking beautiful.

4.4.3.1 *Artefact Design and Safety*

The Calming Sphere is an assembly of 12 unique beads, made by each woman from the lightweight material polymer clay, that are threaded on a short leather string. This string is long enough to just fit around the women's wrists and sealed at the edges to mitigate risks of self-harm. Following current fashion trends, the bracelet also includes up to 6 small metal beads (selected by each woman) that are placed in between the clay creations (Figure 34 shows an example bracelet). The choice of materials was shaped by discussions with hospital staff, who told us that some of the women may be very limited in what they are allowed to wear (e.g. no heavy or sharp metal pieces) as a consequence of their individual risk assessments (cf. Thieme et al., 2013b; 2014b). Moreover, the use of polymer clay for the beads – a material that can be modelled in a variety of ways and that offers a range of textures and colours for creative self-expression – was a considerate decision for enabling stimulating, hands-on creative engagements with the women as part of the personalisation process of the Spheres (see Chapter 6 for more detail).

4.4.3.2 *Feedback on the Design Concept by Hospital Staff*

When I presented examples of the Calming Sphere bracelet (see Figure 35) to staff nurses and clinicians working with the women, they expressed appreciation for their aesthetic qualities and said that the women generally like jewellery. While all beads were considered small enough to not cause any serious danger if swallowed, staff raised concern about the small metal beads, explaining that some of the women could attempt to insert them into their eye lids as an act of self-harm. At the same time, and adopting a *positive risk-taking* approach, staff did not want to restrict their use entirely, particularly since individual risk behaviours of the women can change and may be less severe by the time they created their Calming Sphere. For this reason, we agreed to invite the women to create two bracelets – one with and one without additional metal beads – of which they would be allowed to keep at least one in their room, and the other one would be safeguarded by staff until their behaviours have improved enough to have both. While staff assumed that the women would understand and perhaps wear the bead bracelet as a piece of jewellery, they explained that I will still have to quite pointedly introduce them to the use of the bracelet as a tool for self-distraction, to practice mindfulness or relaxation.



Figure 35. Images of the example beads and bracelets that were shown to the hospital staff to explain the Calming Sphere concept.

4.4.4 Creative Activities for the Personalisation of the Spheres

The design specifications of the Spheres described in Sections 4.4.1-4.4.3 form a reference point for a co-creative process, whereby the women are invited to personalise their set of Spheres artefacts. In a series of five sessions, I will be working individually with each woman using different art and craft materials to assist them in the creation of personalised contents for, and components of, their Spheres. The proposed activities include the making of beads from polymer clay for the Calming Sphere bracelets; the growing of crystals and creation of colourful plastic charms to decorate the core of the Mindfulness Sphere; and for the Identity Sphere, the selection and colouring of mandala images, the design of the look of its leather cover, and the selection of photos, music and personal interests that the women wish to have included in their personalised videos. In line with the ECD approach followed in this research, these creative forms of engagement may further be regarded as a gentle invitation for the women to reflect and open up about themselves, which can help make visible the often tacit, taken-for-granted understanding that they may have of their self and their situation; and thus can provide a sensitive strategy for gaining insights into the women's experiences, and for building a relationship with them (cf. Wright & McCarthy, 2010). Chapter 6 provides more details on the rational and individual activities of this co-creative process.

4.5 Summary

In this chapter, I presented the design process and concept of the Spheres of Wellbeing and described how the design was informed by my engagements with hospital staff; my understanding of relevant previous research projects and HCI designs for mental health and wellbeing; and approaches to design that are respectful of the women's emotional and cognitive abilities, and that respond sensitively to their mental wellbeing needs. As a set of three artefacts, the Spheres are specifically designed to engage the target group of women in activities that support them in practices of mindfulness, tolerating distress, and developing a stronger sense of self. Since the design concept was primarily informed by hospital staff and the research literature, the importance of the concept of actively and sensitively involving the women into a process whereby they can personalise their artefacts became very apparent. The Spheres therefore present a set of digital and analogue templates that are intended to get completed through a series of creative activities with each woman.

In initial evaluations of early stage prototypes of the Spheres, hospital staff expressed enthusiasm about the artefacts and considered them as appropriate for use on the MSU and as a potentially useful addition to the women's therapy. They also valued the idea that the women become active contributors to their artefacts, which they regarded to align well with the hospital's person-centred care ethos. Throughout my conversations with staff, they raised however concerns about the safety of the Spheres artefacts. To this end, I was careful in choosing particularly tear proof and robust materials in their fabrication to safely encase any technology, and negotiated with the staff to flexibly manage safety arrangements in response to behavioural risk assessments of the individual women. In the next chapter, and keeping with the experience-centred design (ECD) methodology adopted in this research, I describe the overall procedure and the individual methods of the co-creation, deployment and evaluation of the Spheres of Wellbeing. Chapter 6 then described the creative personalisation process with the women. Chapter 7 and 8 then present the findings of the women's experiences of this process and with their Spheres.

Procedure and Methods: CoCreating & Evaluating the Spheres

5.1 Introduction

In this chapter and in line with the Experience-centred design (ECD) methodological approach followed in this research, I describe both the overall procedure and the individual methods of the co-creation, deployment and evaluation of the Spheres of Wellbeing. I begin with outlining the process of gaining ethical approval for the project and present some of the considerations made for protecting my physical safety and emotional wellbeing, as a researcher coming into this specific healthcare context. I then describe the process of identifying and introducing the research to potential participants, including the target population of the women in the medium secure unit (MSU) and their ward staff. The subsequent section then introduces the set-up of the creative activities with each participating woman spanning over a five week period. Following the fabrication and finalisation of the Spheres, I describe how the artefacts were presented to each woman, which initiated a 15 week evaluation period that involved primarily a range of qualitative methods for gaining a rich understanding of the women's experiences with their Spheres. This chapter concludes with a description of my approach to analysing the collected data and in carefully presenting the findings of this research so as not to breach the confidentiality of the participants.

5.2 Doing Experience-Centred Design in this Context

In keeping with ECD and the research aim to gain an in-depth understanding of the women's experiences with their Spheres, the process of creatively personalising and evaluating the Spheres required a meaningful, empathic engagement with the women and hospital staff within the specific context of the specialist medium secure hospital unit.

As described in Section 4.4.4, for building a relationship with and getting to know the women, this initially involved my engagement with them as part of a series of creative activities. While this presents an opportunity for tangible participation, in the context of the women's challenging behaviours, it also comes with a number of constraints regarding how the sessions are conducted to safeguard everyone involved. Section 5.4 describes some of the safety regulations and personal training that I received in advance for managing these risks. Section 5.6 further describes how the creative engagements were set up to create a space that feels

comfortable for the women and would invite them to get involved in the activity and to start building a relationship with me. Section 5.7 then outlines how I included and responded to the women's creations in the final fabrication of their Spheres, and my approach to maintaining contact with them during my absence from the hospital.

Although the Spheres were designed to specifically respond to therapeutic activities of mindfulness and distress tolerance, conforming to ECD, it was important that introductions of interactions with the Spheres (Section 5.8) were less prescriptive or formalised and instead more open-ended to allow for the women to potentially develop their own uses and to choose more freely when they wished to engage with these artefacts; thereby enabling a more personal appropriation of the technology into their life.

Section 5.9 then describes a variety of qualitative methods commonly used in ECD, such as interviews with the women and ward staff, for capturing the women's experiences with the artefacts. In this regard, the complexity of the women's mental health problems and their Learning Disability (LD) required consideration, since the women potentially experienced difficulties – more so than other people – to be aware and make sense of their own emotions or motives; and they may also struggled to verbally express themselves. Section 5.9.1 therefore describes my approach in helping the women to share their personal stories of how they used and interpreted their Spheres. In addition, to more holistically capture the women's experiences, Section 5.9.2 outlines how I planned to engage members of staff in dialog, by asking them to capture, talk about, and evaluate their observations of how the women interacted with their artefacts. These narrative accounts are further supplemented by quantitative log data produced by the digital Mindfulness and Identity Spheres that indicates how frequently the women engaged with these artefacts and how usage changed over time (Section 5.9.3).

Finally, Section 5.10 of this chapter presents my approach to analysing and reporting on the women's experiences. In this regard, I explain how the findings of this research are presented as collective themes of the individual experiences shared by each woman and ward staff, rather than individual trajectories, to sensitively respond to ethical requirements for protecting their confidentiality in the context of the small-scale nature of the research and this specialist care facility. The findings are further contextualised by insights that I gained through my discussions with local research partners (R&D Manager/ Local Investigator and Research Nurse) and my own engagements with the women and the ward staff, which were situated within the hospital environment. These enabled me to observe the women and their interactions with Spheres and the ward staff within their everyday life, and to also experience the dynamics and atmosphere

on the wards; all of which helped in building up a picture of what life in a medium secure unit (MSU) might be like for the women.

5.3 Gaining Formal Ethical Approval for the Research

The process for receiving ethical approval for research within health and care settings can be complex and challenging for non-healthcare professionals (e.g. from the HCI community) to address. These processes often place strict limits on the conduct of research in hospital and other medical care contexts. Details of the specific process and considerations addressed in successfully applying for ethical approval, including the key documentation submitted as part of this process, highlight many of the ethical and safety issues at play and serve as a potentially valuable resource for researchers seeking to undertake similar studies.

In December 2012, the proposed research for the Spheres of Wellbeing was approved by the NHS Research Ethics Committee (NRES North East: Newcastle & North Tyneside 2) and received subsequent approval by the R&D Department of the collaborating NHS Trust. This process required the submission of a Research Protocol, including a detailed description of the motivation and planned conduct of the research, alongside necessary research materials such as information sheets, consent forms, interview guides and observation tools; and formal confirmations of study funding, sponsorship, insurance and indemnity cover, and a signed agreement to govern the conduct of my post-graduate studentship with the hospital.

Any ethical issues related to this project, such as the process of sensitively seeking informed consent of a potentially very vulnerable service user group; the assurance of the safety, health and wellbeing of all involved; and the confidential treatment and anonymous presentation of any collected data, are addressed both in the Research Protocol and the Integrated Research Application System²⁷ (IRAS) application. The descriptions of methods in this chapter include detailed explanations as to how I proposed to address these ethical issues during the various stages of the research. My understanding in this regard however was closely informed by conversations with the R&D Manager at the hospital, who shared with me her professional and personal experiences of conducting research with the target group of women. She provided essential insights into existing work practices and safety procedures of the hospital, and assisted in reviews of the research protocol and ethics support documents. Importantly, she also attended my meeting with the NHS Research Ethics Committee to answer more specific, hospital service related questions, and to reassure to the committee members

²⁷ IRAS is the UK online system to apply for permissions and approvals for research in health and care [Last retrieved 28.02.2014 from <https://www.myresearchproject.org.uk/Signin.aspx>]

that she would closely support and carefully oversee all aspects of the research on site. In particular her responses about how she would assist me in the process of seeking consent of a population described as vulnerable and to have a Learning Disability, without coercing them to take part, meant that committee members were more confident that appropriate measures were taken and to give a favourable opinion for the project to go ahead.

In addition to these formal approvals for the research project, I personally also had to apply for a Research Passport (requiring CRB clearance and Occupational Health certification) and attend 'Breakaway training', which taught me how to maintain a safe distance of the women and how to block an attack. These were required for the receipt of a Letter of Access (LOA) to the hospital and for the conduct of the research. The overall process and time scale of gaining ethical approval for this project and an anonymised copy of the NHS Research Ethics (REC) form are included in Appendix B.1.

5.4 Protecting the Physical Safety & Emotional Wellbeing of the Researcher

As part of the planning of this research, and guided by risk assessments that form part of the formal ethical approval process, I was considerate of any potential risks or burdens of the research for the research participants, and also of any risks to my personal safety and emotional wellbeing. The following describes a set of arrangements made for the set-up and support of all research activities that took place on hospital wards for protecting my health when operating in this sensitive care environment.

In terms of physical safety, and as an external researcher coming into the medium secure setting, I had to familiarise myself with existing safety practices. This included the attendance of 'Breakaway training', as described in Section 5.3, as well as the counting-in, and -out, of any equipment or objects brought onto the unit; the wearing of an alarm system on my clothes (e.g. trouser loops); and the use of a safety belt with a 'pocket pouch' to anchor keys for unlocking doors. To be permitted to use keys, I had to take part in a key induction session. In addition, in any interactions with the women I was accompanied by at least one member of the ward staff with experience in comforting the women and handling incidents. Moreover, certain items of loose clothing and jewellery that the women could easily grasp and pull, such as scarves and earrings, were prohibited; long hair had to be tightened back and put up; and it was recommended to me not to wear any items that would draw the women's attention to personal information.

Considering the women's complex mental health conditions, and their (at times) very challenging behaviours, I and my supervisory team were mindful that I could be emotionally affected by my work with the women. To this end, the R&D Manager of the hospital, who had now take the additional role as the Local Investigator of this research on-site, adopted the role of a supervisor and coach for me, providing formal and informal support throughout the project. As a trained Cognitive Behavioural Therapist in addition to her research expertise, she helped debrief my experiences at the end of each day. Debriefings are a routine practice amongst psychotherapists, whereby they attend to each other's distressing experiences. In the context of this research, this included discussions of particular research activities on the wards and whenever I felt that my personal or professional understanding of a certain situation was challenged. Jointly we would review, reflect about, and discuss what went well during the research activities as well as any issues that I was concerned about such as worries about causing distress for the women or appropriately managing the time of staff. Our conversations were also of fundamental importance to clarifying aspects of my experiences with, and for gaining an empathic understanding of, both the women and ward staff (cf. nursing literature on reflective practice, e.g. Burns & Bulman, 2008).

Fortunately, discussions with official members of the research team such as the Local Investigator and also the Research Nurse were covered by a shared confidentiality agreement, thereby avoiding conflicts in protecting participants' identity. I was further supported by my supervisory team, with whom I had regular meetings to talk about the research and how I was affected by it. Moreover, the keeping of a research diary to document my experiences helped not only my process of making sense of the research as part of my ECD approach, it helped in 'digesting' emotional and distressing encounters; and I also made an effort to maintain a healthy work-life balance (see recommendations for researcher wellbeing by Moncur, 2013).

5.5 Recruitment Process and Participants

As an outsider, coming into this hospital environment, I required assistance to identify key individuals to support the research. To this end, the Local Investigator made contact with the Department of Human Resources at the hospital to identify members of staff working on the MSU as well as potential 'women' participants, and liaised with their staff team to arrange for individual research activities.

5.5.1 Hospital Staff

Recruitment to the study at first involved members of staff that were working on the MSU and involved in the women's care. The Local investigator arranged for information about the research to be sent to the Ward Manager for distribution to their staff team. Thereafter, she organised three ward visits for me to meet with the staff and to offer them more insight into the project by showing examples of materials for the creative sessions as well as prototypes of the Spheres; and to provide opportunities to ask questions. These visits attracted further interest from staff, especially those that had not previously engaged with any of the written project information.

During this initial period, and by the time that the creative sessions with the women had started, 23 staff had been recruited; another 10 staff signed up for the research during the conduct of the creative sessions; and 14 additional staff signed up for assisting in the evaluation. Over a period of 7 months, between January 2013 and July 2013, 47 members of staff (16 male and 31 female) were recruited. The staff included 19 day shift and 8 night shift or twilight Support Workers (Band 3²⁸); 13 qualified Staff nurses (Band 5), one of which works nights; 4 (Senior) Managers (Band 6 to 8); two Occupational Therapists (OT); and an Assistant Practitioner (Appendix B.2 presents a list and short descriptions of the professions of any staff members involved in the research). Six of the staff worked primarily on the low secure services (LSU). Staff's involvement in the research mostly included the supervision of the creative activities and interviews with the women; and contributions to the data collection process through sharing their views and observations of the women and the Spheres.

5.5.2 Women in Medium Secure Services

Based on a list of specific inclusion and exclusion criteria (see Table 1), potential women participants for this research were identified by their clinical care team. These criteria were identified in discussions with the Local Investigator prior to the recruitment phase to ensure that potential participants were not excluded from the research. Ethically this was important to not have to exclude any women who would wish to take part, while practically this also extended the group of potential participants to recruit from.

²⁸ Band levels represent the pay rates for NHS employees. There are nine pay bands: a higher band number indicates higher pay and higher level roles (e.g. manager, head of service). [Last retrieved 19.05.2014 from <http://www.nhscareers.nhs.uk/explore-by-career/psychological-therapies/pay-for-psychological-therapies-staff/>]

It is important to note that I had at no time access to personal or forensic records of potential participants, which would have required prior consent by the women. The Local Investigator explained that this could however be challenging, as the women tend to be embarrassed about their personal history and are often unwilling to share such information with others, risking that they might reject their participation entirely. Since the design and concept of the Spheres was closely focused on the group of women, this exploratory research included, at this stage, only female participants (but could potentially be extended to male populations). Moreover, due to the women’s Learning Disability, the exclusion criteria defined that the women need to be able to give consent (as assessed by their clinical care team) to ensure that they understand the project and have sufficient ability to express themselves.

Table 1. Principal inclusion and exclusion criteria for the research target group.

Inclusion Criteria	Exclusion Criteria
Female	Male
Age 18-65	Unable to give informed consent (e.g. clients with a more severe LD) or no consent given
Inpatient in the MSU [name of NHS hospital]	
Dual diagnosis of LD and PD (as established by the professional health and care team of the women) and/or experiences emotional dysregulation to the extent that the care team feel she would benefit from inclusion in this creative intervention	
Given informed consent to take part in the research	
Sufficient English language skills in order to understand and express themselves verbally	

To introduce the project and ourselves as researchers to the women, the Local Investigator and I joined a community meeting of the women on their flat. The meeting began with introductions, first by us, followed by each woman telling their names. The Local Investigator then explained to the women how she had been working in the medium secure services for many years but had now taken on the role as a Research Manager; and I introduced myself as a PhD student in computer science, enrolled at Newcastle University.

One of the women had heard about the project before, when it had been showcased during a research event two month earlier (7.11.2012). Since her attendance at the showcase event, she had already told the other women about the project and also shared her thoughts on the project with us during the meeting, thereby supporting our efforts to explain the planned research activities to the others. To give the women a better idea about the research and what they would be doing should they choose to participate, I showed them a slideshow of images on

a laptop computer, presenting the different materials for the creative sessions and images of Spheres prototypes. I further explained that this project is part of a programme of research that aims to find out how technology might help them to feel good about themselves, how it can be used to distract or calm them, or be a tool for meditation. All women showed interest in the project and asked a variety of questions, for example, about the kinds of images or music that they could have on their 'purse' (Identity Sphere); what the 'ball' (Mindfulness Sphere) is made of; if the project was planned as a group activity; and when it would start.

Following this initial group meeting, the Local Investigator scheduled additional individual meetings for us with each woman on subsequent days; these took place in a spare bedroom of the women's flat on the MSU. For these meetings, I brought prototypes of the Spheres as well as examples of craft materials to re-explain the purpose of the creative sessions and invite conversation about the project. For instance, I showed the women a box with differently coloured clay blocks, let them pick-up and knead a piece of clay to get a feel of the texture, and explained how they would be making their own beads from this material to create their 'bracelet' (Calming Sphere). The women would also get to explore different crystals, plastic charms and rubber stamps. During this session, the women were particularly interested in the 'purse-like' leather artefact, which I demonstrated to them by using a precoloured mandala with a QR code fiducial marker in the middle that triggered a generic video of relaxing music and animated flower images.

Following these demonstrations, the women were then provided with an information sheet, written in appropriately accessible language and supported by pictorial prompts (Appendix B.3), for them to read and consider carefully. Since one of the women could not read, I sat down to slowly read the information out loud for her, step-by step, while allowing the woman to take a look at the pictorial images as we went along. While this woman appeared to be attentive to the information, The Local Investigator and I wanted to ensure that she properly understood the project and what it entailed. I therefore asked her to recall core information (e.g. *"Can you tell us which are the three objects that you will be given as part of this research?"*) as well as to respond to each statement of the consent form that addressed the ethically more sensitive issues of the research (e.g. *"I know that I can stop taking part at any time and no-one will be upset with me"* or *"I understand that the researcher will have to tell my carers if I talk about plans to cause harm to myself or others"*).

Once the women had read and understood the information about the research and were given opportunity to ask questions, I explained to them that they had one week to carefully think about and discuss their potential participation with others, before consent in writing would

need to be provided by those who volunteered. Although I explained to the women that they should take time to reflect about their participation, four women already decided that they wanted to take part and wished to sign a consent form (Appendix B.3) at the end of our meeting. Another woman consented a few days later, after consultation with staff. At the point in time that these recruitment activities were being conducted, only five women were living in the six-bed flat of the MSU. However, one week into the conduct of the creative sessions, the spare bed was given to a new admission. Following conversations with the other women and staff, she also wished to participate. I therefore approached her too with information about the project, showed her example materials and artefacts, and went step-by-step with her through the information sheet and consent form as part of the consent process.

Throughout the recruitment process the Local Investigator and I paid careful attention to try not to coerce the women to participate, and carefully emphasised that their participation is voluntary, that they can drop-out of the project at any time without giving a reason for doing so, and explained what the implications would be if they said “no” to the research (e.g. *that this would be absolutely fine and would not impact negatively whatsoever*).

Following recruitment the participants comprised of a group of six women who shared a six-bedroom flat in the medium secure services of a specialist NHS Foundation Trust in the UK. Most of the women were in their early twenties; their ages ranged from 18 to 43 years. All had a mild-to-moderate Learning Disability with IQs ranging from 53 to 69. Prior to recruitment, the women were assessed by their clinical care team to have been capable of giving informed consent, to fit the inclusion criteria, and to be likely to benefit from participating in the research. In terms of their mental health, the women suffered from high co-morbidity, meaning that they can have multiple disorders that co-occur (e.g. a primary diagnosis of BPD with a secondary diagnosis of Post-Traumatic Stress Disorder). The women’s primary ICD-10²⁹ diagnosis ranged from Borderline Personality Disorder through to mixed Anxiety and Depressive Disorders, and Atypical Autism with Anxiety; all of which reflect severe emotional difficulties with symptoms and behaviours similar to those described in Section 3.4.1. While Dialectical Behavioural Therapy (DBT) was the therapeutic model for the women’s care pathway, this was in the process of being introduced and had not yet been fully established on

²⁹ ICD-10 is 10th the international standard diagnostic tool for the classification of diseases by the World Health Organisation (WHO). It provides clinical descriptions and diagnostic guidelines for the classification of mental and behavioural Disorders [Last retrieved 11.02.2014 from <http://www.who.int/classifications/icd/en/>].

the MSU. At the time of recruitment, only two of the women were four months into their first phase of receiving DBT.

5.6 Creative Activities: Overall Set-up and Procedure

Following recruitment, the Local Investigator arranged with the leading nurses and the ward managers of the women's service to schedule a series of five creative sessions for me to work individually with each woman over a period of five weeks. These sessions were scheduled not to interfere with the women's attendance in therapy or other activities they liked engaging in (e.g. cooking). This scheduling was also mindful of staff's advice as to whether the women were known to have difficulties to get up in the mornings and avoided busy ward days (e.g. ward rounds).

All creative sessions took place in a meeting room on the ward. As a familiar environment to the women, it was likely to reduce any anxieties that they may have, and was in close proximity to the ward staff, if support was required (i.e. if the women became emotionally distressed, agitated or aggressive and were at risk of harming themselves or others). All sessions with the women were further attended by the Research Nurse to assist me in these activities. As an additional safety measure, and to comfort and support the women (e.g. if they were feeling insecure, or if their risk behaviours required an extra safeguard), a second member of staff attended seven of the sessions. Moreover, to avoid upsetting the women, I was briefed by the staff about certain sensitive topics that I should avoid in conversations with individual woman (e.g. disrupted family relations), and about specific behavioural risks (e.g. a woman's tendency to pull hair) for consideration of my own safety. Other safety processes included the counting-in and -out of all materials brought onto the ward, including tools (e.g. technology, scissors, cameras, rope, vanish or glue), which ranged between 87 and 366 items for individual sessions (for an example tools list see Appendix B.5). In addition, the seating arrangements in the room were chosen to ensure a distance of at least one arm-length between me and the woman, who often sat opposite me, separated by a table to minimise risks of a sudden attack.

Five of the women attended all creative sessions, and one woman only attended two sessions due to a decline in her mental health at the time of the scheduled activities. With another woman, four of five sessions had to be ended before their scheduled completion time, as her level of emotional distress prevented concentration on the activity at the time. Importantly, no incidents happened during any of the sessions. Following a person-centred approach, for sessions that women failed to attend or that were disrupted, catch-up activities

were organised in subsequent sessions. Overall, 27 sessions were conducted and on average these lasted for 1 hour and 44 minutes ($SD = 36.7$, $min = 14$, $max = 154$ minutes). Chapter 6 describes in detail the conduct and the materials created as part of the creative sessions.

At the end of the 5 week period, the Research Nurse further suggested to the women that they could make a storyboard about the creative sessions, to which they responded with great enthusiasm. The storyboard was created in approximately one hour by the group of women at the tables in the dining area of the flat, and was supported by me, the Research Nurse, and supervised by the ward staff. All, but one of the woman, who had been in the high dependency (HD) area at the time, participated. Another woman had to leave the activity early to meet her parents during a visit.

5.7 Fabrication of the Spheres of Wellbeing

Following the co-creation sessions with the women, I finalised the fabrication of all six sets of Spheres of Wellbeing together with my research colleagues in our university research lab.

For the Identity Spheres this involved the custom fabrication of the leather cover for the phone device that included a robust protector screen and a small 3D plastic button that was safely encased at the top of the artefact. The appearance of the leather cover was informed by design sketches made by each woman as part of the co-creation sessions (Section 6.2.3) resulting in variations in the colour, ornaments, pockets, shapes or engraving of the individual designs (see Figure 36). Closely following the design brief of each woman, the leather covers were precisely cut using a laser cutter and dyed it in the colour of their choice. I then moulded the device tightly into leather before assembling the different leather pieces, by gluing and robustly stitched each layers together, and sealing their edges with multiple layers of coating to give the artefact a solid, yet beautiful finish (see Appendix B.6 for detail).



Figure 36. Fabrication of the Identity Spheres following the design brief of each woman.

For the Identity Spheres, the women's mandala patterns were printed on sticker paper and before adding on a bespoke QR code (the fiducial marker) to each design; and editing each of their videos. For the contents of the videos, I made use of both materials provided by the women (e.g. photos, stop-motion animation they made with me during the creative sessions) and materials that were collected mostly using the Internet, that corresponded to the interests and wishes that the women had expressed during the co-creative sessions (e.g. video of a particular football match, a specific music video of favourite singer, cartoon figures).

Since the women chose a particular song for each video (with exception of the stopmotion animations), its length typically determined the length of the contents being displayed. Apple Final Cut Pro and Windows Movie Maker software were used for the video editing process. Where a video was composed of still imagery, pictures were carefully animated through gentle moves and transitions between them. The first set of videos (excluding any add-on videos created at the end of the 15 week deployment) were on average 3 minutes long ($M = 182$ sec, $min = 41$ sec, $max = 483$ sec), and displayed content relating to their family, friends or pets (4 videos in total); showed favourite musicians (6 videos in total); the sport teams they followed or other hobbies and interests that they wanted to have included (3 videos in total); or the animations that they had created together with the researcher (5 videos in total). Of these videos 4 were slideshows of images and photos, 7 made use of existing video materials, 5 were animations, and 2 were hybrids of the other formats.

For the fabrication of the Mindfulness Sphere, I worked together with two research colleagues, who had experience in making a two-part silicon mould, which was needed for the casting of the resin ball. The mould we produced had two indentations at either side to create mounts to which copper disks would be fixed, and a hole at the bottom to anchor a bespoke 3D printed white plastic container that would later house the Sphere's electronics (see Appendix B.6 for details). At its top, this plastic container was fitted with 6 transparent lenses allowing 6 multi-colour LEDs to shine through. At either side of the plastic container we left a hole for a copper wire to connect the inside electronics with the copper disks on the outside of the Sphere. For the casting process we then sealed all openings of the plastic body with a removable silicon-based glued (to protect it from resin ingress).

Small hooks around the outside of the plastic body allowed me to attach small decorative pieces to it. As decorations, the women had chosen some of the plastic charms that they had created (Section 6.2.3) as well as some of the crystals they had grown (Section 6.2.2), which informed the colour scheme of fabric ribbons that I used for disguising the plastic container (Figure 37). However, due to unforeseen chemical reactions between the grown crystals and the resin solution, the crystals could not be included in the final designs. Instead, I replaced these by similar coloured glass beads. The self-grown crystals were returned to the women, and safeguarded by the ward staff.



Figure 37. Mindfulness Spheres of the women showing their individual decorations.

The casting of the resin was a difficult process with significant heat being generated as a consequence of the chemical reaction needed to solidify the object, and internal stresses resulting from the cooling process of the ball (as the top and bottom layer cooled down faster than the middle layer) tending to cause the resin to crack. As a result, all materials used to decorate the core of the artefact needed to be relatively heat-resistant such as glass beads or nylon threads and fabrics. Moreover, to eliminate the internal stresses caused by the cooling process, the resin was poured in 4 stages (instead of 1), delaying the time between each stage just enough to allow for the individual layers to still bond with each other. Once removed from the mould, we carefully polished each resin ball, before we soldered and safely glued two hand-crafted copper disks to the mounts, and inserted the electronics into the container. Moreover, one of my colleagues designed a 3D printed custom stand for Sphere, for display purposes and to provide support during charging (for more details see Appendix B.6).

To finalise the Calming Spheres bracelets (Figure 38), I simply assembled the clay beads made in the co-creation sessions and the metal beads and leather strings chosen by the women (see Section 6.2.2).



Figure 38. Assembled Calming Spheres of the women.



Figure 39. Individual letters sent to the women.

Moreover, to keep the women engaged in the project while they were waiting for their Spheres to be completed and maintain a relationship with them, I sent a letter to each woman that included photo stickers showing individual steps in the fabrication process as well as a set of tattoo transfer images (Figure 39) that each of the woman had selected in the final creative session. For the two women who did not attend or completed all five sessions, I selected tattoo images that represented some of the interests that they had expressed towards me during their time together (e.g. a love for cats or football). Moreover, half-way through the fabrication process, the Local Investigator, the Research Nurse and I co-organised an event at the hospital for the women to showcase some of the pieces they had created as part of the creative sessions and to explain the individual activities to other services users and the staff (approximately 40 attendees). Four weeks later, with the completion of the fabrication and testing of the artefacts, I brought the completed Spheres to the hospital.

5.8 Introduction & Deployment of the Spheres

One day before the deployment, one of the women moved from the MSU to a low secure unit (LSU) of the hospital. While this allowed me to continue working with her, she was now separated from the other women and her place on the MSU was taken by a new admission, who had not taken part in the Spheres research. Moreover, before I could hand out the Spheres to the women, all artefacts had to be presented to a Safety Manager at the hospital, who carefully inspected and had to approve their final design for deployment. The Safety Manager had previously been involved in consultations and discussions about the design of the artefact, so as to maximise the likelihood that they would meet the safety criteria. The safety procedures further required that all artefacts were added to the unit's inventory list to allow for regular checks of the equipment and their location. Together with the ward staff, I had to identify a safe

place for storing the artefacts in the women's bedrooms as well as appropriate charging facilities (e.g. existence of power sockets). Only two of the women were allowed open access to their artefacts, another two had intermittent access due to their risk behaviours, where at times, their Spheres had to be kept in a separate room that only staff had access to. For the remaining two women, their Spheres were locked behind a transparent Perspex cupboard in their room together with other electrical appliances (e.g. TV or stereo).



Figure 40. Spheres of Wellbeing gift box with the Spheres, chargers and user manuals.

5.8.1 Deployment Day

For their deployment, I placed the Spheres of each woman inside a custom-made gift box (see Figure 40), which was a deliberate decision for two reasons: (1) this type of special packaging felt appropriate for emphasising a certain preciousness of these new possessions of the women and to resonate with and to respect the care they had given and the investments they made to their creation; and (2) this box, with its bespoke indentations for individual items, offered a format for organising all artefacts and charging equipment and provided a container for safely transporting the Spheres, when the women eventually leave the MSU.

The women were then invited to attend an individual session with me and the Local Investigator, in which they would explore their gift box and take a closer look at their Spheres. Four of the sessions were attended by at least one additional staff member due to either safety

regulations, to provide additional support to individual woman who were feeling unsettled, or due to the staff member's own interest in learning more about the project. All sessions took place in a meeting room or quiet room outside the women's flat on the MSU (and LSU for the woman who had moved there). The deployment sessions spanned between 19 and 38 minutes ($M = 27, SD = 7.01$), were audio recorded and partially transcribed to capture the women's initial responses towards their Spheres, which were included in an overall Thematic Analysis that is described in Section 5.10.

During the session, the women had a look at, and wore, their Calming Sphere bracelets. Once on their wrists, I showed them how they can use one of the smaller beads to tighten their bracelets. I also measured if the length of the leather string was a good fit, or needed to be shorter or longer for individual woman, before sealing the knot of their bracelets as an additional measure of safety.

As a result of previously showing the women a prototype of the Identity Sphere during the recruitment and creative sessions, two of them remembered well how to use this Sphere. They immediately opened their purse-like artefact, pressed the button at the top to switch its camera on, and placed one of their Mandala images with the embedded QR codes in front of it to trigger their video. For the other women, I showed and guided them step-by-step through this process to ensure that they understood the 'scanning' of their Mandalas and they had several practice runs until they felt confident enough to use the artefact by themselves. To explain the 'scanning', I compared the Mandalas to barcodes on products, which further helped in explaining how a code sometimes might not scan properly (e.g. the camera vision can be blurry if held too close to the QR code, preventing it to get recognised). Moreover, I explained to the women that, to save battery power, the Identity Sphere was configured to automatically switch its camera off, if no QR code had been recognised for some time.

Once each woman had triggered at least one of their videos, I showed them how they could stop a video from playing by simply pressing the button at the top, and explained that if not switched-off, the video would repeat. I reminded the women that each Mandala pattern would trigger a different video and that only their Identity Sphere with their set of Mandalas can playback the videos, meaning that the other women would not be able to see their videos, unless they invited them to do so. I also assured them that pressing the button and scanning the images will become easier with time and practice, and re-mentioned that the Mandalas are stickers that they can place wherever they would like to have them in their rooms.

To learn how to charge the artefact, I invited the women to practice the insertion of the plug into their Identity Sphere, pointing out little symbols on the plug to assist them in

identifying the correct orientation; advising to not use any force when plugging it in; and recommending that both digital artefacts get charged every night to ensure that they are always ready for use, and to not interfere with their data logging process (see Section 5.9.3 for more detail on the data logging). Should the Identity Sphere completely run out of battery, I explained how it could be restarted after charging by pressing the button at the top for a prolonged period time, reactivating the device and causing it to automatically reload the camera application.

For the Mindfulness Sphere, I showed the women how they can hold the ball so that their hands make contact with the copper disks at either side, and without touching each other. As soon as their hands made contact with the metal disks, the lights inside the ball would start to light up. I slowly talked the women through this process, explaining how the lightening up of the ball signals that the artefact is trying to detect their heartbeat and that this can take up to 15 seconds. As soon as each woman received a visual representation of their heartbeat, I explained that the signal is stronger when they do not move their hands, as this can cause it to lose the signal. Should the signal get lost, I encouraged the women to keep touching the artefact until it picks up their heart rate again. Once all women had practiced holding the ball and getting a heartbeat signal, I showed them that if they held the artefact for a prolonged time, the lights at the inside would change colours. To charge the ball, I introduced the women to the custom made stand and advised them to take care when placing the ball onto it. We practiced pulling it off the charging plug a few times together. Once the Sphere was connected to power I pointed out that a specific light sequence of blue and red LEDs would indicate that the ball was properly connected and charging.

For future reference on the use of, and charging procedure for, each of the digital Spheres, I left each woman with small booklets containing easy-to-read instructions and a concise summary of everything that I had explained to them during this meeting. The booklets were also intended as a useful resource to share with staff. Moreover, on the subsequent day, I visited each of the women again to practice the use and charging of their artefacts.

Importantly, during the introductory session and following advise by the Local Investigator, I tried to also address certain expectations that the women might have of the technical robustness of the Spheres, so as to counter any potential feelings of disappointment. For example, I asked the women to be very careful with the objects, explaining that they were new, handmade artefacts, which were more likely to break than other devices that they might commonly use, such as their PlayStation or Xbox that had been developed and tested by technology providers over many years. Although, I explained that the Spheres, as prototypes, were potentially more fragile and therefore could break more easily, I encouraged the women

to make use of them and explained that I would be on hand for the duration of the study to immediately address any problems that might occur.

In this initial period of the deployment, I focused especially on teaching the women how their Spheres work practically and how they should look after them. At this stage, I left it open to them when and for what purposes they chose to use their Spheres to motivate a sense of ownership and agency. I especially encouraged those women who were less likely to have free access to their Spheres to ask staff for their artefacts, if they wished to use them. Finally, I told the women, that as part of the research I would visit them over the next four weeks to talk to them about their experiences with their Spheres. I explained that they were helping to test the artefacts and that I was interested to find out how they used them, and if they liked or disliked their Spheres, stating this would help improve the artefact and my understanding as to whether it would be worthwhile re-making them in the future.

5.8.2 Deployment Weeks 1, 4, 10 and 15

Unfortunately, for the deployment and evaluation period of the Spheres, the Research Nurse, who, as a key enabler of the Spheres research during the design process and the creative sessions with the women, had championed the research on the MSU, had been moved to a different hospital unit. During the first two weeks of the deployment, I was therefore accompanied by different members of staff during my visits to the MSU and LSU to meet with the day and night care staff of the women to explain about the Spheres. This included the informing about the functionality, maintenance and potential risks attached to the Spheres; providing an overview about the background and purpose of the research; and outlining opportunities how the staff could support the research by completing event cards and filling in specific diaries (see Section 5.9.2). These visits further gave both staff and the women an opportunity to ask specific questions about the Spheres, and enabled me to address any problems that the women encountered in the first weeks of using them (i.e. two women had difficulties to 'scan' their QR code images when they were sitting in the dark, as this interferes with the detection of the black and white QR pattern).

One week into the deployment, when initial excitement about the Spheres started to wear off, staff observed a decline in the women's engagement with the Spheres. Motivated to promote the research and being mindful of the women's cognitive abilities (e.g. limitations in attention span or remembering), staff frequently asked if they should remind and suggest the use of the Spheres to the women. Whilst I explained that I did not wish to enforce or restrict their use and was interested to see how the women engaged with their Spheres over time, I

agreed that staff could suggest them to the women, as it felt to be appropriate, and as they would do with any other artefacts or technologies in their service.

At the end of the first week of the deployment I met again individually with all but one woman, whose decline in mental health at the time restricted her ability to attend to the research. These meetings served to capture their initial experiences with the artefacts and also to gently introduce the women to Spheres-based activities that lent themselves potentially to more therapeutic engagements. Our conversations revealed that while the women could relate to, and had already identified, different uses for their Identity Spheres, they reported less use of their Mindfulness and Calming Spheres, which suggested a need for more direction and support as to how they could appropriate them. For the Calming Sphere, I therefore proposed to the women that they could, for example, hold on to and play with the beads on their bracelet when they would feel slightly nervous, or to try and count their beads one-by-one to take their mind off whatever was troubling them. Similarly, for the Mindfulness Sphere, I suggested to the women to simply watch how the ball lit up with every beat of their heart and to observe how it changed colour over time. I further advised them to try only to focus and concentrate on the ball and how its lights fade without thinking about anything else. To help the women in understanding this as an activity, I compared it to a breathing exercise that the women were familiar with and that also included bringing focused attention to a stimulus, in this case their breath. For all three artefacts I reminded and emphasised to the women that they can use them as they like.

To continue supporting and fostering the women's understanding of mindful awareness and how they could make use of their Mindfulness Sphere for this purpose, towards the end of the 4th deployment week the Local Investigator and I arranged for a groupbased mindfulness activity held on the MSU that was joined by the woman who had moved to the LSU. The activity was led by the Local Investigator, who provided step-by-step guidance on a variety of different ways that the women could bring focused attention to their Mindfulness Sphere. Being considerate that the women might not at all times be allowed to hold the artefact, she explained how they could explore it at least visually by studying the different colours at the inside, noticing what decorations are at the front or back of the ball, by observing the patterns on the plastic charms that the women themselves had created, or exploring any thoughts and feelings that they associate with their own creations and the colours inside their Sphere. She also suggested touching the artefact so that the women would get a feel of its smooth, cold surface, and to experience its weight as they hold it in their hands.

To then introduce the women to more meditative and relaxation-focused exercises using the Mindfulness Spheres, the Local Investigator instructed them to sit comfortably holding their Sphere in their lap with their hands touching the copper disks; and to then close their eyes, taking a deep breath in and holding their breath for a while before breathing out again. Once they had repeated this breathing exercise another time, they were asked to reopen their eyes. By that time, the Spheres had detected each of the women's heartbeats. Next, the women were guided in noticing how the lights inside their Sphere got brighter and brighter; how they flashed in different colours; and how their heartbeat might change in pace the longer they held it. The Local Investigator also pointed the women to take a closer look at their encapsulated plastic charms and beads to observe how the transitions in lights and colours would change their appearances too; or to try concentrate on the sequences and frequency of the colour changes. Towards the end of this group practice sessions we encouraged the women to try repeating some of these exercises on their own.

At the end of the 4th deployment week, I conducted interviews with the each woman and members of the MSU and LSU ward staff. In addition to this initial evaluation period, I revisited the women in week 10 and 15 to follow up on how their engagements with the Spheres had developed over time. These follow-up visits revealed significant decreases of the women's uses of the Spheres. To re-invite interest in engagements with the artefacts, the women and I created two additional videos each for their Identity Spheres.

In terms of the overall functionality of the Spheres, only two technical problems were encountered (in week 1 and 10, by two different women) throughout the 15 week deployment, which were both related to the phone application that was part of the Identity Spheres, crashing. I resolved these either at the same day (for week 1) or during a subsequent visit (in week 14). At times, I had to re-glue the small, decorative leather passé-partout that framed the screen of the Identity Sphere, and twice I had to replace and repair the leather string of two of the Calming Sphere bracelets (see Section 8.7.4.1). With the completion of the research activities at the end of the 15 weeks, the women kept their Spheres artefacts and were assured of the provision of technical support for a period of 12 months. I also gave each a DVD with all five videos of their Identity Spheres as an additional copy.

5.9 Understanding the Women's Experiences

The following sections describe the qualitative methods chosen for capturing the women's experiences in the creation of, and interactions with, their Spheres. These include moments of joint participation in engaging with physical materials and also with the Spheres' objects. This

was documented through semi-structured interviews with the women and members of their care team, and further supplemented by reports of my personal experiences of the project and context, as recorded in research field notes. Log file data collected by their digital Spheres was also used.

5.9.1 Object Use & Individual Interviews with the Women

To capture some of the conversations that unfolded between me, the Research Nurse and the individual woman during the creative sessions, these were audio recorded. In addition, the storyboarding activity offered opportunities for the women to reflect about and summarise their experiences of this process. For this reason I asked the women if they consented for the session to also be audio recorded and included in the research; all women verbally consented to this. Moreover, the Research Nurse documented some of her observations and experiences of our engagements with the women in their care notes; and shared copies of these with me. In addition, to gain a better understanding of how each woman perceived and interpreted the creative activities; and how they felt about and used their Spheres in the context of their everyday life, I conducted interviews with each woman at the end of the 1st and 4th deployment week. All but one woman, who was only able to attend the second interview due to a decline in her mental health during the first week that prevented her participation at that time, participated in these interviews. These lasted on average 18 minutes (*min* = 6, *max* = 25) and, on the MSU, were all attended by at least one member of staff.

The interviews of the first deployment week took place in the women's individual bedrooms or in the HD area of the MSU. While this generally enabled a more intimate atmosphere when the women were talking about their personal experiences with the Spheres, with one exception, all conversations were interrupted on at least one, and up to three, occasions by ward staff. This was a direct consequence of the dynamics of the flat (e.g. staff regularly checking in on the women; safety regulations demanding that room doors were left open allowing staff outside the room to co-supervise the activity), which at times considerably impacted on the women's ability to concentrate. For our follow-up conversations in week 4, I therefore arranged for these to be held in a meeting room outside the women's flat.

To gain insights into how confident each woman was in using the artefact I typically started the interview by asking them to show me how they were physically using each of their objects to ensure the women felt more at ease during our conversation; while support them to articulate their thoughts about their Spheres. This helped address any use problems and encouraged repetitive practicing of the activities (i.e. of the scanning of Mandalas where

necessary). More importantly, having the women sit down – in example on their bed holding their Mindfulness Sphere in their lab – created a more playful and less pressured atmosphere for our conversation. While the handling and playing with each Sphere would remind some of women of the engagements they had had with them and the staff. Some volunteered the sharing of their experiences without the need of additional enquiry. However others required more guidance and reminders to invite reflection on their engagements.

To carefully assist the women in the telling of their experiences and reduce complexity, I would ask them step-by-step: if they remembered the last time that they were using a particular Sphere; how they were using it in that instance; whether they showed or talked about their artefacts to somebody else, and how they had responded to them; to describe what they thought were their reasons for using it at that time; how they felt about the interaction; to explain what they generally liked and dislike about the artefact; and whether they had a favourite Sphere and what they valued most about it. In the last interview, I further asked each woman for their thoughts about the project overall; whether they would like to keep their artefacts; and their reasons for recommending or not recommending this project for instance to the women on the low secure services.

Moreover, considering limitations in the women's literacy skills and to avoid overwhelming them, I tried to phrase the questions as short sentences; used less complex words; and carefully balanced those questions that the women responded to more easily (e.g. when did you last use something) with more challenging, self-reflective ones (e.g. how were you feeling about something). In general, if I recognised that the women were struggling in answering a question, if for example I had posed it too fast, or because they appeared to have difficulties to make sense of it, I would slowly repeat and break down the information. Moreover, since some of the women had slight problems with their speech, I unintentionally, yet frequently, tended to repeat what I believed the women had said to me. These repetitions and also instances whereby the women's responses did not match the question I had asked, indicated misunderstandings and invited further clarifications.

5.9.2 *Staff Observations and Interviews*

In secure hospital services, the ward staff generally tend to be in continuous contact with their services users and can play a vital role in modelling pro-social behaviour and supporting them in their attendance to their treatment targets (Swenson, 2000). Thus, due to some of the ward staff's extensive experience of working with the women's population (more so than me myself), they are well placed to recognize new, unusual or noteworthy behaviours (cf. McQueen &

Knussen, 1999). I therefore invited the ward staff to record any observations they may make of how the women engage with their Spheres by providing them with semistructured *event cards* (postcards that can be completed quickly) and a set of more detailed weekly *diaries* for the first four weeks of the deployment. I chose these materials (see Figure 41) above other forms of experience sampling, i.e. interval or signal sampling (Reis & Gable, 2000), as they offer more flexibility towards the burdens of a hectic ward.

To complete the *event cards* (see Appendix B.4), staff had to make a note at the front of the card of their initials; the date of their observation; the initials of the woman they observed engaging with the artefact(s); information about the location of engagement; if the woman was observed to have been engaging with the artefact(s) alone, or in the presence of other women. The back of the card offered space for narrative descriptions about how the women engaged with their artefact(s) and the situation that may have led to this engagement. Once completed, the cards were placed inside a locked post-box in the kitchen area of the flats (MSU and LSU respectively), access to which was regulated by the ward staff.



Figure 41. Research materials for the ward staff including information and consent forms; guidance booklets; the three diaries, and the event cards and post-box for recording of their observations.

The staff *diaries* (see Appendix B.4) were designed to gather feedback about each woman, once a week, during the four-week observation period, by three designated members of staff. However, due to existing staff rotations and the time demands that this would pose on single members of staff, one of the shift lead staff nurses on the MSU recommended to me that the diaries were shared between the ward staff instead, suggesting their regular completion by

one staff member nominated by her as part of the daily staff team brief. For each diary entry, there were a series of questions asking staff about their assumed reasons as to why the women had or had not engaged with any of their artefacts; to provide detailed descriptions about their observations; to share their opinions about the women's experience with their artefacts; or if they had perhaps tried to motivate the women to use their Spheres.

To support the staff in the completion of these research materials, I made an effort to meet in person with as many of the day and night ward staff as possible to explain the research and offer explicit and transparent instructions, and clear examples of potential 'events', and to provide support for less research-experienced staff (cf. Jones & Forshaw, 2012; Shaughnessy et al., 2006). To this end, I explained to the staff that any interactions with any of the objects, by any of the women at any time, could be regarded as an event. This can include both usual and repeated observations of similar engagements as well as potentially unusual interactions. I further explained that examples of the women using their objects are equally important to the research as records of non-engagement, as both would help in identifying successes and space for improvement, and emphasised that there were no 'right' or 'wrong' observations to be made. I also arranged with the Local Investigator for the distribution of an email providing guidance and concise instructions for the completion of event cards and diaries and included the same on an A3 poster that was put up just above the post-box for the event cards. Moreover, responding to conversations with staff members, who revealed in conversation that they needed more guidance to be available in my absence (i.e. during night shifts), I created self-contained *instruction booklets* and left these together with a cover letter, information sheets and consent forms in the staff office of the respective wards.

During the first four weeks of the deployment, the ward staff completed 81 event cards (6 on LSU) and made 35 diary entries (1 on LSU). In addition, I invited 17 of the staff who engaged in the research activities (e.g. completed *event cards*) and were available in the last days of the four-week observation period, to a semi-structured interview (12 MSU staff, 5 LSU staff); and conducted an additional interview with one of the Ward Managers at the end of the 3 month follow-up. Of all 18 interviewees, eight were qualified Staff Nurses (including two Ward Managers and a Deputy), and 10 were Support Workers (three working nights). Two interviews were conducted with pairs of staff and the remaining 14 interviews were one-to-one. Individual staff interviews took on average 17 minutes ($SD = 6.81$, $min = 8$, $max = 36$), and the two pair interviews lasted for 38 and 45 minutes. The duration of the interview was often governed by the time staff could spare while being on duty, or on their break. Depending on where we could locate a relatively undisturbed space, interviews took place either in the staff office, a meeting

room outside the women's flat; a quiet room, the kitchen or lounge area of the flat; a clinic room, or in one of the seclusion rooms. Five interviews were interrupted by other staff or service users, or because a safety alarm went off, demanding staff's attention.

During the interviews, I used all diary entries and event cards that this staff member had completed to prompt memories and stimulate discussion. Moreover, I asked staff to describe their impressions of the project (including the creative activities); their observations of the women's engagements with their Spheres; and how these artefacts compared to other objects and coping strategies that the women commonly possess or apply. To backfill and remunerate staff for their extra time spent in participating in the research activities, they received additional salary payments.

5.9.3 Log File Data of Identity and Mindfulness Spheres

In addition to experiential narratives by the women and staff, the two digital artefacts were configured to log all interactions. To gain a sense of how often, and for how long, the women used their Spheres, the log data of all Mindfulness Spheres and five of the Identity Spheres (1 missing data set) was captured for the first 15 weeks of the deployment, with the aim of identifying 'significant interactions' in the data set.

For the Identity Sphere I defined such interactions as events where the artefact had been switched on ('CAMERA started' event) and at least one video triggered ('QR recognised', 'VIDEO found' and 'starting VIDEO' event). This would filter out less significant interactions with this Sphere that were logged for instance when it switched on following it being plugged into power, or if for instance staff checked whether its battery was charged. For the Mindfulness Sphere, 'significant interaction' events were defined as recordings of at least one continuous heartbeat signal of more than 30 heart beats to reduce any noise in the data. To distinguish distinct interaction events, subsequent engagements with either of the Spheres had to be at least 5 minutes apart to be counted as a new meaningful interaction.

For each recorded engagement event, I further distinguished at what time it occurred (in the morning: 6-12, afternoon: 12-17, evening: 17-22, or at night: 22-6) and documented the duration of the engagement. For the Identity Sphere I also specified which and how many QR codes had been recognized, and how often videos were played partially, and how often fully. Since the playback of a video would continue and loop if not switched off by the women, it was possible for the women to repeatedly watch their videos without needing to re-trigger them. For the Mindfulness Sphere collected data further included the number, frequency and duration of continuous heartbeat signals. Moreover, any interactions with any of the Spheres that were

related to my visits and included i.e. the testing of the functionality of the artefacts, which I documented in my research notes, were excluded from the data analysis.

5.10 Data Analysis and Presentation

The complete data set included: (a) audio recordings of the creative sessions, storyboard activity, deployment sessions of the Spheres with the women, and interviews with both the women and staff; (b) completed event cards, diary or care note entries by the staff; and (c) log file data from the digital Spheres.

For the data analysis, I transcribed the audio recordings of the creative sessions, storyboard activity and deployment sessions partially – transcribing fully any research relevant conversations whilst summarising talk about the creative activity itself and repeated instructions about the technology – and all interviews with the women and the staff fully. Transcribing these myself was an important consideration for a couple of reasons: it helped protect the confidentiality of the participants; enabled me to add important contextual information that had not been captured by the recordings (e.g. objects that the women engaged with at the time, and people or situations that they referred to); and supported the process of intimately familiarising myself with the subtleties and complexities of the data (cf. King & Horrocks, 2010). For the transcriptions, I used the software package Transcriber (version 1.5.0). The transcripts, together with any text entries made by staff in event cards, diaries and care notes were subjected to Thematic Analysis (Braun & Clarke, 2006).

I chose Thematic Analysis since the research is exploratory in nature, with a focus on understanding participants' individual experiences (inductive), but also as led by theories and previous research on mental wellbeing (deductive). Alternative approaches such as Grounded theory (Glaser & Strauss, 1967), which traditionally aims at identifying analytic categories as they emerge from the data, demand a strict inductive analysis, whereas the Framework Approach, which is increasingly applied in health care research, presents a rather deductive form of qualitative analysis (Ritchie & Lewis, 2003). Yet, while I was mindful of existing theories, I tried to also remain open towards the data to uncover new areas or ideas that have not been anticipated at the outset of the research (cf. Britton, 2006). In this regard, Thematic Analysis presents a useful strategy for meaningfully organising the data when describing the women's experiences (cf. Wright & McCarthy, 2010).

The first stage of the Thematic Analysis involved an intensive familiarization with the data, highlighting parts in the transcripts and additional written records (event cards, diaries and care notes) that were reflective of the experiences and views of both the women and the

staff, and of relevance to the research. For each highlighted section, I created initial content labels, which I then translated into descriptive codes. Through a systematic search for reoccurring descriptive codes in the data set, I merged overlapping, redefined or added codes where necessary. By going backwards and forwards in the data, I developed descriptive codes that shared common meaning into higher-level themes (for an example of an interview transcript and the coding procedure see Appendix B.8).

Where descriptive codes related to stories of the experiences of individual woman, these were coded two-ways to both add to narrative accounts of the individual woman and to those that were shared across the group of women. Although it would be desirable to explicitly describe the individual trajectories of each woman to provide a very rich account of their unique experiences, the findings (in Chapter 7 and 8) present instead the themes that evolved collectively around the women's experiences of this project; which respond to my ideographic understanding of the individuals involved. To describe the women's experiences in form of collective themes was a deliberate decision for keeping with the ethical sensitivities of the research that is to maintain the confidentiality of especially the six women participants considering the small-scale nature of the research that was undertaken in a specialist hospital. It was furthermore important that the personal opinions, experiences and thoughts of both the women and ward staff were presented with a view to safeguard their integrity and to avoid upsetting any of the individuals involved (cf. Barron, 2002). Thus, where the presentation of certain issues that were disclosed by individual participants appeared to be more problematic in these terms, I discussed these with the Local Investigator, who would review my documentation of the findings to assist in their confidential, respectful treatment.

As a result, wherever I presented direct quotes of the women, I was careful to replace their names by pseudonyms; removed indirect identifiers as much as possible; and, at times, also deliberately removed any reference to a particular woman (e.g. by having pseudonyms replaced by [name of woman]). Individual staff members were described using numbers, for example Staff-12 referred to study participant 12, who is a member of staff. For the presentation of the data, it is also important to note that some of the women had more difficulty expressing themselves verbally than others, meaning that their interview responses and presented quotes are often short, and at times only comprise single words.

The analytic process was additionally shaped by the mental wellbeing factors that were described in Chapter 2 (Sections 2.5.1-2.5.4) and the design intent for the Spheres to assist in practices of important Dialectical Behavioural Therapy (DBT) skills of distress tolerance and mindfulness (Sections 3.5.1-3.5.2). The analysis therefore involved a search for relevant,

interesting or contradicting narratives in the data set that related to emotional responses of the women towards their Spheres, and whether they were using the artefacts for performances of their identity, self-distraction, self-regulation or mindfulness. Moreover, the analysis process was supported and the findings contextualised by my own experiences of the hospital setting and observed engagements with the women and the ward staff (as documented in extensive field notes); and also by conversations with my research partners on site: the Local Investigator and Research Nurse. Thus, in descriptions of the results of this analysis, I paid careful attention to present the different perspectives and assumptions that were disclosed by the women and different hospital staff, to make more salient how I arrived at my understanding of the women's experiences with the Spheres and of their care context (cf. Borning & Muller, 2012).

The inclusion of especially the ward staff's perspectives on, and observations of, the women was furthermore of importance for building up a more holistic picture of the women's experiences of their Spheres. As the person who had helped the women to create their Spheres, and who had put a lot of effort into the project and had started to build a positive relationship with them, the women were often reluctant to admit and talk to me about any less pleasant experiences with the artefacts, or that would relate to problems in their mental health. Thus, staff's observations of encounters where the women for example refused to engage with their Spheres (Section 8.6.1), or had tried to purposefully destroy one of them for self-harm (Section 8.7.4.1), were essential for counter-balancing this researcher effect.

5.11 Summary

In this chapter, I described the overall procedure and the methods that were applied in the cocreation, deployment and evaluation of the Spheres of Wellbeing. I outlined the process of gaining ethical approval for the research; presented considerations for protecting my personal safety and wellbeing; and described how hospital staff and the women were recruited to this research. Following this, I presented the arrangements for the conduct of the co-creative sessions with the women and for finalising the Spheres. For the deployment of the Spheres, which was immediately followed by a 15-week evaluation period involving both the women and ward staff, I described my approach for gaining rich, multifaceted insights into the women's experiences of the creative sessions and their Spheres and for ensuring that participants' confidentiality was protected in the presentation of the research findings. The next chapter, Chapter 6, describes in more detail the individual activities and rationale of the creative sessions with the women. Chapter 7 then presents the findings of this creative process and how

the women's involvement in it shaped their relationship with their Spheres; and Chapter 8 describes the women's engagements and experiences with the artefacts.

CHAPTER 6

Co-Creative Process to Personalise the Spheres with each Woman

6.1 Overview

This chapter describes my approach to engaging the six women recruited to this research, who I from now on refer to as *Sally, Kim, Janet, Lucy, Zoe* and *Alex*, in a creative process whereby they were invited to make personalised content and elements (collectively referred to as “pieces”) for their own Spheres of Wellbeing. The account begins with a summary of the rationale behind these activities, which were carefully set up and scaffolded to assist the women to make pieces that would appeal to them and, in keeping with the Experiencecentred Design (ECD) approach of this research, to help create a place that they would feel comfortable to be in, and in which to interact with me as a stranger coming into this environment. I then provide more detailed accounts of the individual activities that were held in each of the five sessions that make up a complete engagement for a woman. Chapter 7 presents the findings of how the women responded to this co-creative process.

6.2 The Creative Activities with the Women

The design of the creative activities was motivated by my intent to enable the women to create pieces for their Spheres that they could relate to, that were beautiful to them, and that were achievable for them to make. I also wanted to gain a more empathic understanding of the women through our joint participation in this process.

Responding to limitations in the women's cognitive and emotional abilities, each of the creative activities involved a carefully scaffolded process, whereby I would be working closely

with each woman, gently teaching and guiding them in small achievable steps through the various stages of the making process. To keep the women engaged in the process, the sessions were designed to offer something different each week and to balance potentially less exciting tasks for the women (e.g. responding to conversation tokens, see Section 6.2.2) with more hands' on activities (e.g. making clay beads, see Section 6.2.1). Moreover, to assist the women in creating pieces that would appeal to them, the activities built on a variety of techniques (e.g. animation) and materials (e.g. stamps, shrink plastic) that, with some additional guidance, can be used to create close to professional looking objects without requiring prior art or craft skills. When working with the women, I ensured that I described the activities and individual steps using short sentences, simple language, visual aids (e.g. showing what the next step entails rather than explaining it) and also common metaphors and points of reference (e.g. treating clay dough like cookie dough).

In addition, such physical and creative engagements can support the construction of a safe environment in which the women may feel distracted from personal distress or destructive behaviours, and can experience their involvement as stimulating, enjoyable and relaxing (cf. Dalley, 1984; Liebmann, 2008). In this regard, a range of considerations were made for the set-up of these sessions in order to create a place that felt safe and comfortable for the women to be in, to partake in the activities, and to engage in conversation.

To create a relatively quiet, undisturbed atmosphere within the constraints of the medium secure unit (MSU) that would allow the women to pay focused attention to the activities, the sessions were conducted in a meeting room just outside the women's flat. However, due to safety regulations in response to known risk behaviours of the women, I was restricted as to how I could position myself in relation to the women (e.g. how physically close I could be to them). Thus, as described in Section 5.6, the activities were configured so that the women would sit at the top of a table and at an arm's-length away from both me and the Research Nurse, who also accompanied these sessions. Moreover, to manage looking after the materials that I had brought onto the ward, I only handed those pieces and tools over to the women that they needed for certain parts of the activity.

To change the perception of the meetings room to create a more informal atmosphere and invite curiosity about the making activities, I typically decorated the table with a colourful table cloth and placed a selection of the materials that we would be working with on display. To provide a sense of continuity and progress over the course of the creative sessions, I would also show the women some of the pieces they had made in the previous week, and ensured to structure each activity similarly, and to include casual tea breaks. Moreover, the Research Nurse

(and most of the additional staff present), who had many years of experience working on the MSU and was very familiar with four of the women, played a fundamental role in recognising and responding to their needs, offering comfort and helping them to open up in conversation, and to help them feel safe in my presence as, initially, a stranger and outsider of this hospital context. The following sections describe in more detail the individual activities, including my approach to explaining their purpose to the women and how everyone present during the sessions assisted and facilitated their engagements.

6.2.1 Session 1: Research Booklet & Bead Making

The first session began with an introduction of the activities that I had planned for the day, which included presenting each woman with example beads and bracelets, and inviting them to make their own. There were two reasons for starting the series of creative sessions with the bead-making activity. Firstly, as a concept, the women were familiar with bracelets and therefore less likely to have difficulties in understanding how the activity of making beads would relate to the creation of the Calming Spheres (as opposed to more abstract links between some of the materials that were created for the other two Spheres). Secondly, beadmaking is a very visual and hands'-on activity that lends itself well to a gentle step-by-step scaffolding process and leads to immediately visible results. In addition, through previous practice, I generally felt very comfortable and confident in facilitating this activity.



Figure 42. Research diaries for each woman with the Polaroid photo sticker camera.



Figure 43. Bead making equipment including clay blocks, example bracelets and clay tools.

Due to risks for self-harm associated with most of the creations that the women were invited to make during this process (e.g. potentially sharp edges of the plastic charms; chemical composition of the grown crystals) and requirements of the research to include some of these pieces in the final design of the women's Spheres, the women could not keep the pieces they

made at the end of the session. Thus, for each woman I created a small A5 paper research diary (Figure 42) that was safely held together by short fabric thread, and that the women could use to insert photo stickers (size 2 x 3 inch) that they could capture and instantly print with a Polaroid Z2300 digital camera during their sessions. This sought to provide the women with something that would help them document, show and revisit the activities and their progress as part of this. Thus, before the start of the making activity itself, I briefly introduced the women to the research diary and explained the functionality of this specific camera. To this end, I encouraged the women to take a test photo and guided them through the processes of printing their image in a step-by-step manner. I further agreed with each woman that, while they could capture as many images as they liked (with the camera), only a maximum of five images could be printed per sessions; and that although the women could take images or have images taken of them (e.g. when doing the activity), that the capturing of images of staff was generally not permitted (unless they consented to it).

The actual bead making activity started off with me presenting the women with a range of 24 coloured Fimo clay blocks (Figure 43) from which they could choose three or four. However, even this relatively low level of choice in clay and colours at times overwhelmed the women; consequently, the Research Nurse suggested breaking this task down by asking the women for their favourite colour first, which all of them could respond to, and from this point encouraging additional choices. Once their chosen clay blocks were unwrapped, I guided the women into taking a small amount of clay (approximately $\frac{1}{4}$ of a block) from each and showed them how to warm and knead the clay with their hands until it was soft enough to make skinny looking clay rolls (generally referred to as clay 'snakes' or 'sausages'). At this stage, the staff members that were present often got involved, assisting the women in preparing the clay (e.g. by kneading additional portions).



Figure 44. Example of the 'Kaleidoscope Technique' (from top left to bottom right).



Figure 45. Different stages of developing a symmetrical clay pattern by Alex.



Figure 46. Selection of kaleidoscope beads by Kim.

Once the women were more familiar with the clay and how it could be rolled evenly, I explained to them how they could use a small cutting matt with yellow measuring lines to divide their clay into equal sized parts. From the smaller clay portions that resulted, the women could then form their first uni-coloured beads by rolling the clay between the palms of their hands. Overall, I taught each woman three basic clay skills that were needed to create more elaborate clay patterns and designs: (i) the rolling of clay into 'sausages' or beads; (ii) the flattening of clay to thin squares to wrap around other clay creations; and (iii) the cutting of clay. While the cutting of the clay needed to be undertaken by me and done at a safe distance of the women (it involved the use of a blade that I wore in a waist belt that was securely attached to my body), the women practiced each of the remaining skills.

The creation of more intricate designs then involved combining smaller dimension clay rolls into one bigger clay cone. Existing steps involved dividing, re-combining and the systematic reduction of the clay to create multi-coloured patterns. The techniques applied were primarily informed by Donna Kato's (2008) book "*The Art of Polymer Clay Millefiori Techniques*",

which was also used in the sessions and from which the women could pick and choose patterns they liked. The two techniques that were most commonly chosen and applied were 'kaleidoscope' and 'mosaic'. For the kaleidoscope technique (Figure 44), differently coloured clay is formed into clay rolls and aligned on a larger square of black clay that gets wrapped around the smaller clay rolls. The resulting clay wrap is then formed into a triangular shape and reduced in size; it then gets divided six times and arranged into a symmetrical pattern for the final bead design (for example creations by the women see Figure 45 and 46). For the mosaic technique (Figure 47), differently coloured clay is formed into equal sized clay rolls and then, alternating in colours, combined into one big, clay roll to fit inside a clay extruder tool. Using the extruder tool the clay gets pressed through a square disk creating interesting textural details in the resulting square clay sausages that are then combined to little mosaic like bead patterns (for example creations by the women see Figure 48 and 49).



Figure 47. Example of the 'Mosaic Technique' (from top left to bottom right).



Figure 48. Examples of layered clay rolls being inserted into the clay extruder.

Figure 49. Resulting 'mosaic' bead patterns.

At the end of every creative session, the women printed the photos they had taken during the activities and kept these as stickers and I provided them with an overview of the activities of the next session. I also explained to them that to solidify their newly created beads, I would have to cook them in an oven, but would return them at the next session so that the women could finish them off by applying a layer of gloss varnish.

6.2.2 Session 2: Bracelet Design, Crystals, Tokens & Mandalas

To begin of the second session, I presented the women at first with the beads that they had created in the previous week. Now cooked and solidified, they required the application of a layer of gloss varnish (Figure 50). Since the women had made a large number of beads (on average $MD= 64$), they agreed that everyone present – including myself, the Research nurse and in some cases additional staff – could assist in this finishing step. Once accomplished, the women were invited to pick and choose a total of 12 beads for each of their two Calming Sphere bracelets, and their colour of leather string (with a choice between black, dark and light brown). For one of the bracelets, the women were also asked to pick three patterns (2 beads each) from a variety of metal spacer beads. Although the women could pick and choose all elements for their bracelets (Figure 51), these were not assembled so as to avoid the situation that the women asked to keep them at that moment in time. Instead I explained that the bracelets would be brought back to them, once they were assembled and the ends of the leather string has been knotted and safely sealed together. The remaining beads were put in a little box and were kept in the personal storage cabinet of each woman.



Figure 50. Bead varnishing by Zoe



Figure 51. Kim's selected beads for her Calming Spheres

For the second half of the session, I explained to the women that we were planning to grow together some crystals that, if they liked, could be used to decorate the inside of their Mindfulness Sphere (referred to in conversation as 'heartbeat ball'). To this end, I handed the women a selection of 12 differently coloured crystal growing substances³⁰ that either consisted of Aluminium potassium sulphate or Monoammonium phosphate, and a selection of ice cube trays and small containers for holding the water-based crystal growing solutions.

I then asked the women to label each of their containers with their name and gave them a little crystal growing chart to document the mixing ratio of their chemical solutions, in case they wished to repeat the procedure in subsequent weeks (to grow their crystals to a larger size). Next, they could choose five crystals substances, some of which would enable crystal growth on the bottom of containers (sulphate-based crystals) whilst others would grow on something that is suspended into the solution (phosphate-based crystals). For this purpose, I prepared a set of small fabric-wrapped plastic stars, which provided the necessary rough surface structure that the crystal structures could attach to.



Figure 52. Pictures taken during the crystal growing activity.

³⁰ For this activity we used the commercially available 'National Geographic Crystal Growing Kit'

Using a measuring container, the women then poured a certain amount of crystal growing substance (e.g. 75 grams) in a measuring jug and mixed it with the recommended ratio of boiling water (e.g. 75 ml) that was carefully added by the Research Nurse through a thermos flask. Once dissolved, the solution was poured into the containers using a small funnel; at times I assisted in this activity, if the women's hands were unsteady (e.g. due to side-effects of their medication). For the safe storage of the crystal containers (Figure 52) away from the ward, I took them to the R&D office of the hospital and brought them back in subsequent weeks so that the women could inspect the progress of the crystal growth.

With the completion of the crystal growing, the sessions turned to the Identity Spheres. To this end, I showed and re-introduced the women to a prototype Identity Sphere (referred to as the 'purse'), and encouraged its use so as to familiarise the women with the 'scanning' functionality of the QR code at the centre of the Mandalas. Moreover, to help the women during the early stages of the creative engagements to generate ideas for their videos, I explained to them how they could create up to three videos that each could include anything they would like, such as a selection of photos, pieces of video, animations, things that we could film or create together, pieces of text, or music. At this stage most of the women already had initial ideas about contents they wanted to include (e.g. images of family members). I therefore encouraged them to bring any such related materials to subsequent sessions to allow the creation of digital copies.

To aid the women in the process of identifying ideas for their video contents, I reappropriated and adapted a set of 'conversation tokens' that were originally designed by Clarke et al. (2013). These consisted of 20 small paper tokens, each showing an image and brief textual cue that would relate to and prompt the women about personal interests and positive aspects in their life (e.g. 'a hobby', 'someone close', 'an achievement'). These were presented to the women as a set of tokens in a small leather bag (Figure 53 and 54) and were used to engage the women in conversations around their personal interests and likes.



Figure 53. Small leather bags with paper-based 'conversation tokens'.



Figure 54. Photo by Sally exploring her conversation tokens.

Since the paper tokens posed no safety risks to the women, they were allowed to keep them in their flat. The Research Nurse further suggested and encouraged the women to also engage with these with the ward staff in the weeks that followed (in the hope that this would help the women to generate more ideas).



Figure 55. Set of 20 Mandala patterns for the women to choose their favourites from. Figure 56. Kim colouring one of her Mandalas.

The session concluded with the women choosing three Mandala patterns to colour in (Figure 55 and 56), which they usually started during the session and then continued, with staff supervision, back at the flat. For the colouring activity, I explained that the women could make use of any colours they liked, yet they needed to pick a light colour for the centre, which was required for the vision-based QR code, that was to be added on later to the Mandala, to function correctly with the camera application that runs on the Identity Spheres.

6.2.3 Session 3: Plastic Charms & Purse Design

In the third session, the women were invited to inspect how much their crystals from the previous week had grown. Since the crystals had already achieved a considerable size (cf. Figure 57), there was no need to set-up new chemical solutions to extend their growth. Instead, the women would engage in the creation of a set of semi-transparent plastic charms, some of which they could later choose to have incorporated around the LEDs lenses on the inside of their Mindfulness Sphere (allowing their light to shine through them).



Figure 57. Examples of some of the crystals grown by the women.

To create the plastic charms, I presented the women at first with a set of 56 different rubber stamps in the shapes of flower petals, butterflies, love hearts and many others. Again, in the cases of women who were overwhelmed by the number of choices available to them, the Research Nurse and I would pre-select a subset of 10 to 15 stamps. From which these women would then pick their favourites. This was followed by the selection of acrylic paints or permanent inks.



Figure 58. Alex applying acrylic paint on a rubber they stamp.



Figure 59. Finished shrink designs by Alex before went into the oven.

I then showed (and practiced with) the women how to apply the paint or ink onto the rubber stamps (by carefully covering the heightened parts) using either a paint brush or sponge, and how to gently press the stamps on paper to create a neat finish (Figure 58). For the creation of the actual plastic charms, the women would then apply this technique on special, 'shrink plastic' paper that reduces in size when placed in an oven (while maintaining any patterns and colours). Once the women had created a variety of different patterns, had experimented with colours and paints, and had coloured some of the shapes using permanent markers, their designs were left to dry. Everyone present then assisted the women in cutting these out, using

scissors. Care was given to also leave a little space to punch a hole at the top of each charm thereby allowing it to be mounted more easily to the plastic core inside of the Mindfulness Spheres. The final designs of the women (Figure 59) were then put at a temperature of 160 ° in the oven of the ward kitchen and were left in there for a few seconds until they had shrunk (Figure 60).



Figure 60. Examples of the final shrunk plastic charms of the women.

In the second half of the session, I once again showed the women the Identity Sphere prototype and asked if they remembered how to switch it on and how it would work with the Mandalas. Once the women had successfully triggered at least one video, they were then invited to attend to the design of the leather cover for this Sphere. Using the prototype purse as reference (see Figure 61), I provided the women with a paper-purse, a set of coloured pens and print outs of a variety of ornaments and decorative framings, with a view to engaging the women in conversation about their desired appearance for their Identity Sphere. Typical questions that I asked of the women included: the desired colour of the leather, how many pockets they wished to have at the inside, how these would be arranged and what shape they would have, if and what kind of decorations they would like at the front or inside, and if (and what) they wished to perhaps have engraved into the leather (see Figure 62).



Figure 61. The generic prototype purse (left) to the paper-based purse sketch by Zoe.

Figure 62. Purse sketch by Janet and her actual leather next cover during fabrication.

6.2.4 Session 4: Stop-Motion Animation

In the fourth session, I invited the women to make a short stop-motion film. Stop-motion is a technique whereby an inanimate object, in this case paper cut-outs, are moved incrementally and each time the object changes in position a photo gets taken. A sequential playback of these photos then creates an interesting dynamic video of the animated object.

For the photo capturing, I used an iPhone and the commercially available software application 'Stop Motion Studio' that provided both an immediate preview function and a transparency setting function through which a previously taken photo would still be semivisible on the phone display while a new photo was taken – this greatly facilitated the imagining and creation of smooth movements. The smartphone itself I mounted on a tripod that was placed on top of the meeting room table (Figure 60).



Figure 63. Video capture set-up for the creation of stop-motion animations.

For the creation of the animations I provided the women with a variety of paper cutouts that included both generic shapes such as numbers, letters, stars or trees, some materials that were more specific to the individual interests of each woman that they had told me about in previous sessions (e.g. horror film materials for Sally, specific game characters for Alex), and white board markers. The activity began with me guiding the women through the process of moving and capturing a paper star and making use of the preview function of the phone application to demonstrate how these efforts translate into an animation. As part of this process,

I also showed the women how they could make use of the white board markers by incrementally drawing or writing on the board underneath the camera. To help the women find out what they could do with the paper cut-outs or pens, I would offer ideas and introduce them to a variety of different techniques from which they would identify their favourites (e.g. incrementally moving, adding or removing pieces, step-by-step replacing of the colours of a particular shape, exchanging small shapes with larger ones to create effects of growth, using speech bubbles and written words to tell a story, recreating a scene from a movie or game). As the activity progressed and the women became more confident with these techniques, they would introduce more of their own ideas both for the creation of extra shapes and how they were presented (see Figure 64 for images of the women in action). While the contents of the animations varied considerably between the different women's creations, each movie had in common a prefix with animated letters that would say "A film by [name of woman]" as well as a final "The end" frame.



Figure 64. The women engaged in the creation of their stop-motion video.

6.2.5 *Session 5: Personal Choices for the Spheres*

During the final session, the women in most cases did not create any new pieces and instead were invited to make their final choices for their Mindfulness and Identity Sphere. Showcasing various pieces the women had created over the last four weeks, and also any copies of photos and music (on a laptop computer) that they had brought in on previous sessions, I would engage them in conversations about what the contents and themes would be for each of their Identity Sphere videos. Together we would take time to browse and listen through music tracks that the women suggested to include in their videos, some of which presented a selection of sound pieces that I had identified as potentially fitting with their respective stopmotion animations (e.g. for Sally's horror-themed animation we listened to songs like 'thriller' by Michael Jackson, playback tunes of the movie 'Scream', or sounds of cracking doors, ticking clocks, evil laughter and scary screams). For most of the women their three videos were a selection of family-related

materials, their stop-motion animation, and a video reflecting a personal interest related to either a favourite sports team, hobby, or music artist.

In addition, at this point in the set of creative engagements, the women had also brought back their (now) coloured Mandala patterns (see Figure 65 for examples), and were asked to identify which of these they would like to have associated with each of their videos.



Figure 65. Photos taken by the women showing the Mandalas they coloured.

To help the women make their choices for the Mindfulness Sphere, I showed them an example of the bare plastic container that would sit at the inside of the Mindfulness Sphere and explained how it would be individually decorated with their creations. The women then made their choice(s) for the colour(s) they would like included, and picked some of their plastic charms and crystals to be incorporated. All remaining plastic charms, crystals and any beads that were left over were put into their personal storage (Figure 66), and were safeguarded by the ward staff.



Figure 66. Storage boxes with the women's left-over beads, crystals and plastic charms.

As a last activity, I asked the women to design their own body transfer images or to choose their favourites from a selection of transfer images that I showed to them as examples. These body transfer images are temporary, easily removable, tattoo like pictures that can be placed as a decorative element on the body. The idea for these came about in conversations with one of my supervisors, who suggested that the women might perceive these as an invitation to

engage more intimately with their body and that placing these images on their body could aid the women to see themselves as looking beautiful; in a gentle and feminine way. These transfers were included as an adjunct to the personal letters that I sent to the women to inform them about progress in the fabrication of their Spheres (see Section 5.7), while I was working away from the hospital grounds.

6.3 Summary

This chapter described in detail my approach to engaging the women in a creative process whereby they were invited to make beautiful pieces for, and to personalise the aesthetics and contents of, each of their Spheres of Wellbeing. I presented the overall rationale of the creative sessions and also the procedures and materials that informed the individual activities that spanned over a period of five weeks. The next chapter introduces the findings of how the women, and also some of the ward staff, experienced this creative process, and how this involvement shaped the women's perceptions of their Spheres. Subsequently, Chapter 8 then presents the findings of how the women made use of, and experienced their interactions with, the artefacts.

Findings on the Creative Process & Relationship with Sphere

7.1 Overview

This chapter begins with presenting the findings on the women's experiences of the creative personalisation process. I describe how the women expressed their enjoyment of this process that was related to the nature of the very creative, person-focused, and carefully scaffolded activities, and the positive social interactions that these entailed; and also their contrast to other existing services that were generally provided to the women. In keeping with the Experience-centred Design (ECD) approach of this research, I outline how my understanding of the women is informed by my own involvement with them as part of the creative activities; individual conversations with the women and ward staff; and discussions with the Local Investigator and Research Nurse, in which we would jointly reflect about our experiences of the project. The findings then include some of the challenges and opportunities that we identified for safely and sensitively engaging the women in the activities, and for gaining an empathic understanding of them within the context of their complex mental health problems and Learning Disability (LD). Following, this chapter describes how the women responded to the receipt of their Spheres and how they came to treat these as personal possessions that they took pride in and were generally quite protective about. Chapter 8 then concludes by introducing the findings on how the women experienced their interactions with the Spheres.

7.2 Experiences of the Creative Activities

The following describes how the women expressed their enjoyment of having taken part in the creative sessions; and how my own involvement in this process as well as conversations with

the women, the ward staff, and local research partners (Local Investigator and Research Nurse) helped identify some of the factors that have contributed to these joyful experiences.

7.2.1 High Levels of Commitment and Joy

In advance of the creative sessions, my readings of the literature on women in medium secure services; conversations with different hospital staff; and my attendance to breakaway training had prepared and strongly sensitised me towards *potential problems* that could arise due to the risk behaviours of the women and limitations in their ability and motivation to engage in any complex activities. Although I had paid close attention to carefully address these concerns in the preparation of the creative sessions, I was initially apprehensive as to how the women would respond to the activities and me as a stranger, and whether our engagements would be comprehensible or be distressing to them. Contrary to my worries and expectations that the women would perhaps not be motivated to engage in the sessions, the women instead presented themselves as curious about what they would entail. To my surprise and relief, early on in the first session and only a few steps into the making of clay beads, the women were beginning to express that they were enjoying their participation. They would continue expressing excitement and enthusiasm about the activities in subsequent weeks, not only towards me during the sessions, but also towards the ward staff thereafter.

The women's expressions of joy during the activities included verbal statements such as: *"This is fun isn't it"* (Lucy, session 1); *"I'm enjoying it"* (Alex, session 3); or *"Aww, I like doing this"* (Kim, session 4), and positive physical responses including frequent laughter and having big smiles on their faces, which were also often captured by photos taken during the activities. Being asked by the Research Nurse at the end of the storyboard activity to summarise their experiences of the creative sessions, the one word responses of the four women present were: *"Excellent"* (Kim), *"Ace"* (Sally), *"Brilliant"* (Alex) and *"Tastic"* (Janet).

That the women were enthusiastic about, and committed to, the activities was further revealed by some of their expressions indicating that time spent doing the activity was passing by quickly (e.g. Lucy: *"Uh, ten o'clock already"*); in their rejections of pre-agreed break times away from the activities, including the forgetting of cigarette breaks; and occasional wishes to continue with the activities even if they had already completed all that was set out to be done. In conversations with the Local Investigator about the women's engagement in the activities, she explained that especially the rejection of cigarette breaks was an extremely rare occurrence and strong indicator of their commitment to these sessions.

As a result, the women were usually engaged in the creative activities for 1 ½ to 2 hours and created a large number of pieces for their Spheres (see

Table 2 for details). For example, each of the six women created between 39 and 81 clay beads, set-up between 10 and 36 crystal growing solutions, and made between 18 and 31 shrink plastic charms. Moreover, five of the women created a stop-motion film that each contained between 178 and 377 photos. The productivity and commitment that the women exhibited also came as a surprise to many of the ward staff, who explained that the women usually had difficulties concentrating and engaging for longer periods of time. Remarking on the high level to which all women showed interest and were enjoying their engagements in the creative activities, Staff-11 for example shared: *"(...) I thought it was fantastic, the girls were heavily involved. I find that they really, really enjoyed, you know, participating in any creative, 'cause they absolutely love to be creative, do the girls, you know, make the beads and things like that, and it was enjoyable to see them, you know, they were really enthusiastic about it"*.

Table 2. Overview about the attendance at the creative sessions by each woman including information about the duration of each session; if any additional staff members were present to support the activities; and also the individual creative outcomes of each activity.

	Creative	Creative	Creative	Creative	Creative	Activity 1	Activity 2	Activity 3	Activity 4	Activity 5
Lucy	Duration & Staffing	1:57 (1 add. staff)	<i>Non attendance</i>	2:24	<i>Non attendance</i>	<i>Non attendance</i>				
	No. of creations	Beads: 54	<i>N/A</i>	Crystals:25 Shrinkies: 18	<i>N/A</i>	<i>N/A</i>				
Janet	Duration & Staffing	2:28	1:49	2:34	1:45	0:59				
	No. of creations	Beads: 81	Crystals: 36	Shrinkies: 26	Stop-motion images: 376	<i>N/A</i>				
Zoe	Duration & Staffing	0:49 <i>session break up</i>	0:23 <i>session break up</i>	0:14 <i>session break up</i> (1 add. staff)	1:25	0:51 <i>session break up</i>				
	No. of creations	Beads: 39	<i>N/A</i>	Crystals: 10	Shrinkies: 30	Stop-motion images: 232				
Kim	Duration & Staffing	2:06 (1 add. staff)	1:48 (1 add. staff)	2:06	1:44 (1 add. staff)	0:41 (1 add. staff)				
	No. of creations	Beads: 66	Crystals: 30	Shrinkies: 31	Stop-motion images: 361	<i>N/A</i>				
Sally	Duration & Staffing	2:30	1:26	1:56	1:32	2:02				
	No. of creations	Beads: 63	Crystals: 29	Shrinkies: 25	Stop-motion images: 178	<i>N/A</i>				

Alex	Duration & Staffing	2:33	1:34	2:00	1:57	1:33
	No. of creations	Beads: 65	Crystals: 27	Shrinkies: 29	Stop-motion images: 377	N/A

The following sections detail some of the qualities that were described in dialogue with the women and hospital staff that contributed to these positive experiences.

7.2.2 Unlike Other Hospital Activities: New, Creative & Meaningful

The ward staff described how the women liked the “creative” (Staff-05), “hands’ on” and “tactile” (Staff-09) nature of the creative sessions; how they enjoyed the individual attention and support received; and how the sessions enabled them to create something close to professional looking within a very short time. Through our conversations, I came to understand that this contrasted with other existing services that were generally provided to the women, such as Occupational Therapy (OT), that were described by the ward staff as often group-based, less creatively adventurous (i.e. making of a paper collage, attendance to work classes) and that would usually take the women a few weeks to complete.

In comparison, the creative sessions offered something new and different each week and mostly involved activities that required the women to learn new skills or techniques (e.g. clay craft, animation). Being guided step-by-step in this learning process, I was able to witness moments of surprise by the women, who appeared astonished about how quickly they were creating a variety of appealing pieces for their Spheres. For example, about Lucy’s intricate bead designs in week 1, the expressions of everyone present in the session included: “*Look, look at that one!*” (Lucy); “*Wow they look really cool!*” (Research Nurse); “*Oh wow, I’m well impressed now!*” (Staff-29). In general, the women and also the staff were impressed with the things the women had created and how the designs turned out differently for each woman. All this was described by the ward staff to have contributed to feelings of enthusiasm and selfpride, as well as to continued engagement in the activities. For example, Staff-38 said: “*(...) and I think just they were just proud of themselves I think that it’s kind of, ‘cause they are really lovely objects, I think they are just proud of themselves that they’d been able to achieve that and in that time, just for themselves to be able to commit to it’.*”

As a result, some of the ward staff came to evaluate the activities to have provided the women with something positive to look forward to, and to be kept busy with, each week. Staff42 for instance said about the project for the women that “*(...) the actual creative side of it had given them something to focus on and I think that was really quite powerful to them*”. That the engagements in the creative sessions were potentially personally meaningful to the women was

also observed in the case of Alex, who explained her experiences of the making sessions during our interview in deployment week 4: *“It makes you feel good inside, 'cause I'm doing something for myself”*. She further mentioned during her third creative session how she was applying her coping skills to stay well in order to be allowed to attend these activities each week. Starting off by explaining how she expected the ward staff to regulate access to the Spheres once they were finalised and returned to the women, Alex described:

“What they are saying as well, if, when we get these items off Anja for good, if we are naughty they get locked up in our cupboard, but I'm not gonna do that 'cause I wanna use them as my DBT skills. 'Cause I think doing this [the creative sessions], doing this has helped me hell of a lot. What, yesterday I wanted to kick-off really bad, but I didn't, I took a deep breath and counted to ten, 'cause I thought I want to do that thing with Anja tomorrow, and this is where I am”.

7.2.3 Individualised and Participant-led Process

Throughout the various stages of the creative activities, myself, the Research Nurse and any additional staff present carefully assisted the women in their making endeavour. This involved both physical aid in guiding the women step-by-step in the creation of their designs, and also emotional support in frequently offering reassurance and in creating an environment that felt safe and comfortable to them. In this regard all research and care staff present engaged in efforts to create an atmosphere that felt relaxing to the women and that would free them from any worries about making mistakes. This included repeated explanations that there was nothing that could be done wrong (e.g. Staff-29: *“Note yourselves, there's no right and no wrong”*) and the providence of tailored encouragements (e.g. Research Nurse: *“That is right, that is really good. Do you like that one?”*) that responded to the individual abilities and confidence level of each woman. These could differ considerably among the women, whereby some were observed to have very quickly understood certain tasks and would pro-actively continue with the activity at hand; whereas others hesitated at times and required far more explanation, reassurance and repeated prompting.

In my conversations with the ward staff, some credited the women's high level of interest and commitment to the activities to the personal attention they received in the one-on-one format of the sessions. Staff-07 for example explained: *“I think because it was, there was lots of individual attention, it was personal to them and there were people who were keen to support*

intensively while they, they did the work, and I think that was a big difference from, for most really, they don't get that individual attention in sessions”.

Others shared their belief that the women relished the fact that their involvement was their personal responsibility, as they could, at least to a certain extent, decide what they wanted to do. Staff-29 for instance said about the sessions:

“(...) 'Cause I think it's actually doing something isn't it, with the hands being creative and, and not having to listen too much for too long to a boring subject, some of these work sessions that they do, about budgeting and that, they get fed up, don't they, whereas that was a bit, a bit of a change, completely different and they got to decide what they did and, they got some input, didn't they, they could all do their own thing to a certain extent, couldn't they?”.

In discussions with the Research Nurse however I expressed how it appeared to me that, especially at the beginning of a session or activity, the women did not fully understand the purpose or process of what was going to happen; how they could achieve certain suggested designs; or how their creations would feature in their eventual Spheres. Nevertheless, they were usually open towards and happy to continue with the activity. The Research Nurse explained how this was likely to be related to the structure of the sessions, which followed a similar format each week and involved teaching the women something new in small, tentative steps. This had helped in building up their confidence, motivation and energy to engage with the materials, and their trust in my role as a facilitator of this process, where I had demonstrated each week that I would help the women complete these tasks.

For example, I observed how Kim became increasingly motivated to engage with the making of her stop-motion video as she ‘previewed’ the first scene of her paper animations. Being fascinated by her own progress in the creation, she expressed: *“That's really good, what other ones can we do then?”*; which was indicative of her wish to engage with more of the paper materials and to keep exploring diverse animation techniques. Such effects were also very prominent in the initial bead making activity that often started off by some of the women being a little hesitant in choosing colours or in making their first beads. However, once they saw how successful more intricate designs turned out to be, they expressed increasingly more enthusiasm about the activity, and suggested for example to include more clay and colours, to test new patterns, or began to make own free form shapes.

7.2.4 Positive, Person-Focused Interactions & Social Recognition of Achievements

With permission of the women, any staff members present during the sessions got drawn into the activities and involved in a hands-on manner with the provided materials. This had the advantage that the focus of the sessions shifted from a distant observation of the woman towards a shared social activity that everybody was fully engaged in. Moreover, the creative, material engagement and somewhat playful nature of the activities further led to casual conversations with the women that included frequent acts of 'banter' between all involved, which the women appeared to enjoy and that caused a lot of laughter. To have enjoyed these interactions was an experience that was also shared by the ward staff, who actively participated in the sessions. For example, Staff-29 expressed about how she felt as a participant: *"Good, yeah, I thought it was really interesting too, it was nice watching them and enjoying themselves and, and have something at the end of the day to show for it. It was good"*.

And Staff-38 recounted: *"(...) I think watching the girls making was, they loved doing that, that was really nice, and they've, they are proud of themselves, it was nice seeing them feel that way, so that's a definite positive"*.

As an activity, the creative sessions did not engage with, or address any of the problems or risk behaviours of the women. Instead, in the creation of pieces for the Spheres, the sessions were focused on supporting the women to make their own choices, to build on their existing abilities and to develop additional skills. Moreover, the conversation that evolved during the process allowed me as well as the staff to get to know more about the personality of each woman and their personal interests and likes. All of this helped portray an image of the women as individuals, who were very well-behaved throughout the activities, and who presented themselves as polite and funny as well as ambitious, committed and capable to concentrate for longer periods of time. However, from my own observations of day-to-day interactions between the women and the ward staff and also conversations with the Local Investigator, I came to understand that opportunities for such like engagements were rare in the context of an often hectic ward environment and staff's primary responsibility to safeguard the women and to organise their care (e.g. ensuring that the women get up in the mornings; attended meal times, domestic activities, and therapy; take their medication; etc.).

In addition to experiences of positive, person-focused interactions with the ward staff, both during the creative sessions and when the women reported to others what they were doing thereafter (at times using their research diary with their photos as prompts), the women received strong, positive recognition for what they had achieved in these sessions. Notably, the

women liked to talk about and explain to different staff what they were doing in these sessions, which extended positive social interactions and led to staff regarding the activities as worthwhile in their own right. For example, Staff-43:

“Yeah, there were times when I came on duty at like four [o’clock] and they [the women] would have, they would have had the sessions making them [the Spheres], and then they would be telling me all about it, mostly about the bracelets and I remember them going on about making the bracelets, and there were photos taken, weren't they, the poster [storyboard] was made of it, and I think it was Alex, that was showing me the pictures of it, so they were all proud of it, and have enjoyed it”.

7.3 Challenges and Opportunities for Empathy

The following describes some of the challenges and opportunities of the creative activities for building a relationship with, and gaining an empathic understanding of, the women, including insights into their individual abilities and personal interests; their risk behaviours; and also how declines in their mental health would impact on the activities.

7.3.1 Building a Relationship with & Understanding of the Women

During the conduct of the creative sessions, my key responsibility was the oversight, preparation and scaffolding of the activities for each woman. Thus, to manage all that was set out to be done within the short time frame of each session was a major concern and demanded a lot of my attention, which left little space for me to step back from the activity at hand to observe how the women were responding towards the craft materials and our interactions; all of which can considerably challenge the formation of a more personal relationship with them. Thus, for building a relationship with; gaining a better understanding of; and responding more appropriately to, the abilities of the individual woman, the Research Nurse, who assisted in these activities, had played a fundamental role.

Throughout the activities, the Research Nurse carefully observed the reactions by each woman, mainly as a measure of safety to recognise if a woman was showing any signs of becoming upset or unsettled. As such, she was much better positioned to notice if the women were for example smiling during the session, or indicating that they were struggling with a task or decision (e.g. the women frequently appeared overwhelmed by the multiplicity of materials and choices). If the Research Nurse had recognised that the women were encountering any difficulties, she would step in and offer gentle support by breaking a task down into even smaller

steps or choices, and by bringing the women's focus to 'one thing at a time'. Likewise, at times, she would rephrase certain instructions that I had given to the women, if she felt they may not have been fully accessible to them (e.g. if I explained things too fast or built too long or complicated sentences); all of which further helped me in gaining a better sense of the women's abilities and to sensibly adapt my responses towards them.

Moreover, the pre-existing (work-related) relationship that the Research Nurse had with four of the women also had a positive impact on the process of engaging them in dialogue. By way of example, the Research Nurse knew what kinds of topics she could bring forward to start casual conversations (e.g. '*how is your mum/ brother?*', '*do you remember when we saw that match together?*'), which were most frequently and naturally initiated during longer periods of silence when the women were involved with the activities (e.g. monotonously applying paint; rolling beads). In return, conversations would also be initiated by the women, showing interest in the Research Nurse (e.g. '*Do you have a new car yet?*'), or wished to volunteer certain information to her (e.g. '*I'm going to cinema next week.*'). Over time, as the women and I became more familiar with each other, their enquiries would increasingly include me, asking for example where I was living in the area or what I was doing on my weekends. Also, as I become more accustomed to the hospital environment and my engagements with the women, I noticed that I felt more relaxed and was more attentive to the women during our interactions. Nevertheless, it is generally important to say that, while our interactions with the women were usually very pleasant and felt as a joy to both me and the Research Nurse, facilitating these sessions and emotionally engaging with the women (who sometimes needed much encouragement) involved a lot of labour and often left us feeling exhausted by the end of it.

Conversations in particular about the women's personal likes were further supported through the 'conversation token' activity. Whilst the women tended to quickly answer, put aside and disregard some of the tokens, they would stop with others and engage with us and certain topics more deeply. For example, in our second session with Sally, one of the tokens was labelled 'a sport you like'. While most of the women generally did not like engaging in any sports, Sally explained that she was a fan of a particular football club. As this happened to be the same team that the Research Nurse supported, she would bring about and remind Sally of a very exiting match that the two of them had watched together in the past. As I had not been there, nor did I know much about this particular football club, they explained to me how the last five minutes of a particular game had surprisingly changed, in their favour, which of two rival teams would win the champions league. Their joint excitement about this particular match reached a peak when all three of us started to watch a summary of these final five minutes of the match on

YouTube. Sally's excitement about the clip did not only show how much she loved football, but the whole experience of remembering and revisiting this event with us led her to ask for the clip to be included in one of her videos for the Identity Sphere.

Moments such as these, however, where the women brought in their passion and would openly and happily talk about things that they were excited by, were rare. Partly this can be explained by the fact that a lot of the activities were dedicated to the physical making of pieces for the Spheres. Where an activity was specifically looking to engage the women in conversation or where conversations evolved more naturally, this also required the women to feel comfortable to open-up towards us. This however could be complicated by their mental health at the time. To explain this, I continue the earlier example of Sally, who was bubbly and talkative in response to our conversation about the football match. That this moment of her opening up and expressing excitement was rather unique is reflected in how her mood changed, when that same session was interrupted by a member of the ward staff entering the room and requesting Sally's attendance for a doctor's appointment. Visibly disappointed that we had to stop the activity, we ensured to Sally that we would wait for her return and then continue. However, by the time she returned, about an hour later, she seemed distracted and was not smiling anymore. Although the Research Nurse and I actively tried to re-engage Sally in conversation, her responses remained short and emotion-less. She did not appear to be in the same (happier) place anymore.

Section 7.3.3 below expands on some of the challenges for the creative process related to sporadic declines in the mental health of two of the women (Zoe and Lucy) in particular, who were frequently not attending or sustaining their engagements in the sessions.

7.3.2 Understanding the Risks: Physical Distance vs. Closeness

In advance of the creative process, I had been trained and extensively briefed about the risk behaviours of the women, which included impulsivity and potentially aggressive behaviours towards others. In order to minimise risks of a sudden attack, I was therefore requested to be at all times at a safe distance of at least one arms-length from the women. However, during my engagements with them – where they presented themselves on their best behaviour, were very pleasant to work with, and enjoyed their participation – my awareness of their potential risks would gradually decrease. Since I myself had not witnessed any tensions or aggressive incidences to that point, that I had, at times, and unaware of any potential risks, compromised my own safety by leaning forward or moving closer to the women.

My behaviour meant that the Research Nurse, whose key responsibility was to safeguard all involved, could not protect me, should one of the women get unsettled. In between sessions, where she had observed my wrong-doing, she would explain how my behaviour had 'pushed her anxiety levels' and reminded me to adhere to the safety procedures. In particular during engagements with one of the women, whose risk behaviours were considered particular high, the Research Nurse (as well as additional staff present) would sign towards, or even kick me under the table, to remind me to keep distance and instead to delegate parts of the activity to the ward staff. That this was a very serious matter became particularly apparent on one occasion where the Research Nurse kindly and determinedly explained that if she had to remind me more than three times to keep my distance during a session that she would stop and abort the activity entirely; a process that felt frustrating to both of us. The following excerpt of a conversation held with the Research Nurse describes my lack of understanding and inability to imagine the dangers and potentially severe consequences that my safety compromising behaviour could have. During a session break, the Research Nurse physically demonstrated and verbally explained to me:

"You were with your head right under the thing, you don't know you are doing it, but you are like this. (...) you need to be way out of her reach, way out of her reach, I'm really sorry, I'm really sorry, if, right, you do it, the way you were [physical demonstration of grabbing my head as I was leaning forward], I can get you in like that in no time at all, I really mean it, you got, I can't tell you enough, if something happened I would never forgive myself. I can't explain to you, until, you don't understand and you never will, and it's good that you don't understand, but I can't, you are making me nervous. My heart is like this [upbeat], seriously, you need to sit down and tell them [other staff] what to do".

7.3.3 Responding to Temporary Declines in Mental Health

Throughout the five week period of the creative activities, two of the women were experiencing temporary and at times unpredictable declines in their mental health, causing them difficulties in either attending or sustaining their engagement in some of these activities. Lucy for instance refused three times to get out of bed to participate in her scheduled activity (without any explanation offered); and Zoe, who had been newly admitted to the ward, showed difficulties to engage, which staff had ascribed to problems with her mental health.

In Zoe's case, she was eager to return to the activities each week and tried engaging with the materials as much as possible, but was frequently observed to become unresponsive. This

meant that at some stage of most sessions, she would stop engaging with anything or anybody, and without any leading signs. Although the Research Nurse would recognise changes in how Zoe responded and acted upon them quickly (e.g. by cancelling the session and help escort her back to the ward flat), I had difficulties to understand what was happening and felt, especially during the first times that I had encounter such like situations, helpless and was uncertain as to how I should behave. While this was a point of discomfort, especially as I was concerned that perhaps parts of the activities or my behaviour could have been the reasons for declines in the women's mental health, the Research Nurse and also the Local Investigator would debrief any such worries in conversations thereafter. For example, they explained that there can be many triggers (e.g. a thought that came to the women's mind, or something they heard other people saying on the corridor outside the room) that can cause sudden changes in their mood, and that are likely outside of our control.

In order to compensate for any missed out opportunities to create pieces for their Spheres and in line with the person-centred approach of the sessions, in subsequent weeks we tried to catch up on previous activities, which often meant that less time was spent on each. Despite these efforts and since Lucy only attended two sessions overall, she had little opportunity to contribute to the creation of videos for her Identity Sphere (and also only coloured one Mandala). As a result, for the deployment, Lucy only had one video on her Identity Sphere. Yet she agreed to re-engage with me during the first four deployment weeks, continuing her efforts in colouring her remaining Mandalas and volunteering ideas for the creation of two additional videos, which I then gradually added on to her Sphere.

7.4 The Women's Initial Responses to their Spheres

The following sections describe how the women expressed their liking of the Spheres and how their involvement in the creative process had shaped perceptions of the Spheres as personal possessions that the women took pride in and were generally quite protective about.

7.4.1 *Look and Feel of the Artefacts*

When I first presented the women with the gift-box containing their Spheres, they all expressed excitement and appreciation. They said they were impressed with their artefacts, which they repeatedly described as "*really nice*", "*cool*" or "*ace*". Initial comments of the women upon opening their gift-boxes included for example: "*Wow! I like the look of this...*" (Lucy); "*Oh yeah, that's nice*" (Janet); "*It's good them*" (Alex); and "*Awww. Really happy with it*" (Kim). Two of the women additionally compared receiving their Spheres to getting a

Christmas present (e.g. Lucy: *"It's like having a Christmas present isn't it"*).

During this initial session and over the course of the deployment, the women typically appeared to appreciate their Sphere's bright colours and the decorations at their centre, which they recognised as their own creations. They also appeared to like how they could look inside the artefact, and expressed enjoyment about how the Sphere lights up and changes colours. They also welcomed its smooth surface. The latter was especially so for two of the women, who embraced the 'lovely' and 'really smooth' feel of the ball, and repeatedly held and clutched it close to their cheeks. Summarising her impressions of the Mindfulness Spheres, Kim shared: *"I think they are really good. I really like the balls with all the lights in them, and it's relaxing to watch them, and it's nice and smooth, and it's like center-y stuff"*.

About their Identity Spheres, the women said they liked the look of their small leather purse, describing it as "nice" and "well cool". About the Identity Spheres, the women in particular valued that *"they are like personalised to us"* (Sally), both in their physical design (e.g. Alex excitedly: *"It's got my name on it!"*) and in their video contents. Furthermore, the women also appeared impressed with the beautiful look of their assembled bracelets that were carrying their self-made beads. Upon a first closer inspection of their new jewellery pieces on their wrists, the women stated for example: *"Awww, well happy with this! It's a nice pink!"* (Kim); *"The beads... well cool!"* (Sally); and *"It's really nice isn't it"* (Lucy).

Overall, and throughout the 15 week deployment period, the women frequently expressed towards me their appreciation of all of their Spheres, articulating few, if any preferences of one Sphere above the others (e.g. Sally: *"I like them all to be honest with you."*; Alex: *"The favourite one, I don't know. I think the both of them are really"*).

7.4.2 Personal Significance of the Spheres

While all Spheres were repeatedly described by the women and staff to have been 'very personal' to each woman, staff ascribed in particular the "sentimental" (Staff-42) value of the Identity Spheres as carriers of the women's co-created videos as to *"feel quite special"* (Staff47) to the women. In this regard, staff confirmed how the contents of the embedded videos reflected the individual interests of each woman, their own ideas and music choices as well as the people and memories that were of significance to them. As such, the Identity Spheres were thought of by staff to be *"something to love and something to relate, something to be attached to"* (Staff-44). For example, Staff-26 described the importance of the Identity Spheres as follows: *"Well, just 'cause it seems to be quite a lot of personal things on it, so it obviously means a lot to, you know, the person using it. (...) I mean the content, the content, seems to be perfect to me, I mean, you*

know, they personalise how they want it, so just adding things like, don't know, maybe photos of family or, you know, favourite singers or whatever, you know, anything you want...".

Some of the ward staff also recognised how the videos related to the identity of the individual woman. For instance, Staff-22 noticed about Sally, as she showed her videos to the ward staff: *"Yeah, because when they came, Sally's were the first one that came on and I thought yeah that's Sally to her T, it were [song title] weren't it, [singer], Sally's"*. In particular those videos that played back personally meaningful songs or that were linked to, or showed images of the women's family were evaluated by staff to create *"quite a strong association"* (Staff-07) to the women, and were liked the most by them.

For example, when I asked if she had a favourite video, Alex responded: *"Yeah, my family one"*, explaining that *"It is 'cause I got a lot of contact with my family and I see them quite often, well, every six weeks. So I really enjoy doing that"*. In this context, staff often emphasised to me that the women's relationships with their family were of great importance to them, and something through which they often defined themselves. Zoe in particular was described by the staff to have a very close relationship to her family, yet she did not possess any photos of her relatives when we created the videos for her Identity Sphere. During the deployment period, two of the ward staff therefore reported how Zoe had approached and explained to them that she wished for her videos to also include family images. Staff-22 recounted:

"I think, well, I know Zoe has mentioned on hers that, 'cause she hadn't got any family pictures, and she said she wished that she did, that she had family pictures on hers, so I think if she did have family pictures on hers a bit more, I think she would have engaged with it more, because hers is just a lot more music isn't it?".

Similarly, some of the music choices made by the women were identified by some of the staff to have been characteristic of the women, describing for example some of Kim's and Zoe's music preferences as *'quite slow'* and *'moody'*, whereas Lucy's songs were described as *'quite upbeat'*, *'modern'* and *'dancy'*. While Zoe for example was aware and mentioned to me about one of her songs that it was *"a bit depressing"*, she also said she liked it. However, in my conversation with some of the ward staff, some raised concern about those songs that included sad or very emotional lyrics, expecting potentially negative effects on the women (e.g. Staff-42: *"(...) it can make them worse"*) if they listened to them. Yet others explained how these more depressing songs may reflect what the women were interested in and wanted to listen to. Trying to empathise with the women, Staff-07 explained:

"I think the purses are good, I think ...when I was listening to some of the choices, the music choices that they'd have, they were, lots of them are quite emotional, they had a significance attached to them, and I remember thinking, oh, that seems perhaps an odd choice to, to manage, when you are already upset, to listen to lyrics that might have a lot of emotional content, but then I thought, well, you know, I used to, I could do with that on occasion, if you got the blues, you put something blue-sy on and just be with it for a time and then and that's a way of, I don't know, focusing the feelings in a way, so, that's a similar thing that might be happening (...)"

On a similar note, Staff-43 explained how one of Sally's songs *"could have quite easily been a trigger for anxieties, but it's sort of went the opposite really"*. And Staff-09 added: *"That's probably, you know, even if it's like, you know, this kind of depressing songs, if, if they enjoy them it doesn't matter, if you enjoy singing it, them, it's just 'cause the contents of it is a little bit down, and you know"*.

7.4.3 Sense of Ownership and Pride

The women's active involvement in the co-creation of their Spheres helped shape a personal relationship between them and their artefacts, which nurtured a strong sense of ownership of, and feelings of pride in, their new possessions. For example, Staff-40 shared about Janet and her Identity Sphere:

"(...) from my point of view, she's actually created that Sphere and the form and it's very very personal, and person-centred to her. And I think she, she's got a better sense of ownership, she's actually being actively involved right from creating, you know, doing the Sphere and video etc., so she's got a greater ownership of that, that's something that is special to her, it is not something that's widely used, if you will and is created for, like a questionnaire etc. assessment tick box exercise you see, it doesn't have that element about it at all, and I think that's what she, I think that's the difference".

The artefacts were something that I had given to the women that they were allowed to keep and that were introduced to them as something that was 'theirs' to use at their own discretion, which in itself was described by staff to have been of great value to them. For example, Staff-09 explained how the women enjoyed creating the Spheres and also that *"they enjoyed, you know, the actual possessing them and, you know, use them when they like to use them"*. Staff-15 added about the women:

"(...) they are fully aware I think of the fact that they've, that it's their choice when they use them, so I think a lot of it is still being sort of around staff encouragement to use them, but I think that just that fact that they know they are theirs and they can use them when they want to, is probably enough, you know".

Moreover, staff emphasised how leaving it in the responsibility of the women, if and when they wished to engage with their Spheres was distinct to the way that other support tools or strategies were usually introduced and suggested to the women. For example, Staff43 explained about the Spheres: *"They can be used for as briefly or as long as they want to be used for, and it's different from their typical everyday coping skills like, and I think that impacts".*

That the women had a sense of ownership of the artefacts and felt attached to them also became apparent in our conversations. During an interview with Sally, she once affectionally expressed about her Mindfulness Sphere: *"I love it. It's mine. I really do"*; when asked if she would consider giving her artefacts away, she responded: *"Even if my mum would try to have them, I wouldn't let her take it"*. Moreover, when I asked the women at the end of the 4th deployment week whether they would like to keep their objects, with no exception they all said that they wished to keep their Spheres. For example Alex responds: *"I would. Definite."*; repeating *"No. I definitely keep them, not giving them away"*.

A connection to the person and sense of possessing the artefacts was also supported by the fact that all of the women's Identity Spheres had either their initials, their first name, or the name of a relative or friend engraved in the leather cover. This highlighted their uniqueness and contributed to their perception as being personal property. For example, when I asked Sally what she liked most about the project she pointed at her Identity Sphere saying: *"The little thing inside with [name of boyfriend] on"* that she herself had designed and wished to have included in the artefact.

Due to their involvement in the creation process of the Spheres, the women also expressed pride in their artefacts. For example, Staff-09 shared about Sally: *"Making the videos, 'cause I saw Sally's video, she loved the fact that 'Right, I've made that, I've done it all myself' you know, she was really really proud of it, you know (...)"*. Staff-43 also recounted a memory of Janet:

"Yeah, with Janet and, it was the first time that I'd seen her in a little while, like a couple of weeks and she, she was dead chuffed, she were really proud, she went after her bedroom and then brought her purse out and were showing me her videos and, she's got a, she made a video of [name of playstation game], 'cause she loves playstation doesn't

she and [name of playstation game], and she can play that for hours, so she's there, sat there really happy showing me it, which, for the first time I'd seen hers, I thought that were quite cute. (...) [She's] Really proud of it".

This self-pride was further described by staff to have contributed to the women's sense of self-worth. Staff-43 for instance said: *"I think it's been a beneficial project 'cause it's given them sort of, a bit of self, self-worth as such, in self-pride of them making objects, which they've never made before, and that I don't think they would have ever thought of anything like that."* This was further distinctive in that the women generally did not have many possessions that they are proud of. Staff-26 shared in this regard:

"(...) Kim for example, she seemed really, really proud of it, which is a really good thing, because it's, you know, possible she might not have a lot of things that she is proud of, but you could just see she was sort of brimming with pride, showing me the Sphere of Wellbeing, and showing me her pictures and stuff, she loved it, so yeah, I just think it's good, you know, they've got something that they can feel proud of I suppose".

7.4.4 Being Protective of Precious Personal Possessions

Because of the women's personal investment in their Spheres, which turned them into precious carriers of their ideas, contents and creations, the women were generally quite protective about their new possessions, and made commitments to treat them with care. Staff explained that this may have contributed to the fact that the women had not (with one exception, see Section 8.7.4.1) tried to break the artefacts for purposes of self-harm.

Particularly during the initial days of the women first receiving their artefacts, they were very careful in handling them and repeatedly said that they will look after their Spheres. In addition to early concerns about the general treatment, storage or charging of the artefact, the women expressed worries about accidentally breaking their digital Spheres by either misusing or dropping them. For example, when Kim first switched off one of her videos as it was still playing on the purse, she asked me to re-assure that: *"It won't ruin it [the purse] if I just switch it off, won't it?"*. More critically, when Alex once almost dropped her ball she said in fear: *"Ah. I can't break that, bloody hell, it means a lot to me"*. Alex also expressed concerns about taking her Mindfulness Sphere to her family during a visit away from the hospital, as she *"Didn't want a chance to get [it] broke"*. About Alex's relationship with her Spheres, Staff15 further described: *"(...) it's something that I think she probably treasures, that she looks after, again, and she's quite happy because she's made so much progress recently that she's allowed*

time in her room to go in there and do it, to use it”.

In general, the women were also a little resistant to make use of their Mandalas as stickers to decorate their room or furniture, which staff attributed to worries that the women might not be able to take them off the walls again when they move between rooms or leave the unit. For this reason, Alex shared with me: *“I was thinking about getting some card, to stick them on card, and then sticking the card on the wall so we know where they are when we gonna use it”.* Apart from Sally, who said to have *“stuck them [her Mandalas] on my therapy book”* to create a connection between the Spheres and her DBT therapy materials, only Janet made use of her sticker Mandalas and placed them along the side of her desk, right next to where she was charging her Spheres.

On the basis that the women had co-created their Spheres and were showing concern about accidentally breaking them, staff were hopeful that they would not destroy them, which is a common occurrence when the women are distressed or angry. Staff-38 explained: *“(…) And I think the fact that they've made them gave the hope that they wouldn't then kind of, that they would look after them and that they wouldn't do anything with them when they are angry and stuff”.* Apart from one case reported about Sally and her Calming Sphere (Section 8.7.4.1), all Spheres remained intact, which, knowing the women’s risk behaviours, indicated to staff that they cared about the artefacts. Staff-38 continued:

“(…) they all could have done, [name of woman] could have got her video [purse] and found out which bits to use to put in her eye and stuff, and she hasn't done.

(…) She could pick, [name of woman] could pick at anything to get under, there's the purse thing and the click button clip thing she could got the button, she could got that, she could have, and I'm saying it in a way that she hasn't, 'cause she had, obviously it means something to her (…) I think it shows that she cares about it”.

7.5 Summary

In this chapter, I described how the women enjoyed their involvement in the creative personalisation process of their Spheres and how my conversations with the women, ward staff and local research partners (Local Investigator and Research Nurse) supported the identification of factors that have contributed to these joyful experiences. In light of the mental health problems and cognitive abilities of the women, hospital staff remarked on the high level of commitment that the women exhibited in response to the creative activities, which they attributed to the hands’ on creative, person-focused and carefully scaffolded making process

that encouraged the women to make own choices and gently guided them in the creation of beautiful looking pieces in short period of time. These aspects were further described as in contrast with other, mostly group-based activities that the women more commonly engaged in. Thus, and since the sessions offered the women something positive to focus on and look forward to each week and enabled favourable social interactions, staff came to evaluate them to have been worth-while in their own right.

In the context of the creative activities, I further described some of challenges and opportunities for gaining an empathic understanding of the women and their context of living. Here, I highlighted how the involvement of especially the Research Nurse in the creative process was instrumental in: enabling me to respond more sensitively to the capabilities of each woman; creating a space in which the women felt comfortable to engage both with me and in more personal conversations about their individual interests and likes; reminding me of necessary safety procedures regarding the women's risk behaviours; and debriefing my experiences of observing some of the women starting to disengage or become upset due to declines in their mental health.

This chapter closed with a description of how the women were responding to the initial receipt of their Spheres of Wellbeing and how the sensitive approach in inviting them to creatively contribute to their design meant that they felt ownership of, took pride in, and were genially quite protective about the artefacts. The next chapter, Chapter 8, presents the findings on how the women made use of, and experienced interactions with, their Spheres.

Findings on the Women's Uses and Experiences with their Spheres

8.1 Overview

In keeping with the analytic procedure described in Section 5.10, this chapter presents the collective themes that evolved around the women's uses of, and their individual experiences with, their Spheres; and outlines how my understanding of the women and their care setting is informed by conversations with the women and ward staff; discussions with local research partners; and my own experiences of the ward environment. The chapter begins with a general description as to how often and for how long the women were using their Spheres, and how their engagements changed over the course of the 15-week deployment. Subsequent sections then describe in more detail how the women made use of each Sphere; how their interactions related to and helped promote important facets of their mental health and wellbeing that were described in Chapter 2 (Sections 2.5.1-2.5.4); as well as some of challenges that at times complicated these engagements.

Overall, I identified four predominant uses of the Spheres: (i) enjoyable acts of 'showand-tell', whereby the women were showing their Spheres to ward staff, hospital peers or families during visits, which nurtured feelings of self-pride and led to the evolution of positive, more balanced conversations and playful interactions with staff and peers, thereby strengthening their social ties and a sense of belongingness to others; (ii) having developed more personal and private uses around their Spheres, the women also approached the artefacts to be reminded of happy memories or good feelings, which enabled them to (re-) connect to positive aspects of their self and to be reminded of their individuality, offering reassurance and promoting their self-confidence; (iii) the women furthermore turned to their Spheres as vehicles for experiences of comfort and calm when they felt low or lonely and wanted to feel connected to important people in their lives; wished to be stimulated or to relax; and to escape

situations that felt unsettling to them; (iv) finally, and in contrast to uses of the Spheres that were focused on enhancing or maintaining a sense of wellbeing, staff also reported how they prompted and directed the women towards using their artefacts as tools to support them in coping with emotional distress, when they showed signs of anxiety or anger. Yet, such efforts were less successful, as the women refused or were unable to engage with the Spheres in those moments. Nevertheless, the women and staff also reported on a variety of successful cases in which the Spheres were used to distract the women from troublesome thoughts or feelings, and to help them settle when feeling upset, nervous or stressed.

The final sections of this chapter carefully provide some insights into how uses of the Spheres differed amongst the women (as influenced by personal interests, their understanding of and access to the technology, and fluctuations in their mental health); and how the complex, highly regimented and socially dynamic hospital environment, in which engagements were situated, impacted on, and at times challenged their uses of the artefacts.

8.2 Frequency, Duration and Distribution of Use over Time

In interviews with the ward staff, they described how the women’s engagements with Spheres were most frequent in the first two deployment weeks, and that this was when the women showed most excitement about the artefacts. Findings from analysing the logging data of all Mindfulness Spheres and five of the Identity Spheres (1 missing data set) supported this observation and indicated a drop in overall use after the 4th deployment week (see Figure 67), which marked the end of the initial (more intensive) evaluation period that actively involved both me and the staff. As described in Section 5.9.3, the log data of the Spheres, which included all recorded interactions during the first 15 weeks of the deployment, was analysed with a view to identify ‘significant interactions’ with the artefacts.

Table 3. Log data results for the Identity Spheres of five of the women: their number of meaningful events; the average and range in the duration of the interactions; number of videos that were triggered both in each event and in total; and the number of triggered videos that were played partially and fully during engagements.

	Number of events and their duration (in sec)						Number of videos			
	N	mean	SD	median	min	max	triggered per event (MD)	triggered in total	played partially	played fully
Zoe	9	423.4	256.1	348	193	1021	3 (max = 8)	37	37	9
Janet	15	377.9	336.6	255	35	1374	2 (max = 4)	29	29	24
Lucy	19	1084	1005	600	178	3490	1 (max = 6)	44	44	49
Kim	20	510	509	393	25	1770	2.5 (max = 19)	70	69	25
Sally	34	524.9	397.8	439.5	58	1764	3 (max = 14)	119	115	74

For the Identity Spheres, 97 of these interactions were identified in total, ranging between 9 and 34 interactions by individual women ($MD = 19$) that spanned on average 10 minutes ($M = 599.2$ sec, $SD = 614.5$ sec, $min = 25$ sec, $max = 3490$ sec) and involved the triggering of on average $MD = 2$ videos ($min = 1$, $max = 19$). A descriptive summary of the log data findings for each woman is presented Table 3. Almost all interaction events with the Identity Sphere ($n = 85$) took place in the first 4 deployment weeks (see Figure 67 for their distribution over time). The log data also indicates that most interactions were recorded in the late afternoon (35 events) and evening hours (47 events) rather than in the morning (8 events) or at night (7 events); and the average duration of events was longer later in the day (in seconds: $MD_{morning} = 304$, $MD_{afternoon} = 398$, $MD_{evening} = 485$, $MD_{night} = 587$). The findings regarding the number and types of videos being triggered, as visualised in Figure 68, suggest a roughly equal distribution between the three video categories.

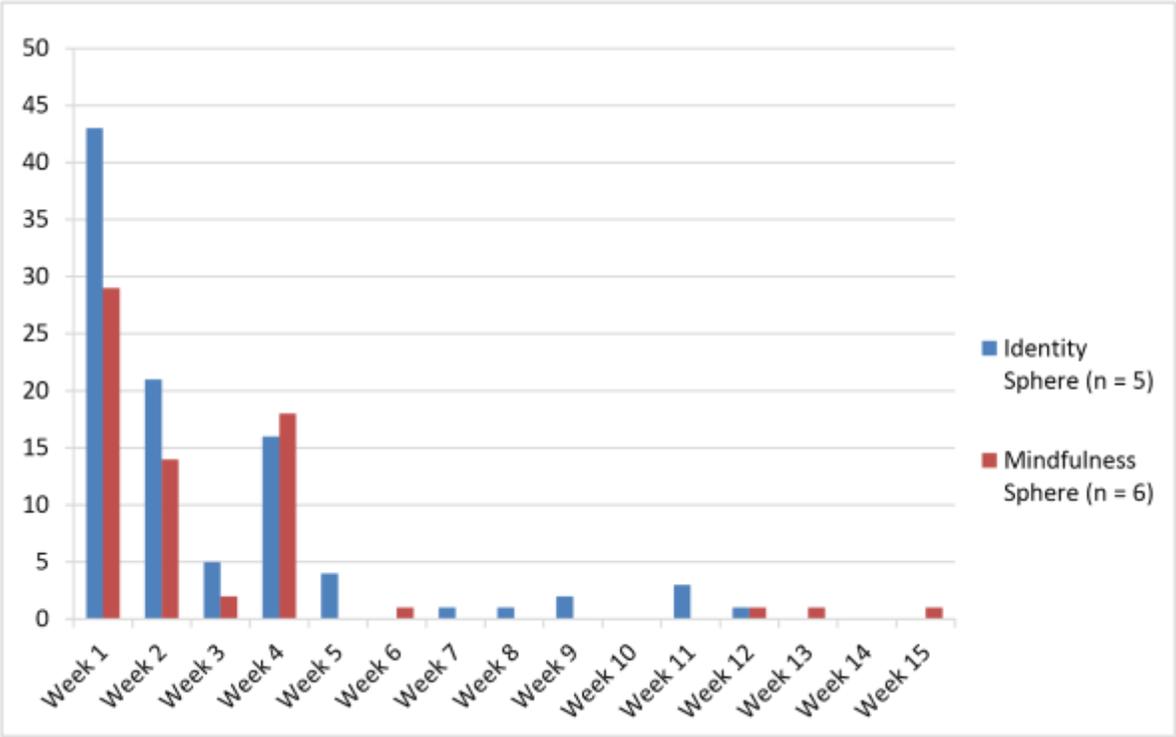


Figure 67. Number of interaction events with the Identity and Mindfulness Spheres over time.

For the Mindfulness Sphere, only 67 significant interactions were logged and these ranged between 5 and 21 events by each woman ($MD = 9.5$). The data indicate that most of these interactions were short, lasting 4 minutes on average ($M = 248$ sec, $SD = 308.7$ sec). Individual engagement events contained between 1 and 40 continuous heartbeat signals (average

duration $M = 57$ seconds) that each would involve at least 4 and up to a maximum of 614 heartbeats. Table 4 presents a descriptive summary of the log data for each woman.

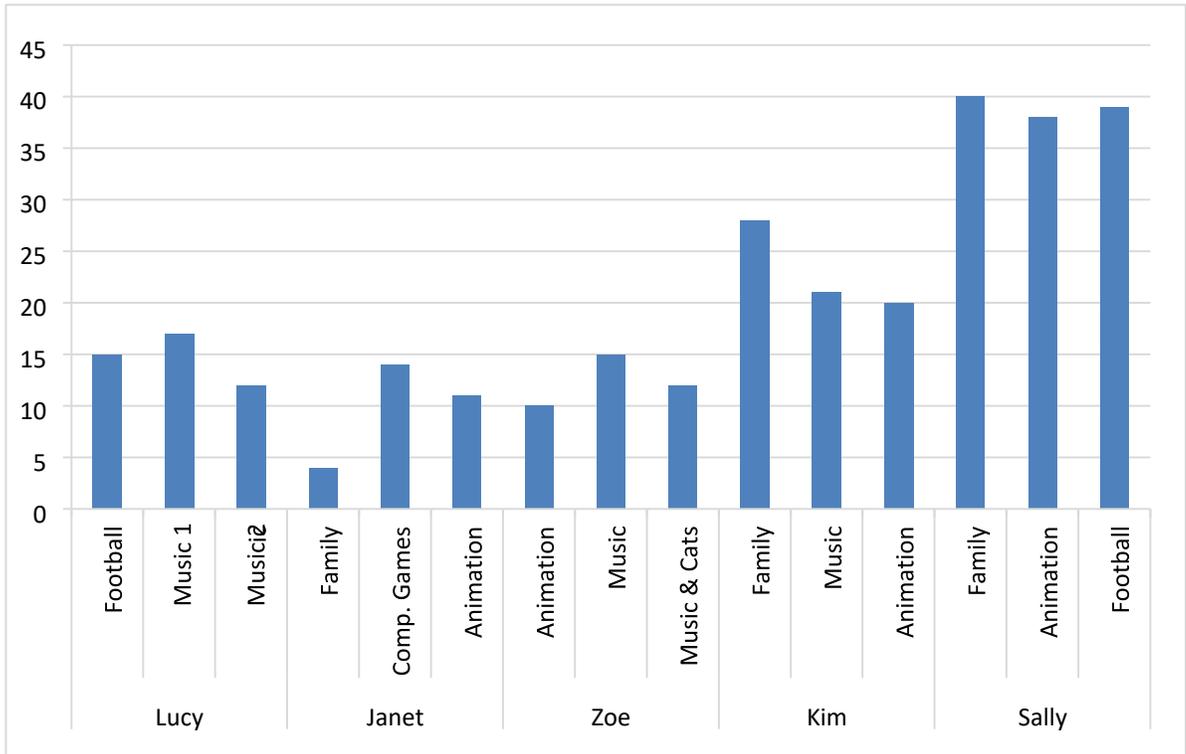


Figure 68. Overall Number and types of videos triggered by each woman.

As for the Identity Sphere, almost all interaction events with the Mindfulness Sphere ($n = 63$) took place in the first 4 weeks of the deployment (Figure 67) and decreased over time. The log data again indicates that most interactions took place in the late afternoon (31 events) and evening hours (17 events) rather than in the morning (7 events) or at night (1 event); 11 events could not be specified. The average duration was longer for events that took place later in the day (in seconds: $MD_{morning} = 46$, $MD_{afternoon} = 153$, $MD_{evening} = 137$, $MD_{night} = 269$).

Table 4. Log data analysis for the Mindfulness Sphere for each woman: their number of meaningful events; the average and range in the duration of interactions, and the number and average duration of heart beats per continuous signal.

	Number of events and their duration (in sec)						Continuous heartbeat signals			
	N	mean	SD	edian	nin	max	No. of signals per event (MD)	No. heartbeats per signal		
								average (MD)	min	max
Zoe	10	406	531	174	17	1661	2	14		
Janet	6	356	453	11	22	1064	1	49	16	255
Lucy	5	233	285	33	14	582	2	19.5	4	275
Kim	9	254	225	267	30	633	2	37	4	389
Sally	16	221	229	140	21	717	1.5	30	4	268

In conversations with the women and staff regarding the use of the Calming Spheres, they shared how most of the women (Sally, Janet, Lucy and Zoe) wore their bracelets only occasionally, and in most cases just during the initial phase of the deployment, whereas others (Alex and Kim) did not wear their bracelets at all. The following sections provide more detailed accounts on how the women made use of, and experienced, their interactions with each of their Spheres, including explanations as to why engagements with the artefacts were at times absent or were deemed to be less successful; and descriptions of some of the individual and contextual circumstances that challenged engagements with the Spheres.

8.3 Socially Performing Identity: Self-Pride & Belonging to Others

In conversations with the women and staff, they frequently described how the women were using their Spheres to ‘show-and-tell’ to members of their social group how they had cocreated the artefacts, how these worked technically, and what about their individual contents and creations they liked and were most meaningful to them. Such acts of ‘show-and-tell’ were primarily observed in the early weeks of the deployment and were performed by the women for the ward staff, their hospital peers and also their families (during visits). These engagements were recognised to have been very enjoyable for the women and to have led to the evolution of positive social interactions, strengthening their social ties and contributing to a sense of belonging.

8.3.1 Acts of ‘Show-and-Tell’ to Hospital Staff and Peers

The women were repeatedly described by staff to have been very *happy* and *excited* to show and explain their new artefacts to them and their hospital peers, who all showed interest and responded positively to their Spheres. For example, Staff-09 described Kim: “(...) *you know, she did it as well, she loved explaining and going through it all and showing people, you know*”.

When I asked about what may have motivated Kim to show her Spheres, another member of staff explained: “*I don't know, she, she just wanted to show me really, I think. Just, just to show it off, just to show me all the hard work kind of thing*” (Staff-26). Such acts of “*show-and-tell*” (Staff-22) were reported as being frequent during the first two weeks of the deployment, but decreased over time; Staff-42 explained:

"(...) I think when they first got them, they used the Sphere [Mindfulness Sphere] quite a lot and the wallets [Identity Spheres] and they were all talking to each other and showing each other, and they were like excited, but I don't know if it wore off a little bit or, did it, it just seem to gradually go down. (...) It was mainly, when I've seen it, when they first got them, I think they were just more, the excitement and they said 'look what mine does' and mainly like towards the staff, they were showing all the staff the videos and things like that".

Acts of 'show-and-tell' were not only initiated and motivated by the women's desire to show their artefacts to the staff; members of staff also described themselves to have been curious to find out more about these novel possessions of the women, and therefore prompted such engagements. Staff-07 for example said: *"(...) it was new and exciting and they were keen to see, and we were all interested to see what they've been working on, so that was good"*. Moreover, I also observed how some acts of 'show-and-tell' were triggered by my visits to the hospital ward, which appeared to remind the women of their Spheres and, at times, initiated presentations to staff. In addition, staff reported on one instance in which Alex had brought her Identity Sphere to her DBT group session to show her peers, and had written in a diary entry how: *"Alex asked to take her wallet to her DBT session, which was facilitated"*; with staff assuming that Alex wanted to *"share the experience with her peers at DBT"*.

8.3.1.1 Recognition of Achievements

When I asked the women how staff or their peers responded to their Sphere demonstrations, the women uniformly expressed how the others had *liked* their artefacts and were describing them as *good* or *nice*. For example, responses by staff included: *"It's really good, well done."* (Staff-51); *"How brilliant. Having your little personal thing on there..."* (Staff-09); and *"Wow, awww, it's lovely. Thank you!"* (Staff-39). Enquiring as to how these responses by staff made the women feel, their often short, yet firm replies included expressions such as *"good"* (e.g. Janet) and *"happy"* (e.g. Kim, Lucy). Moreover, such positive recognitions of the women's personal possessions were also described by staff members to have contributed to feelings of pride and a sense of achievement (e.g. Diary entry about Sally: *"Proud feeling showing staff what she had made"*), alongside experiences of happiness and joy.

8.3.1.2 Opportunities for Positive, More Balanced and Playful Interactions

For some of the conversations that evolved around acts of 'show-and-tell', in which the women explained the functionality of their artefacts and how they came into being, staff remarked on the level of knowledge and detail that the women brought to these descriptions.

For example, about Janet, Staff-40 recounted: *"(...) every time she was explaining things, it became more detailed, which was, I was quite impressed with her, because she does struggle to retain knowledge and information"*. Another member of staff, Staff-48, also recalled a conversation with Janet, who was showing one of her videos that included a scene from a certain computer game that the staff was unfamiliar with. Staff-48 explained: *"She has talked to me about, making it, when she's doing the game, talking me, she had to talk me through the game, she knows more than me"*. Thus, as experts and co-creators of their Spheres, the women were at times able to present themselves as very knowledgeable, which was found to have contributed to positive and more balanced conversations with staff. This is also evidenced in the following observation made by Staff-15, describing how Sally interacted with another staff member, who she had not seen for a while:

"I think it was definitely in a positive way, she hadn't seen him for a while, it's a chap who's gone off to do his nurse training, he was talking about the different placements and things that he has been on, I can't remember how they [the Spheres] got mentioned, but perhaps he had been into the treatment room where some of the Spheres are and have seen them and I think they just got chatting about it, it was really nice and Sally, was one of the only ladies who was up at that time, it was earlyish in the morning, and she just offered to get her items and show him, and went through them with him, so it was quite positive, sort of informative..."; when asked to elaborate on the engagement, Staff-15 continued: *"I think a positive engagement, equally sharing information and giving and sharing information, I said that the chap knows her from, he worked on here [the MSU] previously, but obviously he's not been for quite some time, so I suppose they had some interesting things to perhaps talk about, the sort of the day-to-day stuff"*.

On occasion, there was also evidence of the women using their Spheres to initiate more playful interactions with staff. For example, Sally, who supported a particular football team that was in close rivalry to the football club that a member of staff supported, used her football-themed video as a way to tease him. Staff-26 wrote about Sally (event card):

“Sally has already listen[ed] to music [family video] after talking to her nan - when Sally saw support worker, Sally change her music choice to [football video] then shouted to [staff name] to listen to this, you red nose. Sally started having banter joking and laughing about football - [staff name] is a [rivalry football club] fan (Red) and Sally is a [other football club] Fan (Blue). Sally was in good spirits while listening to this song”.

Members of staff also described how engagements with the Spheres by one woman were found to have a snowballing effect on the others. For example, explaining this interplay, Staff-43 said: *“I think it's like a Domino effect as well once one person has one, has her purse out 'Ahhh, can I have mine', 'Ahh can I use, have mine', yeah, I think that's mostly the case”.* More social and shared engagements with the Spheres by the women was also something that I had witnessed myself a couple of times. For example, on one occasion during a daytime visit, I once saw how Sally had brought her Spheres to the dining room table to show them to Staff33, which served as an invitation to Kim to also get her Spheres from her room. As a result, both women started to show their artefacts and videos to members of staff and also each other. Since Kim and Sally shared a similar taste in music, they started to sing along to one of the songs. Observing their interaction from a distance, I came to notice that Kim at times had difficulties with pressing the button at the top of her Identity Sphere and with the scanning of her QR codes. Also noticing Kim's struggles, Sally, who appeared more confident using it, helped guide Kim step-by-step through the process until she got her videos to play. Such social interactions around their Spheres, where the women shared the contents of their videos and at times even supported each other, were perceived by staff as enjoyable social activities. Staff-47 for example said: *“(…) they do seem to enjoy when they are all doing it together and they all have a little natter about it”.*

That these social interactions around the Spheres can contribute to a sense of togetherness and belongingness was particularly apparent in the following example in which the woman, who was newly admitted to the MSU and did not possess any Spheres, expressed the wish to also partake in these activities. During a ward visit early into the deployment, I came to observe an occasion where most of the women were gathered around the dining room tables of their flat, showing their Spheres to staff. The newly admitted woman, who was also watching the other women, expressed to me the desire to partake in the project, saying how she would like to have a pink purse with images of her family included. While I was unable to involve her at this stage of the research (and could only apologise for this), I later observed how the other women would frequently offer and share their artefacts with her (e.g. Sally offering her Mindfulness Sphere: *“Here, you can have mine”*).

8.3.1.3 Introduction of Self & Opportunities for Forming Social Bonds

Acts of 'show-and-tell', in which the women were sharing and talking to the ward staff about the contents that were represented through their Spheres (particularly through the videos), were also described by the staff to have enabled them to get to know more about some of the personal interests and likes of each woman. This was most apparent in the case of Janet, who only had recently moved to the low secure unit (LSU) and used her Spheres to introduce herself to the new staff and peers. During my interview with Staff-44, she shared the following recollection of Janet, who approached her with her Identity Sphere:

"(...) I've never met Janet before and she came up and said hello. We were in the dining room and she brought the video up to me [her Identity Sphere], and I still didn't know what it was, and she was showing me pictures of her dog, of her mum, her dad, and I said, even the other girls who were sat round were 'where have you got that from?', they all wanted to know, so she, so I was sort of, 'Oh, that's really lovely this, this is really nice, what is it?'. So she said it's part of the... Sphere, and I said 'Right', I said, 'well I don't know anything about it' I said, 'but that's really nice for you to come over and let me look Janet'".

This and other examples further showed how Janet made use of her Spheres as a way to initiate conversations and interact with others. For instance, when I asked how Janet was using her Mindfulness Sphere, Staff-48 recounted: *"She was focusing on the lights. I wouldn't say she was, she was also showing it, so it wasn't total focus, 'cause she wanted the other people to, she wanted to interact with other people with it".* That it can be very difficult for the women to both break off any existing relationships and form new relationships within the context of the hospital environment, was also described by Sally, who at one point explained her recommendation of the Spheres project to the women on the LSU: *"Because some of them might find it hard to talk to staff and that, but they can use these, well I say talk to staff at first, but these help calm down, they are, aren't they. Calm down".* When I asked her to explain a bit more how the artefacts would help other women talk to staff, Sally continued: *"Yeah, because I know all the staff on here [the MSU]. But if I went on to [name of LSU] and I knew no-one, then I won't talk to them and I won't, I'd just keep to myself".*

8.3.2 Defining their Relationship to Family

While staff and the women frequently described the importance of the women's relationships with their family, being confined to the hospital environment limited opportunities for contact and meetings with family members. For most of the women, day visits to see their families,

particularly if they were living further away from the hospital grounds, would often only occur every 4-8 weeks. In the few encounters that the women had with their families during the evaluation period of the Spheres, they reported having told their family about their Spheres; to have taken them on visits; and to have gifted some of their Calming Spheres to members of their families.

8.3.2.1 Showing off New Possessions & Recognition of Achievements

Similarly to the accounts described so far of interactions with staff and peers, the women appeared very keen and excited to also 'show-and-tell' their families about their new possessions, even women, who had no family contact. For example, one of the staff (Staff-46) described an occasion in which Sally was sitting at the dining room table using her Spheres, first watching the colours change in her Mindfulness Sphere and then playing back a family video of her Identity Sphere that included a family-themed song and images. This led Sally to call her grandmother. During our interview in week 4, Sally said: *"I was telling my Nan about them. And she said 'I would love to see them'"*. When I asked about what she told her Nan, Sally recounted:

"I told her when we first started it off, about what we were doing, she went 'Ahh, I'm glad you like it and you, you know, you have to tell us how you get on with it', so I told her the other night and I was playing her [name of family video], I was playing it down the phone. (...) And I went, 'Do you know that picture of me, you, [Name of male person], my other brother, and my granddad on it?' she went 'Yeah', 'It's got that on it!' and then when I was a baby and trying to climb into the washing machine..."; to which her Nan responded with laughter.

When I asked the other women how their family members had responded to their Spheres, Alex described her mother's reaction: *"She said she's impressed with it"* and that *"She loved it, she actually loved the purse. Especially with the people on it. The family on it, she loves it"*. Similarly, Janet told about her mother's response to the Mindfulness Sphere: *"Said she want, she wants one, said I'll buy you money for it, that it'll buy money for you, and that one"*.

However, not all of the women had yet had a chance to show a member of their family their Spheres in person. Lucy for example explained in week 4 how she was planning to tell her Nan about the artefacts, but had not seen her yet: *"No, cause I'm seeing her on Thursday"*.

8.3.2.2 Gift Giving: Strengthening Social Ties

During visits by family, two of the women (Zoe and Alex) had given both their Calming Sphere bracelets away to relatives, which raised concern in some of the staff, who argued that the women should have kept their bracelets for themselves. Staff-07 for example stated:

“I was really surprised when Zoe gave her bracelets away, and I just, I didn't get that at all, I was really shocked when I saw the email that she just given them to family like, she invested all that energy in producing and then she just gave them away, when it was meant to be her special things (...).”

Through discussions about instances of the women gifting their Calming Spheres to family members with the Local Investigator, she explained that staff's concerns in this regard are likely to be informed by their understanding of the vulnerabilities of some of the women. In some cases this can include a history of abusive family relationships, which makes the women potentially more receptive to be coerced by family members to give their possessions away. In this context, Staff-07 explained how Zoe's relationship to her family is very complex and has a strong influence on her: *“(...) family dynamics influence Zoe really seriously, if she has a phone call and it is upsetting news, she immediately responds to that, she's I don't know that she has a well-developed sense of herself apart from family, as an indi., as a person in her own right, so, yeah...”*.

Independently of these concerns described by the staff around risks of coercion, I myself had witnessed on numerous occasions some of the women mentioning during the creative activities (as they were making the beads and choices for their bracelets), how they wished to give some of their beads, or at least one of their bracelets to family members. Similarly, upon inspection of their finalised Calming Spheres during the deployment sessions some of the women expressed immediately: *“I'll give one to my grandma, if I can”* (Lucy); *“I might give my mum that one, I'll give her that one”* (Janet). Since 'family' often appeared to be a key concern of the women, an opportunity to share something that they themselves had created and were very proud of, was regarded by some staff as a positive. Staff-47 said: *“Some of them have given their bracelets away, which is quite nice for them, because they've made them and they want their family to have them, which is good, but I think maybe, if they'd keep them, they might have got a little bit of something from them as well”*.

For example, in my interview with Alex at the end of week 1, she shared her plans about wanting to give both her bracelets to her mother, explaining: *“Cause my mum said to me on the phone the other night, she says, 'I've heard you made me some bracelet havn't you?’*

'yeah', she says 'when you put it on me Alex, I'm not going to take it off at all.' (...) So I'm going to give [her] those two of them". Three weeks later, Alex told me about her bracelets: "I used it on my visit yesterday, at my mums. Showed my mum what it is and then when my sister seen the other one: 'Alex can I have it, it looks really nice' I went 'Alright, then have it'." Alex further explained about her mum: "It was her birthday on Saturday anyway, so I thought I've given it to her for her birthday."; and that: "(...) This was the first time that I've seen my sister in 25 years".

Moreover, when I asked her what her mother had thought about the bracelets, Alex explained that: *"She loves the bracelet, she won't take it off. She won't take it off".* While it might not be entirely clear if it was primarily Alex choosing to give her bracelets to her relatives, or if she felt coerced to do so, this interaction presented an act of defining her relationship with her mother and sister, and served to strengthen their social bond.

8.4 Internally Connecting to Self

Over time, the women also developed more personal and private uses for their Spheres, through which they were reminded of happy memories and that allowed them to (re-)connect to positive aspects of their self, offering reassurance and promoting their self-esteem.

8.4.1 Space for Privacy & Personal Engagements with Spheres

To be living in the medium secure unit (MSU) of the hospital meant that the women were constantly observed and supervised by the ward staff, who were responsible for ensuring that the women were not harming themselves or others. During my regular visits to the women's flat, I came to witness that this even included observations of the women in very intimate spaces such as their supervision when showering or using the toilet, and even watching them in their sleep; which demonstrates how little space there was for privacy.

Whilst the women had little control over how and with whom they would spend their time, some of them described how, following initial showings of the Spheres to others, they had developed more personal and private uses of their Spheres; and to have at times preferred using them on their own (e.g. Alex, Janet, Zoe and Sally). For example, in relation to her use of her Mindfulness Sphere, Alex explained: *"I prefer to do it myself. 'Cause it is more privacy and more quiet."*; And Sally said: *"If I'm allowed to use it on my own then I'll use it on my own, if I can't then..."*. Although members of staff frequently had to supervise the women when using their artefacts (see Section 8.8.1.2), they described that they did not *"like going intruding"* (Staff-29) or *"disturb"* (Staff-40) the women in their engagements. For example, Staff-42 explained about the Identity Spheres:

“No, mainly when, when I have seen it mostly used, like following an incident, or even beforehand, we do try to give them that bit of space, so that we are not just drowning them, and they just can get their thoughts sorted, do you know what I mean, and then when, they can talk to us when they want to, because if we gotta keep asking, they not gonna speak to you are they, you just let them just get [their] thoughts together and speak to you, yeah, so we’ve given the wallet and just let them have their own space with it, so...”

Staff also described how they tried to respect that some of the women were rather private (e.g. Janet, Alex) and aimed to demonstrate understanding of the women’s wishes and need for privacy with their Spheres (and more generally). About Janet, Staff-45 for example explained: *“I think she, it’s the isolation. I know you want your privacy, you need your privacy, you need to go away and think about things”*.

8.4.2 *Reminder of Self: Confidence & Affirmation of Individuality*

Staff frequently described and acknowledged how uses of the Identity Spheres, in particular, with their embedded personalised video content, allowed the women to connect to *“happy places”* (Staff-45), to bring back *“good feelings”* (Staff-40) and *“positive memories”* (Staff-43), and to remind them of their *“individuality”* (Staff-15); all of which can nurture inner strength. This was especially apparent when staff described how the women at times had difficulties to remember that there were meaningful things in their life. Staff-42 shared:

“The wallets I think is more reminder of what they have got and what happy times they have had, like happy memories, 'cause I think it is quite easy for them to forget, while they are in here isn't it, sometimes that they have, they have cuts of their memories, and they have people who care about them, they have got things important to them”. When asked, about her assumptions how the women might feel about their videos, Staff-42 continued: *“I presume, to be honest, they are getting something positive out 'cause they are seeing everything that is important and it is reminding them that there are things that are important to them 'cause sometimes, especially when they are feeling that low, they forget that there is anything important in their life at all and they do need that reminder”*.

Reminders of what is important to the women, were found to have encouraged the women to feel more confident in themselves, and to be more motivated to try and progress in their lives. For example, when reflecting on the potential outcomes of the Spheres for the women, Staff-26 said: *“Well, if it's things like, if they've got pictures of their family or friends or whatever, they can look at that and it reminds them of the people on the outside, so it might just*

make them feel a bit more, I don't know, it might spur them on, you know, to try to progress and get out of here". In an interview with Alex, she also described how watching her family video, with images of her mother, made her feel more confident to want to move on. As she described: "On my mum one, it makes me feel more confident like that I want to get out of here. I look at my mum. I think, I think that I should have more confidence in myself". Moreover, one of the staff explained in an anonymous diary entry about how Zoe had been distressed and was encouraged to use her Identity Sphere to calm down: "Watching her video may have reminded her that her family would not want her to feel like this". Staff-15 also described how the artefacts in themselves, as opposed to their content, served as reminders of both the enjoyable experiences of their creation, and as a reflection of the women's individuality, even when they were not in use. Summarising his impressions of the project, Staff-15 explained: "(...) it's using technology that exists, and it's been specifically, set aside in certain objects that, that would, essentially I suppose, have some sort of therapeutic value for the person, just purely, not necessarily around calming or de-stressing, but helping them perhaps remember their individuality, remember their, their worth in helping to create things, you know that they, they've taken part in, they've made some very very ornate and very interesting objects, you know, the videos would, would demonstrate their uniqueness and sort of, where they've come from. (...) they are certainly things that they would, the ball specifically, they would have that forever I suppose, 'cause even if the batteries died, it would still be a nice object, you know, the bracelets again, are the sort of things that, having daughters, having, being married, ladies have jewellery boxes and put things away, but they always like to get them out every now and again, and have a look, so that would be the benefit of that, and that sort of again, they've made, that they would remember this time, that's obviously over a number of month, so yeah, definitely worthwhile".

8.5 Keeping Well

The women were also observed and described to have turned to their Spheres as vehicles for comfort and calm when they felt slightly low or lonely, and wanted to feel connected to important people in their lives. They further requested and made use of their Spheres when they were bored and wanted to be stimulated, relax, or escape situations that felt unsettling to them. Collectively, these serve as examples of how the women made use of their Spheres to try and maintain a sense of mental wellbeing.

8.5.1 *Comforting: Feeling Connected to & Reminded of Others*

On a number of occasions, staff described how uses of the Spheres served as a positive activity for the women to engage in when they were feeling “*a little bit down*” (Staff-26), “*lonely*” (Staff-38), were “*missing family*” (Staff-44), and wanted to feel connected to important people in their lives. For example, Staff-44 recounted a memory of Janet using her Identity Sphere: “*(...) she said she liked to look at it, it made her feel happy, made her feel that she wasn't on her own (...) with the ball she also said she was, she would sit in her room and feel close to something*”. Confirming such remarks by the staff, Alex too described her experiences of using her Identity Sphere as follows: “*I've been upset this morning so put my family one on and looked at my family, it just cheered me up*”.

However, there was also evidence that such uses of the Spheres for promoting a sense of connection to significant others were linked to feelings of sadness. Staff-14 recounted an experiences of Kim: “*I remember Kim saying one night, she was on her ball, and she was saying it was upsetting her, because she was, it was making her think more about her family and she was thinking about her brother, and she got quite, like choked up in there, but it was Staff-26 that was with her that night*”. Staff-14 added: “*She was down at the time, and probably thinking of her family, but said it's making her worse.*” During our interview in week 4, Kim confirmed about her use of the artefacts that: “*Sometimes it makes me sad, sometimes it makes me happy.*”; but overall she described her experiences with it as “*positive*”, explaining that what she liked most about her Spheres is that: “*They remind me of my brother*” and that she uses them: “*Because I want to remind me of my brother.*”

8.5.2 *Stimulation*

The ward staff further reported how they offered and how, at times, the women also requested to make use of their Spheres when they were bored, or wanted to be stimulated and kept busy. About Lucy, Staff-22 (event card): “*Lucy was offered the item as she was bored. Engaged with the purse, happy. And laughing willing to show to others*”. Similarly, Sally once explained to me how she had a play with her Identity Sphere while she was (for a long period) in the high dependency (HD) area. Referring to the same instance, Staff-53 wrote how “*Sally was in a good mood when she asked for her purse she wanted to listen to the music on it.*” (event card); During our interview, Staff-29 further explained about Sally: “*But then again, she is in HD isn't she, and not really got much to do, so I suppose [it's] something to do, right?*”

Moreover, the ward staff frequently described how Alex was making use of her Spheres, when she was in a “*good mood*” (Staff-45) and “*feeling relaxed*” (Staff-47); and to have enjoyed

to spend time with the artefacts by herself in her bedroom. Staff repeatedly noted in diary entries how Alex used her Spheres to have *“Thinking experience, time to think”*; a *“Calming experience”*; and *“me time”*. In addition, on one occasion, Alex herself also mentioned to me about her motivation for using her Spheres: *“I like to keep myself busy”*. In other words, some of the women occasionally utilised their Spheres deliberately for selfentertainment purposes, when bored and lacking stimulation, and to have a bit more time and space for themselves (away from others).

8.5.3 Biofeedback for Relaxation vs. Mindfulness or Self-Regulation

Observations of how the women were using their Mindfulness Spheres were mostly linked to acts of ‘show-and-tell’; and experiences of comfort, calm and relaxation. Regarding the Mindfulness Spheres, some of the women for example reported how using their Spheres felt relaxing and at times helped them to get to sleep. Lucy for instance said: *“It’s relaxing as well before you go to bed”*. Sally explained about this aspect of using her Mindfulness Sphere: *“It relaxes you, doesn’t it”* and that *“It sends me to sleep a lot. I like the lights. It reminds me when I was little, and the lights you can get”*.

Little evidence however was given for uses of the Mindfulness Spheres in the practice of mindfulness, or for utilising its biofeedback functionality for self-regulation of arousal. When I asked the women about how they interacted with this Sphere, they frequently expressed how they *“just look at it”* (Kim) or *“look at [the] lights”* (Janet) to see their colours change, and to observe the little plastic charms and beads at the inside. Sally for example described her use as: *“Yeah, I like looking at it. I’m just staring at it. I don’t know why.”* When I asked if she had noticed that her Mindfulness Sphere changes colours over time, Sally remembered and could correctly recall all the colours and the sequences in which they appeared, which was indicating that she had brought at least some focused attention to the visual feedback of the artefact. During my interviews with Alex, she further described two slightly different uses of her Mindfulness Spheres; her first depiction closely related to some of the instructions and guidance that was given to the women as part of the group-based mindfulness activity by the Local Investigator:

“My way is, I put it on my knee, well I can’t do it because my knee is sore, put it on my knee, put it on there and then I close my eyes and wait for the light to flash, I can’t see the light flashing anywhere ‘cause my eyes are closed, I give it a couple of seconds for it to flash and there it is. And then I just look at the crystals, the things that I’ve made in it, I look

at them and just wait for the colours to change. There are all different sort of stuff that's in it, what I made."

In addition, Alex also described how she used to count her heartbeats when the lights inside the Mindfulness Sphere were flashing, and how she used this Sphere to help her with a certain breathing exercises: *"Well, I have it on my bed and then put that on my hands and then I just take deep breath in and take it out through my nose and do it for a couple of seconds, do it again, and out through my nose."* However, I believe that this use of the Sphere as an adjunct in the conduct of breathing exercises may have been prompted by some of the ward staff, who had predicted that a focus on the rhythmic visualised heart rate could help the women focus on their breathing, and help them to *"become more you know like settled in yourself and start thinking a bit more clearly"* (Staff-45).

Although the wards staff were generally very positive about the biofeedback functionality of the Mindfulness Sphere (e.g. Staff-42: *"(...) they can actually see their own heartbeat reducing, they can see the effect of the state that they are in, what affect it is having on them physically, 'cause sometimes they don't really recognise what, the state, what effect it is having on their body, and they are that aroused"*), its potential use for self-regulation remained under-explored. Only on a few occasions there were reports of, and about, the women noticing and pointing out changes in the frequency of their heart rate (i.e. Alex: *"It's going a bit faster now."*; Staff-48 about Janet: *"She'd come out with it, in her hand, and say that's me heartbeat when it was beating, and she said 'It's fast isn't it?' and then she watched it go slower. So she was telling me what her heart was doing."*); and only Kim was described to have been motivated to use her Sphere as *"a way of monitoring and managing her, 'cause she can, trying to get it to slow down"* (Staff-07).

8.6 Coping with Distress (in Crisis)

Another commonly observed use of the Spheres related to staff prompting and directing the women to use their Spheres as a means for coping when they were unsettled or appeared anxious or angry. However members of staff's efforts in this regard were often unsuccessful, as the women typically declined or were unable to engage with the Spheres in those difficult moments. Nevertheless, the ward staff also reported on a number of cases in which some of the women (e.g. Zoe, Alex, Sally and Janet) made use of their artefacts when they experienced distress. In this context, staff and the women described how the Spheres distracted the women from troublesome thoughts or feelings, and helped them settle when feeling upset, nervous or

stressed. This led staff to appreciate the Spheres as an additional, albeit more personal and less medical tool in their repertoire of coping strategies to offer to the women.

8.6.1 Staff Expectations, Hopes & Practices around Coping in Crisis

For the majority of the staff that I spoke to, the Spheres presented something that they felt the women *“could engage with at times when they felt upset”* (Staff-38), regarding the artefacts as useful and *“a good help when people have been having more unsettled days rather than settled days”* (Staff-43). As part of their diary entries, staff often explained their hopes of the artefacts *“to have a beneficial effect”*, to create *“positive thoughts/ brighten her mood”*, to have a *“calming influence”*, or to *“make her feel at ease”*. Having been hopeful that the Spheres would have positive effects on the women, staff frequently suggested their use at times when the women were having difficulties to settle. In responding to a question about when she had suggested uses of the Spheres to the women, Staff-42 explained: *“Yeah, mainly if, if they were feeling low or having a bit of trouble like settling, I think that was when it was suggested mostly”*. Staff-22 elaborated on this in relation to Lucy: *“(…) and then mainly, with Lucy, is the main one that we’ve offered it with, because she’s probably the one who had most difficulties, you know, a more difficult time in the past four weeks.”*

However, attempts to promote the use of the Spheres when the women were anxious, unsettled or going towards crisis, were often described as unsuccessful, either because the women were unwilling or unable to engage with the artefacts. Thus, staff explained how they had to make use of *“quite a lot of encouragement”* (Staff-52) to get the women to engage with their artefacts, which was not always well received. Staff-07 described for instance: *“I’ve tried to, if people have been in a bad place to offer access to, to the objects as one of the strategies, but it hasn’t always been well received. Sally has often said ‘no’ and Lucy once threw the purse at me [laughs], but, she didn’t want to use it, but, yeah…”*.

Even when the women engaged with the Spheres when they were unsettled, their use of them for managing their distressed state was not always successful. For example, one staff member wrote about Sally using her Identity Sphere when she was angry (diary entry): *“confrontation with staff Sally threw her stickers on the floor due to her agitated behaviour”*. On a different occasion, Staff-46 also noted about Lucy (event card): *“When Lucy became unsettled all objects offered to use as a coping skill – Lucy refused said had used it in day but never worked – advised Lucy to try and use her object but Lucy refused”*. When asked about their assumptions as to why the women were often unwilling to engage with their Spheres when unsettled, members

of staff concluded that the Spheres may not be suitable for high levels of distress. For example, in relation to the Identity Spheres, Staff-07 explained:

“Sometimes I think it's 'cause they got past the point of being able to engage with anything in particular, [name of woman] didn't use it until after she got herself to a bit of a better place already through using the other stuff, she hadn't taken any med, but she had had some staff support, she had all the temptations of clothing removed, which kinda got her into a safe space where she could give some attention to that [Identity Sphere], 'cause when she was sat in her cloth she was busy trying to tear them and get bits off, or, scratch your face and whatever it might be, so when she was in that zone, none of the, I don't think anything would have, she needed staff support, that's what she needed, but once she kinda got a little bit past that, it became something that she could have safely that might help”.

Staff also described their difficulty in finding the “right time” (Staff-29) and identifying a sensitive way to recommend the Spheres to the women, without such uses being “forced upon them” (Staff-09). For example, Staff-29 said:

“I think they definitely seem to get more out of the actual creative side of it [the project] rather than the [Spheres], but whether that's because we aren't necessarily encouraging them often enough, or at the right time, so I don't know what it was, you, you don't want us re-encourage them to do it when they really did lost it, 'cause [laughs] you gonna definitely get one launched at you, maybe if we can see that they need distracting now that's, that's probably the best time to be suggesting it, but then again, if you are that bit too soon and that bit too late they will just... [Anja: “It's hard to find the right moment.”] Yeah. That's the hardest thing”.

Overall, refusals of, and less successful engagements with, the Spheres for emotional coping and the prevention of incidents, led to a sense of disappointment in the staff that the women “don't seem to be getting as much benefit out of it as we'd hoped” (Staff-26). In expressing his disappointment Staff-07 added: “I don't think they've used them as much as I perhaps thought they might, or hoped they would, but I can, when they have used them, like Zoe yesterday, it was, I can see it being helpful, yeah.” However, other staff members offered a subtly different perspective on the nature and levels of use of the Spheres. Staff-05 shared:

“I think to be honest with you, it probably worked as well as I'd hoped it done, you know, it is obviously frustrating if, if the use hasn't been as much, but again, I'd have been

absolutely amazed if people been using daily and on every occasion, it doesn't really happen [laughs] unfortunately, but I think it's been a success and I certainly think there's scope to continue using them and have the resources available to, to carry on really (...)"

The disappointment of some of the ward staff that the Spheres had not been used as frequently or successfully, especially when the women were distressed, indicated an underlying wish for a coping strategy that works in these most difficult moments. This became further apparent in conversations with some of the staff during one of my visits to the LSU, who explained that use of the Spheres as a means for coping *"has a double-sided effect in that it helps staff cope better, because they can help the women in their coping"* (Staff-45).

Expanding on this Staff-44 added:

"It's like, yeah, it's good for us guys as a staff team because it's like, they've got xBoxes and the clients have got xBoxes, televisions, iPods, things like that, but 'this' is another coping strategy as it, but it's very personal, they can look at their family, they can look at their dog, their animals, their friends, the ball lights up, you know, so it is, it's good for staff as well to sort of be able to say, you know, 'C'mon shall we go to your room and you can perhaps use it and chill, relax', yeah."

Moreover, through my conversations with different wards' staff, who would interpret and compare the Spheres in relation to other tools that they commonly used to support the women when they were going towards crisis, I came to understand that the use of coping strategies was a common practice on the hospital wards and a concept that both the staff and the women appeared to be very familiar with. Section 8.6.3 below expands on staff's descriptions and evaluations of the Spheres a tool for coping.

8.6.2 Use for Self-Distraction & Calm

In this section I present some of the examples where uses of the Spheres were described by the women or ward staff to have been successful in distracting the women from troublesome thoughts and feelings. Staff-11 for instance described Zoe and her use of her Identity Sphere:

"But did you, I did use the purse as something that is redirection for one of the girls, who was, she was upset because of, you know, one reason that had to do with her family and things like that, and I said, well we get your purse and, you know, and we sit down together, and I held it, so she didn't have the opportunity then to throw it, and she flashed the, you know, the thing underneath to set it off, and she had a smile on her face as she was looking

at the pictures and was listening into the music, which you know, is really good, you know, at re-directing her mood."

In this regard, staff described how the Spheres offered the women a means for distraction by breaking cycles of disruptive thoughts and in giving them something else to focus on. In talking about Janet, Staff-48 explained: *"I think it occupies the mind, it takes her mind off whatever is upsetting them or whatever they are feeling, it just takes their minds away from that and helps them get through maybe an hours period or whatever to focus on something else"*. Staff members were particularly appreciative of the Identity Sphere videos and their potential to help get the women *"out of the glue"* (Staff-26); even if they engaged with the artefacts only for a short period of time. Staff-29 for example explained: *"(...) if you can think of something to distract her, and that is a good way, because even if they only use it for 5 minutes if that, it's just, it's just interrupted them thoughts that was harming them in the first place."*

As a result, staff frequently reported how uses of both the Identity and Mindfulness Spheres had helped the women settle. For example, Staff-43 noted about Lucy how was *"presenting as unsettled and disruptive to other peers. Asked to spend time in the HDU [high dependency unit] which she did without issue, and asked for her purse."*; And that: *"Lucy sat in the HDU watching videos and listening to her purse. She had it for 90 minutes and use it whenever she wanted it. She said later that it helped her"* (event card). On a different occasion, Staff-22 wrote how using the Spheres helped Zoe to settle (event card): *"Zoe was prompted to use her objects after feeling low – was being nursed on level 3 supervision in her bedroom. Zoe listen to her music app watched the ball change colours in the dark. Zoe settled returned back to communal lounge started to interact with peers and staff"*.

As a result, staff observed, and the women described, how the women had turned to their Spheres, in particular their Identity and Mindfulness Spheres, at times when they were feeling *"upset"* or *"anxious"* (e.g. Janet), wanted to be *"cheered up"* (e.g. Alex), or felt *"stressed"* (e.g. Zoe). In one case staff had reported that Sally requested to use her Spheres when she was angry. When I asked her about this instance, she explained that she wanted to use it when she was *"really pissed off"* and that she believed that *"looking at the pictures of my grand-dad and that would have calmed me down"*.

Moreover, in particular Alex was frequently described in diary entries by the staff to have used her Spheres to *"de-stress"* and to be *"focusing on things (positive)"* when she was

worried for instance about her CPA meetings³¹ and to escape unsettling dynamics on the flat (e.g. *“Alex used her ball and her purse to relax her as flat dynamics were bad”*). That unsettling flat dynamics can feel very uncomfortable is something that I too came to experience quite vividly during one of my ward visits, when I came to witness how one of the women appeared visibly troubled, was kicking against furniture, pounded loudly against the walls, and was crying and screaming from distress. In this moment I further noticed how her behaviour was causing a large drop in the mood of the other women, who would increasingly become upset and show signs of nervousness, starting to bite their nails or staring at their feet. To escape such like situations, Alex for example was frequently observed by the staff to go and *“shut herself away”* in her bedroom to use her Spheres when the *“flat dynamics are annoying her, and it might just chill her out that bit”* (Staff-29).

Furthermore, and although the women reported to have only at times, if at all, worn their bracelets, staff reported two instances where they had seen the women holding onto and playing with their beads upon showing signs of nervousness. About Sally, Staff-38 said: *“(…) Sally, oh she used her bracelet and she played with the beads on her wrist, I think one the peers was unsettled and I just noticed at the time that she was twitteling, twitteling with it, so”*. About Janet, Staff-48 recounted: *“I’ve seen holding her beads, yeah, when, but I think it was nerves, I think a lot with Janet, because she’s had this move [to low secure], this transfer, and I think when she first came here, it was nerves more than, and maybe they alter with the nerves maybe it settled her down and, you know”*.

8.6.3 Spheres for Coping: Unlike Other, More ‘Hospitally’ Things

Although uses of the Spheres were not always successful for coping with distress, staff came to regard them as an *“extra coping strategy”* (Staff-43) and an addition to their existing *“tools in the toolbox”* (Staff-07) of things to offer the women for this purpose. When I asked them about the kinds of tools, strategies or approaches that staff would commonly suggest for supporting the women, they mentioned techniques that these involved ‘distraction’ and ‘talking’, as well as more ‘individual tools’. Staff listed examples of distraction tools such as *listening to music, watching TV or DVD, playing computer games* as well as engaging the women in art work, or providing them space to settle (e.g. time in quiet room, HD or seclusion area). Staff also explained how they frequently employed talking techniques, whereby staff attempt engaging the women in conversations about their difficulties or feelings. However, this process

³¹ CPA stands for Care Programme Approach, which are regular meetings whereby the women’s mental health needs and their care plan are assessed and reviewed by mental health care professionals. [Last retrieved 29.04.2014 from <http://www.nhs.uk/CarersDirect/guide/mental-health/Pages/care-programme-approach.aspx>]

was often described to be very difficult if a woman was in a particularly troubled state of mind. Staff-45 explained: “(...) *they don't want to engage, they've learnt over the years not to engage, 'cause they don't realise what the problem is. It's only when you start engaging, and talking, then you maybe may even notice, to solve whatever the issues are at the time*”.

Moreover, this process around engaging the women in talking was described to not get assisted by supplementary tools, with exception of occasional uses of pen-and-paper (e.g. to write down pros and cons of a certain behaviour to assist the women in analysing their situation). In addition, staff frequently suggested to the women to make use of their individual coping techniques, which included diary writing; cuddling with soft toys (e.g. Zoe); the flicking of an elastic band worn on the wrist to manage impulses of self-harm; sitting and bouncing on an exercise ball to de-stress (e.g. Kim); as well as activities such as word searches and colouring (e.g. Lucy); or needle work and the completion of jigsaws (e.g. Alex, Janet).

When I asked staff to explain how the Spheres compare to existing coping tools or strategies, they valued the Identity Spheres in particular as they were interactive, offered the women “*a selection*” (Staff-15) of content to choose from, had high sentimental value, and had the potential to stimulate a wide range of senses due to their multi-modal format that combined imagery with video and music. Moreover, the Spheres were described by staff as being *unique* and very *different* to anything that the women had ever used before, including the Calming Spheres (e.g. Staff-43: “*Whereas they've had bracelets before, but they've never had their own videos*”). However, staff expressed concern that the videos could lose their stimulating appeal over time, as their novelty decreases. Staff-29 explained:

“It has changed them while they were doing it, but whether that, whether it will last or whether they just get bored when you go, I don't know, because their attention span is not really that, it's gonna be quite, you know, stimulating hasn't it, and I suppose, after a while they might, once they've seen the video, I don't know how many times, they might think, it's like reading a book, you can only read it so many times”.

Whilst the Identity Spheres were generally acknowledged for their potential to stimulate, the Mindfulness Spheres were appreciated most for their potential to support relaxation. Staff-42 said: “*The Sphere I'd say was more relaxing because obviously if they get hold, if they are holding it they can see their heartbeat going, and they change their lights and they've got all the different things that they have made inside it, they are personal to them (...)*”.

Some of the staff further raised additional uses of the Spheres that related to the talking techniques, explained how the artefacts could act as “*an ice breaker*” in helping staff to find a

way in to having conversations with the women and “to break down the barrier to having that therapeutic relationship” (Staff-45). Offering the women, through the Spheres, something to focus was found to take pressure away from the women to have to talk about their difficulties (e.g. Staff-43: “They don’t have to explain themselves”).

Staff also emphasised how the personalised design of the Spheres “added value” and made the artefacts very distinct from each other, and not examples of the sort of “hospitally” (Staff-07) one-size-fits-all things that typically exists in the environment and are often imposed on the women. Staff-53 articulated her understanding of the Spheres as follows:

"I think it is about making a design in personal objects to promote your own wellbeing and its, it feels like it, it's like a responsible way of coping rather than stuff that we've done to people, I know the idea was yours, but quite often in hospital, things get done to people and we end up with a bit of a, a one size fits all, so people go on aggression management and it's a group, and it's, it's not necessarily not individual but these feel like a really personal way of keeping yourself well, that's transferable, whether you are living in hospital or a group home, in your own flat."

Moreover, some of the staff acknowledged the potential of the Spheres to promote the development and practice of more specific therapeutic skills such as mindfulness, distinguishing them from any of the other existing tools. Staff-05 shared about the Spheres:

"(...) they are all kind of 'things' aren't they to use to de-escalate, but I suppose, again, it's a bit, all that's more distraction isn't it rather than this, this is slightly, well it is significantly different I think in that you are developing a skill isn't it in that you try to become more mindful, so again, I think you kind of got a niche thing going on here, that we don't really have any, apart from the talking thing (...)."

The Spheres were valued for having been portable, thereby “easy to carry” (Staff-15) and “transferable” (Staff-53) when the women move on from the hospital wards; they were evaluated to have been “accessible” (Staff-26) and appropriate for their age group; and to have been fairly robust and safe to use, which is a moderating factor in their acceptance and application as a means for coping (see Section 8.7.4.1).

8.7 Inter-Personal Differences in Understanding and Use

While I previously described how the women made use of their Spheres, this section expands on some of the differences in how individual women engaged with their Spheres. These were

informed by variations in the women's personal interests; how they were able to make sense of the Spheres; their mental health at the time that engagements were possible, desirable or proposed; and their access to the Spheres, which was moderated according to the safety of the artefacts in relation to personal risk assessments that were conducted for each woman.

8.7.1 Personality and Individual Interests

Variations in the use of the Spheres were partly associated with inter-personal differences in the personality characteristics and interests of each woman. For example, whilst some of the women proudly showed their artefacts, and the videos they had incorporated, to all available staff and peers (e.g. Sally, Kim), others (e.g. Zoe, Alex or Janet), who either described themselves or were described by the staff as being more private or shy, would show them only to a subset of the staff. For example, Staff-26 explained that: *"(...) some are more private than others, do you know what I mean, it's like Kim, Kim she has no problem, she will get it out and she will show you and she would tell you all about it, but, I don't know. I suppose it depends on the individual client."* In contrast, Staff-22 shared about Zoe showing her Calming Sphere:

"Zoe has to, you know, has to have, has to know you before she'd opened up and (...) ...trust issue with Zoe. If you see her with, if you see her with people that she feels comfortable with, she's totally different."

Moreover, one of the woman in particular, was frequently described by the ward staff to have been very impatient, significantly more so than the other women, and therefore tended to quickly lose interest to engage with anything in particular. Staff-15 described:

"I think [name of woman] who does enjoy looking at her video, but I think she just gets very very bored with anything very very quickly, we are talking about when they are playing sports, she just, it's just so much lethargy, I don't want to say lazy, but she's very very lethargic, (...) if she had an unlimited credit card, she'd get very very fed up very quickly spending money on that, you know, which would be unusual for a young girl, so I think she, she's very specifically different."

The women further differed in the extent to which they showed interest in the Spheres or needed to be encouraged to engage with them. While some of the women (Sally, Alex, Kim) needed little or no encouragement (e.g. Staff-43 about Sally: *"(...) she'll never, she's never refused to use it, when I've asked her"*; Staff-11: *"(...) But Alex is, is absolutely fantastic, I mean she will, and she loves it"*), others (Lucy, Zoe, Janet) were found to be more difficult to engage, or to require more direction and support in using their Spheres. For example, Staff-29 described how

one of women: “[name of woman] has never asked me, when we have asked her she just said ‘no, don’t wanna do it’. (...) it might help [name of woman] more, if she’d use it, but you’d have to really bully her around to doing it, she just doesn’t, she just can’t be bothered I don’t think, and yet if she would, she might get some benefit out of it.”

Uses of the Spheres were also found to compete with other interests of the women, who were reported to have, at times, preferred to instead watch TV (e.g. Alex); play cards (e.g. Sally); or favoured one-on-one support and wanted to relax (e.g. Kim). Interestingly, whether the women were interested in using their Spheres further depended on the outcomes they anticipated of their interaction. For example, one of the women was described to like to show off and to ‘feel important’. Thus, while she initially engaged a lot in acts of ‘show-and-tell’ with her Spheres, she was likely to lose interest in the artefacts if engaging in another activity or behaviour enabled her to feel special or distinct from the others. Staff-29 said: “(...) she tends to be more into her keyboard at the moment, does [name of woman], ‘cause it makes her feel quite important I think if she’s typing, nobody else has one at the moment, it’s a bit about that with [name of woman], yeah, she asked, she likes to be a bit different, and a bit special I think...”

As described earlier about limitations in privacy and the extent to which the women have control over their situation, staff conjectured about one case where a woman rejected the use of her Spheres and stated that her videos would trigger negative memories, and that this may have reflected an attempt to exercise control over what she wanted and did not want to do. Staff-05 explained:

“I think, it’s, I don’t know why, it’s hard for me to say ‘it was an excuse’, but, she was kind of saying ‘oh, well it brings back bad memories’ and, you know, about the videos and things like that. I think she put a song on something as well, and she was saying that ‘when I picked that song I was in a really in a good place’, but now if, you know what I mean, I’m in a bad place that song brings different memories for me and, but, which is possible, you know, quite possible, there was from knowledge, there was this sense that it was just kind of, lost interest now really, and it’s like ‘I’ve picked that excuse’.”

8.7.2 Understanding of Therapeutic Uses of the Spheres

While the women generally demonstrated a good practical understanding of how their Spheres worked, the women’s understanding of their use in relation to more therapy-focused activities was limited. In conversations with staff, they explained this by the way in which the artefacts were introduced to the women and into the service, as well as difficulties related to a deficit in

pre-existing knowledge about Dialectical Behavioural Therapy (DBT) and related skills practices. Moreover, how the women made sense of their Spheres was also informed by staff's understanding of the Spheres and how they suggested uses of them to the women as it was demonstrated in Section 8.6.1. I expand on this in Section 8.8.1.1.

After the first deployment week, when I focused the majority of my efforts on practical challenges such as making arrangements with the staff for the charging, maintenance and safe storage of the Spheres and introducing the women to the functionality of the two digital artefacts, I then showed and practiced with the women how they can use their spheres for specific therapeutic practices such as mindfulness. However, this process of teaching the women more therapeutic activities involving their Spheres proved difficult to achieve in the few sessions that I had with each of them during the relatively short time span of the project, and this was further complicated by a general lack of pre-existing knowledge and practices of DBT by both the women and the ward staff.

Moreover, in the context of how the women were introduced to their Spheres, some of the staff criticised that the transition from the creative sessions, where the women were intensely supported by the Research Nurse and me, to possessing the objects and understanding their purpose, as a transition that was too demanding and one that was difficult for the women to manage without much more guidance and support. Staff-09 shared:

"I think, also the girls sort of went from having all this one-to-one time creating them to 'Right, I've got them in my room, right, what am I going to do with them now?' you know, it took a while for them to settle down and then, you know, right 'there it is and this is what it's been used for', it could have like continued from the one-to-one basis, (...) and all of the sudden it's got a function on the flat, and, and it's learning what that function is, and you know, this is what you got to use it, and it's difficult trying to, you know, 'this is something that you can use at any time you want', you know, you can enjoy (...)"

Independent of the set-up and limited time scale of the Spheres project, some of the staff acknowledged that teaching the women how to make use of, and accept new tools or strategies for coping, can be challenging and time consuming. Staff-09 explained: *"(...) sometimes people that we supported, you know, for years you know, redirecting, redirecting people to things that they enjoy, knowing that it is a good coping strategy, they still don't want to do it, they don't you know, it takes time to realise"*. Another staff member, Staff-05, explained that therapeutic concepts such as mindfulness are still new to the women and needed a higher level of, and more continuous, practice: *"I suppose it's relatively a new term and again although Alex has done DBT*

hasn't she. I suppose she has some awareness of it, I suppose Sally wouldn't know, it was new to her, Kim again I don't think she's done much, so I suppose yeah, they are relatively new terms, it's gonna take a while for them to grasp isn't it".

The process of learning new therapy concepts or skills was further challenged by the difficulties some of the women had in concentrating on, processing and/or retaining new information, which related to their learning disability, and, following explanations by staff, differed considerably between the women.

8.7.3 Mental Health Problems

Interactions with their Spheres were further influenced by temporal variation in the mental health of the women, which impacted on their motivation and ability to engage with them. In particular, three of the women were described by staff to have had a more difficult period in terms of their mental health during the first four deployment weeks, which was reflected in the extent to which they used their Spheres.

For example, staff reported how one of the women had initially been very enthusiastic about her artefacts and made good use of them, but as her mental health declined due to difficulties associated with her move to a new ward environment, her level of engagement decreased and appeared less successful. For example, Staff-48 commented: *"I think it's just faced off a little bit as the week..., because I think she's had a little bit of an unsettled period, yesterday, she wasn't very well, so, I think if she did, she just didn't have the energy to do anything (...)"*. Staff-14 described the same woman: *"(...) I was over there the other night and she wasn't happy and I tried to focus her on that [the Sphere], and I think she was just gone beyond it."* In her interview with me at the end of the 4th deployment week, the same woman explained why she hadn't used her objects lately, saying that she: *"Didn't feel like it"*.

In addition to, and independent of, temporal declines in the women's mental health, more persistent mental health problems such as biases in the women's thought patterns were also found to have impacted on how the women were able to make sense of their Spheres and how they could be of value to them. About a different woman, Staff-43 for example said:

"I think with [name of woman], as well she just doesn't think of utilising coping skills that maybe we would think of using, like straightaway (...). So I don't think it's because of the nature of that items, the objects, or anything like that, I think it's just when she is in that frame of mind, or even just generally, even when she is in a good mood, she wouldn't even think of asking us for, for something, and to benefit her." Continuing her explanations, Staff-

43 added: *"I think, yeah, I don't think she has the capacity really to understand why she is really using it, like I think people can tell her and she would say she understands, but really I think she wouldn't, she wouldn't find that emotional site to it, that emotional connection"*.

The literature on people with borderline personality disorder (BPD) describes how the condition causes the individual difficulties in self-soothing arousal and to accept, or do, nice things for themselves. Similarly, about this same woman, Staff-09 explained how it can be difficult to engage her with the Spheres *"when she is in that frame of mind, isn't it? You know, she doesn't want to be distracted"* and *"Like I say, with [name of woman], you know, you can say it was positive the way she wants and she will do it for a few minutes and then it's like, 'No', you know, 'I don't want to be enjoying this', you know, 'I don't want to be calming down'"*.

Overall, staff acknowledged about the women that *"it's just unfortunate that they've got the challenging behaviours that they've got"* (Staff-22) and that this added a lot of complexity to facilitating and evaluating the women's engagements with their Spheres. Staff05, for example, recognised: *"I think you've got, had an exceptionally difficult service user group to try to do a project with, and I hope it hasn't toppled your research too much, I suppose there's issues around kind of motivation, and willingness, and just, I suppose just general kind of mental wellbeing really that can obviously impact on peoples willingness or readiness to kind of use those"*.

8.7.4 Artefact Safety in Relation to Individual Risk Behaviours

The women's engagements with their Spheres were further moderated by the extent to which they had access to their artefacts as was regulated by the general safety of the objects and the individual risk behaviours of each woman.

8.7.4.1 Perceived Safety and Risks of each Sphere

As with all materials or objects that were brought onto the MSU or LSU, staff were very cautious of potential safety risks involved in giving certain artefacts to the women. In terms of their safety, staff described the two digital Spheres as *"fairly robust"* (Staff-07) and *"low risk items"* (Staff-43), particularly when compared to other tools such as game consoles or CD players whose design does not restrict any access to batteries or their internal electronics. As a result, some of the staff considered the Identity Spheres to be potentially safe enough for the women to even access during moments of distress, or when they are in seclusion. Staff-07 shared about the Identity Sphere: *"For me, I would have said that, sometimes in a situation when their risks are high, and the girls can't have access to things that they might use to harm themselves or whatever,*

that is a positive thing, that they could say have like access to, I mean you can even give somebody that in seclusion."

Regarding the Mindfulness Sphere, staff appreciated that, as a solid object, it was something that the women *"couldn't really dismantle"* (Staff-22) or easily pick apart, yet, they were concerned about it being a *"fragile"* and *"quite heavy"* (Staff-40) object that could potentially be thrown at somebody. As a result, most of the staff explained that they would not *"risk"* (Staff-11) giving this Sphere to the women upon any signs of low mood or distress.

Explaining these safety concerns, Staff-29 spoke of the Mindfulness Spheres: *"(...) I do know one staff, one or two staff have said, well, flipping egg, if it's calming them down when they are anxious or angry, are we safe to be giving them, 'cause we've had televisions thrown at us and things, you know. You worry that, it's gonna get thrown back at you, if you give it them when they are angry, so we tend 'not' to offer it then"*.

Thus, and in part as a consequence of two of the women being regularly observed to have thrown their Identity Spheres when experiencing distress, staff tended to facilitate interactions with the Identity Spheres in preference to the more fragile, and thus risky, Mindfulness Spheres. In a diary entry, staff described an interaction with one woman and how they had: *"given her purse to utilise as she has been stressed and angry all day. Chose the purse as it may have been thrown in anger as [name of woman] is very volatile"*. During our interview, Staff-11 added: *"The girl in question was a little bit distressed, so 'why don't you use your purse, your Spheres of Wellbeing?', you know, we didn't want to bring the glass ball because she was already in the process of throwing things round the room, and said 'c'mon', you know, you'll enjoy this, get all your picture cards and they got thrown, everything got thrown on the floor."*

Nevertheless, staff had only minor concerns about handing the Mindfulness Spheres to the women when they were more settled. In terms of the biofeedback functionality of the artefact, and the opportunity for the women to notice changes in their arousal, some staff however expressed disappointment that the artefact was not safe enough for use when the women were highly aroused. Staff-42 shared:

"I think main negative for the ball, especially with regards to [name of woman], is, it can be used to see how aroused you are, but with her she would not sit there and look at it, she would just throw it, if you'd try giving it to her, if she was that aroused, were it would, you would be able to see it on the ball, she just throw it at you, so we haven't been giving it to her, because obviously we don't want her to break it. (...) obviously, she can use [it] while

she's settled and, but she's not really gonna see a difference in her heartbeat if we can't use it at a different time that's, that's what I'm trying to say".

The findings also indicated safety concerns regarding the Calming Sphere bracelets. Although these were assessed by a Safety Officer and the women's clinical care team to have been safe enough for them to use, some of the women (e.g. Zoe, Kim, Sally) had only restricted access to them as a result of individual assessments of their risk behaviours. For example, some of the women were known to try and insert small pieces into their body (e.g. under their eye-lids), or to break parts off for purposes of self-harm. The low-levels of wear of the women's bracelets can partly be ascribed to these safety concerns. Staff-29 explained:

"We don't often let them wear their bracelets, because we are afraid really that they might, you know, do things with beads, 'cause they've been, you know, I mean [name of women] inserts, she's inserted some things into her eye-lids, nothing from the, these objects but, she has to be really settled and even when you think she's settled, she's not always settled, you know what I mean? She can be really unpredictable and the least bit of the thinking trigger her off. I've not really seen any of them wearing the, the bracelets, but maybe that's because they have been a bit of a risk maybe to some of them at least, which is a shame, 'cause they are really nice, I'd buy one of them, if I saw it, I'd pay good money for them, they are really pretty aren't they?"

During our interviews with the women, they also frequently mentioned to me how they were not allowed access to their bracelets. For example, when I asked Kim if she had worn her bracelet, she responded (week 4): *"Not that I remember, 'cause I'm not allowed"*. In my interview with Zoe (week 4), she spoke of how she had worn the bracelet, yet she had to take it off at night for the ward staff to lock it away. Staff-22 too remembered this encounter with Zoe explaining: *"(...) we had to lock it up at night time, but she said 'Oh please let me keep it', but I said, 'Well no', because, you know, we, it has to be risk assessed and things like that, I said I put it on your bundle so you can have it tomorrow (...)"*. Despite potential risks associated with the bracelets, staff said that they tried *"not to restrict how long they were taken of them [the women]"* (Staff-38) and tried to allow the women to wear their bracelets as much as possible.

However, the safety concerns about the Calming Spheres by staff were legitimate, and were confirmed when one of the women indeed had once broken parts of her bracelet off, which staff ascribed to reasons of intentional self-harm. On an event card, Staff-22 noted about the woman in question: *"Found beans in a box, broken off piece (small of bracelet)"* and *"feel she had*

intentions to use these to self harm". During my interview with Staff-22, she further expressed: *"I'm disappointed with [name of woman], when we found her beads that she had broken, 'cause she, she is one of them that like, can make stuff and quite value things that she's made, so we were quite astonished that she had, you know what I mean, tried to, well, she had broken them aren't she"*. In my conversation with the woman in question, she herself explained to me, visibly embarrassed, how one of her beads had *"snapped"* on one of her bracelets, and asked for it to get repaired. And also another woman once approached me with a broken leather string during a visit explaining: *"Yeah, I fell over it, of the chair and it snapped it a bit"*. I repaired the Calming Sphere bracelets of the two women and brought back to them, or for safe custody by staff, within the same or following day.

8.7.4.2 Free vs. Restricted Access and Need to Request Spheres

Assessments of the women's risk behaviours were used to determine if they could freely access their Spheres. Whilst their Spheres were usually stored in their bedrooms, only two of the women had unrestricted access to them. All remaining women had either temporary access, or were fully restricted in their access and needed to ask staff for their artefacts, who had to unlock their cupboard and usually supervise their engagements with them (see Section 8.8.1.2). Unsurprisingly, restricted access to the Spheres was found to reduce opportunities for the women to interact with them. Staff-22 explained about Alex's frequent uses of the Spheres: *"Probably because she's got, she had access to it more than anybody else. Alex didn't have to involve anybody, did she, because she could just take it, herself off, if she were feeling low in mood, Alex can take herself to her bedroom and use it and say, well, I've done this or I've done that, where it's harder for the rest of them to access"*.

Requests by the women (under access restrictions) for their artefacts from staff were not frequent. While some of the staff recounted that *"Nobody, nobody has ever asked me for an object, nobody has ever done that"* (Staff-07), others witnessed how the women would ask on occasion for their objects. Staff-29 said of Sally: *"She will ask for it, if she sits in the lounge, but she will ask for it, so I think she is getting some benefit"*. Moreover, some of the staff acknowledged that it may not come easy for the women to approach them. About Janet, Staff45 said: *"She doesn't know how to approach staff to use it with her"*. Staff-22 explained how the women were aware that *"they can't access it as much"*, knowing that interactions would require individual staff support. However, whenever the women did approach staff, staff reported to have tried to facilitate their use as much as possible.

8.8 Staff Dynamics & Spheres Integration within Existing Hospital Services

If and how the women were able to use their Spheres was further informed by the complex, highly regimented and socially dynamic ward environment in which their engagements were situated. This included a number of challenges around the staff's understanding of newly introduced care concepts of DBT, and how the Spheres were conceptually linked to acceptance- and mindfulness-based activities. In addition, staff's ability and readiness to facilitate any interactions with the Spheres could be compromised in light of their general work commitments that, at their core, were focused on the safeguarding of the women and the organisation of their care. While staff came to evaluate the Spheres as a useful addition to existing services and described the project to fit well with the ethos and desired practices of person-centred care; DBT; and an integrated therapy model, attempts to integrate uses of the Spheres into existing ward activities or treatment services such as Occupational Therapy (OT) and Psychological Treatment Services (PTS) proved challenging.

8.8.1 Attending to a Hectic Ward vs. Attending to the Spheres

In conversations with staff about their overall impression of the project, they claimed to have liked it and explained how they valued the underlying concept, often describing it as a "*fabulous*" (Staff-52), "*excellent*" (Staff-40) and "*brilliant*" (Staff-47) idea. While staff's responses towards the Spheres generally reflected a sense of excitement, optimism and hope that the artefacts were beneficial to the women, there was also a sense of pressure to support engagements with the artefacts due to their awareness of the effort and investment that were made to set up and realise the project (which was also explicitly communicated top-down by the management). Moreover, staff were at times challenged by limitations in time and resources to facilitate the use of individual Spheres in the context of a ward environment that they described as often very hectic. Simultaneously, members of staff's primary concern had to be the safeguarding of the women and the organisation of their basic care. Staff-29 explained about the use of the Spheres: "*(...) maybe if we encouraged them more, but then again, it is basically at that time at night, we've got jobs on and, we try and rush everything, get everything done before the end of the shift and from that evenings tend to be the ones they have time to do it more, like I say, it's finding those times, keeping encouraging them.*"

8.8.1.1 Understanding of DBT and Related Practices by the Ward Staff

While members of the clinical care team of the women and in particular the managing ward staff came to evaluate the Spheres to fit well with the aspiration for a person-centred care model and the philosophy of DBT, DBT had only recently been introduced to the hospital services. As a result, a large amount of the ward staff on the MSU, more so than on the LSU where DBT had already a longer tradition, were not yet familiar with, or trained about this new therapy model. This considerably challenged their understanding of related therapeutic practices such as mindfulness. As Staff-05 explained:

“I suppose like, for example the DBT group is relatively new, just we are a little bit behind really, ideally we'd been doing it, using..., and I suppose aspects we've always done, so I think we are a bit behind in that (...) there is a bit of an absence in [harrumphs], excuse me, in the staff training. I think the staff, it's not completely alien to them, but if you'd ask to sort of give a detailed account [about mindfulness] then the majority of people probably just remember what it is.”

Whereas the ward staff were very familiar with common behaviour change skills such as the application of coping strategies during crisis situations (see Section 8.6.1), their understanding of mindfulness; how it can be cultivated; and its underlying focus on teaching the women acceptance skills, was less well developed. This made it more difficult for them to support and guide the women in the pursuit of acceptance- and mindfulness-based practices, either with or without any involvement of the Spheres.

Since DBT and associated practices were not yet fully integrated into the ward culture, introducing the staff team to new therapeutic concepts was considered a complex and longerterm process that was likely to extend what could be achieved in individual briefing sessions by me, and in the given time scale of this project. Nevertheless, to introduce staff to potential uses of the Spheres, I made personal contact with most of the ward staff and approached them with a range of information via different formats (e.g. information sheets, instruction booklets and leaflets) and channels (e.g. email, poster, showcase events). However, other work demands on staff, and the fact that there was no additional time allocation for staff member's facilitation of the use of the Spheres (e.g. by higher-level management) restricted how much attention they could give to the research and the provision of more detailed explanations to staff of therapeutic practices that would involve the Spheres.

As a result, staff mentioned during the interviews how their knowledge and understanding of the Spheres for more therapy-focused uses was limited. For example Staff11

described how the women used their Spheres: *"I think, especially with the girls that we have got, would be mainly to show people, you know, and talk about the Spheres of Wellbeing, and you know, the creative, you know, the creative behind it, how it's made, as a therapeutic thing I don't, I don't know how it'd work (...)"*. However, staff also acknowledged that challenging ward dynamics presented a number of difficulties for the conduct of any (research) project within this setting. Explaining why the introduction of the Spheres reflected a complex process, Staff43 shared: *"It could possibly to do with this environment though, hasn't it and, because it, it's quite a difficult environment to get someone from one-to-one, careful or not, on the flats sort of using it and understanding it, and all staff being aware of, being able to [know] how to do it, how to advise them, how to use it properly, and charge it properly"*.

8.8.1.2 Staff Ability and Readiness to Facilitating Interactions with the Spheres

Apart from challenges associated with teaching staff how they could promote more acceptance- or mindfulness-based activities with the Spheres, staff's attempts to facilitate uses of the Spheres by individual woman also proved, at times, to be a complex and not always feasible endeavour. Partly this was related to limited time and resources of the staff time, described by Staff-22 as: *"(...) I know the girls, they have to have it on a one-to-one basis with us at night, 'cause it's only me and Staff-14, and you know, and they are getting all their bits out, wires and stuff like that, you know, and we'd have to sit with them, so to do all five of them."*

Interactions with the Spheres also proved challenging if one or more of the women were unsettled, showed disruptive behaviours, or if an incident was occurring that demanded staff attention. Staff-47 explained why on some occasions the women could not make use of their Spheres: *"There just wasn't enough staff to facilitate, there was lots going on on the flat, staff were tied up, so they couldn't actually get that individual attention. We probably had to, level them from certain area and we couldn't, sort of, split them up to do personal things, if that makes sense?"*

Even at times when the ward environment was considered to be settled, to facilitate engagements with the Spheres was not always a straightforward process. For example, to unlock the transparent Perspex cupboard in the women's rooms (where most Spheres were kept), there was only one set of keys that was usually worn by one of the ward staff and shared between two hospital flats. Thus, to obtain these keys to access the artefacts was in itself at times problematic. For example, Zoe described to me in week 4 how she *"weren't allowed"* to show her Identity Sphere to her mum and dad during a visit: *"No, 'cause its locked behind my thing [the Perspex cupboard in her room]. There weren't enough staff on to take them out and*

stuff". When I asked if Zoe had asked staff, she asserted: *"I did ask, they said next time maybe, when there are enough staff"*.

How even the smallest undertakings could present a difficulty, particularly if they conflicted with already existing work routines, became further apparent in relation to the charging of the Spheres. To save energy all electric appliances locked inside the women's Perspex cupboard were by default switched-off overnight, and sometimes were left switched off for a couple of days at a time, using a general switch on the power socket. While a lack of power supply did not affect TV or stereo appliances, for the Spheres it could mean that they were not sufficiently charged to function when the women desired to use them, that is, until re-charged and re-set. During my visits to the hospital, particularly during the weeks of the follow-up assessment (weeks 5-15), I often found that some of the Spheres had been left uncharged for longer periods of time (this was also captured in the log data of the artefacts). In practice, any such additional tasks or responsibilities that required staff's attention and support were at a risk of being perceived by some of the staff as a non-essential, additional burden. For example, Staff-22 explained:

"(...) to me it should have been their [the women's] responsibility, you know, the charging, you know, making it that it's been charged 24 whatever, you know, overnight, and that should have been their responsibility I think. But because a lot of them couldn't have access to it [the Spheres] in the room you see, so they've got put in, in the Clinic room, the laundry room, some behind the Perspex, where then it's like person-centred to them, then maybe that's mine and that's my responsibility, where a lot of the responsibility got put on to us".

Regardless of whether staff were technically able to facilitate any engagements with the Spheres, their readiness and degree to which they felt comfortable to take any risks by handing out, in particular, the Mindfulness Spheres to the women was found to vary amongst them. Whereas some of the staff could be described as more risk averse, others appeared more open to considering that *"it might be ... a risk worth taking"* (Staff-07) and had a greater expectation of positive outcomes. For example, Staff-15 acknowledged: *"(...) because the truth is, nobody has [had] anything thrown at them, nobody's smashed them, not so say it won't happen, but if somebody wants to throw one big heavy object, you know, it's plenty of big heavy objects in the rooms that they could throw anyway (...)"*. This reflects some of the realities of everyday life on the ward, whereby the women were known to be able to identify different avenues and materials that they could use for self-harm, if they had that intention. Adding her perspective

about the risk behaviours of one of the women, Staff-38 explained: *"It [pieces of the Spheres] wouldn't cause her any great harm 'cause she'd shuff it in her eye or whatever and stuff, it's not that she'd kill herself or anything with it."*

8.8.1.3 Difficulties in Attending to the Research Activities

In addition to challenges around staff availability and their attentiveness to information about potential uses of, and their propensity to facilitate engagements with the Spheres, on many occasions staff mentioned difficulties in finding the time to document any observations they made of the women during or at the end of often busy, tiring and very long shifts (up to 13 hours). Thus, during our interviews, they explained to me how they preferred the event cards above the diaries, as they were easier and quicker to complete. Although staff expressed a desire to contribute to the research, they felt that long and detailed accounts of their observations, were *"overwhelming"* (Staff-38), *"frustrating"* and *"hard work"* (Staff-09). Staff described how they forgot to fill in the diaries and their difficulties recalling specifics of the events later in the day. In addition to these more practical issues, some staff further described to me their feelings of uncertainty about the expressing of their personal opinions and assumptions about the women's experiences, which stands in contrast to the more factual presentations required for instance in their completion of clinical care notes about the women. This was also related to general difficulties they had in making sense of the actions and experiences of the women. For example, Staff-29 explained about completing the diary: *"And lots of the questions were 'why do you think they...', well it's like reading their minds, we just, you just don't know 'cause you might be, what I think might not necessarily be right, it might be completely wrong"*.

8.8.2 External Research Pilot vs. Integration into Existing Services

When I explored in conversations with the ward staff how more frequent and sustained uses of the Spheres could be enabled, the importance of having a 'champion' in place to facilitate and regularly support the women in using their Spheres was highlighted as well as the need to more closely integrate Spheres-related activities into existing hospital services.

8.8.2.1 Need for Local Champion to Encourage and Facilitate Engagements

When I asked staff for their assumptions as to why the women may have disengaged with their Spheres over time and their propositions for more sustained uses, many highlighted the need for a facilitator to champion the artefacts and their use. Many staff suggested that somebody

like the Research Nurse or myself, was needed to promote and continue activities around uses of the Sphere and to enable regular skills practice. For example, Staff-11 explained:

"I don't know, it's almost like they've lost interest, you know, they don't have somebody there, who's specifically there for the Spheres of Wellbeing, or like yourself and [Research Nurse], who were like heavily, you know, you were, are the [role] of Spheres of Wellbeing and so, I mean, you say 'C'mon let's have a look at your ball and things', they just, you know, it's difficult to get them to engage".

Not only had the ward staff identified that both the Research Nurse and myself served as key enablers in motivating the women to engage with their Spheres, the women also approached me on many occasions, asking for continued engagement. In week 1, Kim for instance enquired: *"So when are we gonna get them out with you again?"* Moreover, when I asked the women at the end of the 15-week deployment how I could support them in using the artefacts more, Alex suggested: *"Persuade us!"*, and to get the staff to also persuade them; which Kim expressed agreement with, asserting that the staff *"should offer you to, like, use them"*.

8.8.2.2 Need for Integration into Existing Hospital Services

The previous section highlighted the need for *"staff buy-in"* (Staff-05) and potentially a ward 'champion' to enable more frequent and sustained uses of the Spheres. In addition, this section presents some of the difficulties that were identified in the way that this research was introduced into the low and medium secure services. While the Spheres project arose out of my collaboration with hospital staff, it was presented as an external pilot study that lacked integration with existing care and management practices.

By way of example, the co-creative process with the women was led and conducted primarily by me and was supported by the Research Nurse without any involvement of members of, for instance, the Occupational Therapy (OT) team, who would be natural candidates to take on and continue these creative engagements. Although the ward staff continuously expressed how much they valued the positive outcomes of the creative activities for the women; evaluated these to fit well with their ethos of person-centred care and an integrated therapy model³³; and suggested continuation (e.g. to add-on new videos to the

³³

Integrated therapy in this context refers to the combination of different therapy services such as Occupational Therapy, Psychological Treatment Services, Speech and Language Therapy and other specialist service to provide more holistic care through tailored treatments targeted at supporting the unique needs and to address the specific problems of each woman.[Last retrieved 23.05.2014 from <http://ukonlinecounselling.com/integrative-therapy>]

women's Identity Spheres) and long-term adoption; attempts to translate and incorporate the creative activities in existing services such as OT revealed a number of challenges. In conversations with two leading OT staff responsible for the women on the MSU, they raised (amongst others) a number of safety concerns about the conduct and supervision of the creative activities that (as described in Chapter 6) involved a multitude of materials, many of which could potentially be of danger to the women, particularly within a group-based format. They further explained that their activities were usually restricted to a one-hour format (including pre- and post-session preparation and reporting), thereby significantly limiting the scope for longer or more complex engagements. They also expressed worries about the time demands of additional training that would be needed to become more familiar with new 'making' techniques that also involved the use of technology (e.g. for the creation of stopmotion videos). In other words, in their current format and existing work practices appeared to offer little opportunity for the modifications that would be required to incorporate many of the activities into future service provision.

In exploring opportunities as to how uses of the Spheres could be incorporated into existing ward activities in a more integrated manner, many staff suggested embedding, in particular, the Mindfulness Spheres into a regular group-based relaxation activity for the women as this would set aside time for them to facilitate and supervise the engagement. Yet, while staff and the women generally liked the idea of group-based activities around the Spheres, within the scope of this deployment, such practices were restricted due to some of the dynamics that were created when one of the women (Janet) moved on to the LSU. The move left both her – as the only woman in her services owning Spheres – as well as the newly admitted woman on the MSU, who did not possess any of the artefacts, in an isolated position. The resulting inequality between those women who did and those who did not possess Spheres generally prohibited the realisation of group-based activities on either hospital wards (with exception of the group-based mindfulness activity that was arranged by the Local Investigator and me in week 4). Consequently, on a number of occasions staff mentioned to me that to facilitate more sustained uses, the Spheres would need to be made more “*widely available*” (Staff-11) and to “*more patients*” (Staff-45). For example, Staff-40 considered the Spheres to: “*(...) be an excellent thing for the group therapy, and relaxation, if more of the ladies have access to that*”.

Similarly, while clinicians were generally very supportive of the Spheres (and informed their design from the outset), an integration of their uses into existing Psychological Treatment Services (PTS) proved challenging for two principal reasons. Firstly, only two of the women

were receiving DBT therapy at the time of the deployment, which created difficulties for Clinical Psychologists to facilitate engagements around the Spheres during group-based DBT skills practices that were also attended by women who did not possess any Spheres. Secondly, while Clinical Psychologists could have suggested, taught or practiced certain uses of the Spheres with the two women during individual therapy, these individual sessions served a different purpose (to address personal or pressing problems such as selfharm or childhood trauma) and were considered too important to substitute with an activity perceived as a test of an unproven technology or approach.

As a result, and although the Spheres project and underlying concept was valued and evaluated by staff to fit with the institution's ethos of person-centred care and DBT, it was difficult to incorporate uses of the artefacts into existing services. This was also partly related to difficulties in facilitating cross-service collaboration as expressed in the following quote by Staff-05, who regarded the Spheres project as a potential starting point for services to work together more:

"(...) perhaps there's a bit of a missing link between PTS and OTs, do you know what I mean, hopefully, you know if you are running an OT session with them, it should tie in with what they are doing in the therapies, and what they are trying to learn in anger management and bring that into art and all the rest of it. And perhaps that isn't as strong as it could be, so again, introducing these pieces of work, this project into those fields, OT and PTS, and getting them to work together a bit more maybe. (...) and again, I suppose it's getting that integrated approach isn't it really, which again is a really tough battle, but it needs to be changed and by everyone so, you know (...)."

Thus, while theoretically, the concept of the Spheres was considered by staff to fit with existing practices and an integrated therapy model, in practice, and in the context of this complex and highly regimented hospital environment, their incorporation into existing wardbased activities and psychotherapeutic services revealed a multitude of additional challenges.

8.9 Summary

In this chapter I presented the findings of the women's uses and experiences of their Spheres of Wellbeing. Building on a rich data set that encompassed interviews with the women and staff; logging results of the digital Spheres; recorded observations by the ward; and my own experiences and observations of the context and related discussions with the Local Investigator,

I came to understand that the women enjoyed their participation in the project and very much liked their Spheres. In terms of overall use of the Spheres, the findings revealed how engagements with the artefacts were highest during the first two deployment weeks, and that they decreased over time with significant reductions in use beyond week 4 that marked the end of the more intense evaluation period. The women made most use of their Identity Spheres, followed by engagements with the Mindfulness Spheres, and only few reported uses of the Calming Spheres. Explorations into how women made use of, and how their engagements with the Spheres linked to; helped sustain; or promoted important facets of their mental health and wellbeing; revealed four major uses.

Firstly, the women frequently engaged in acts of ‘show-and-tell’ with members of ward staff, hospital peers and their families. Such social performances around their Spheres were regularly initiated by the women and provided them with the opportunity to be recognised for their creative achievements, which nurtured a strong sense of pride. Moreover, staff described how the evolution of conversations with the women, where they at times presented as more knowledgeable, contributed to positive and more balanced conversations with staff. Additional shared and pleasant activities with their hospital peers also contributed to a sense of togetherness and belongingness. The sharing of individual video contents towards others further enabled the women to define and re-define important aspects of their identity (e.g. as being playful, their relationships with family) and also allowed staff to get to know more about some of the personal interests and likes of each woman, as was most prominent in the example of the woman who had moved to the LSU and had used her Spheres as a way-in to introducing herself to the new ward staff and peers.

Secondly, the women developed uses of their Spheres that were more personal and private. Here, the Spheres were described by some of the staff to have acted as reminders of the women’s individuality and the enjoyable times of their creation, allowing the women to re-connect to these positive experiences. In reminding the women of happy memories, good feelings and important people, using in particular the videos on their Identity Spheres was found to have at times empowered the women to feel more confident in themselves, and to feel motivated to try and progress in their lives.

Thirdly, the women used their Spheres to keep well and maintain a sense of wellbeing. In this context, they approached their Spheres when they were feeling lonely and wanted to feel connected to the people who care about them; when they were bored and wanted to be stimulated; as a means for relaxation and calm, or simply to escape situations that felt unsettling to them. While uses of the Mindfulness Sphere were reported to have helped the women to relax

and find calm, their exploration for practicing mindfulness or self-regulation, however remained under-explored.

Fourthly, the women were regularly prompted and directed by staff to use their Spheres as tool for coping, particularly when they were showing signs of distress, in the hope that engagements would have a positive impact on the women by distracting them from troublesome thoughts or emotions, and in supporting them to relax. However, staff described their difficulties in finding the 'right moment' to recommend engagements to the women and reported that the women often declined to use their Spheres, particularly when they were highly unsettled. Refusals and less successful engagements with their Spheres as a tool for coping led some of the staff express disappointment that the women were not engaging with their Spheres as much as they had hoped, which indicated an underlying wish by staff for a coping strategy that works in these difficult moments. Despite the declines in use of their Spheres when distressed, there were a multitude of examples of how uses of the Spheres successfully distracted the women by breaking cycles of disruptive thoughts and in giving them an alternative focus. As such, both staff and the women reported occasions when the women were drawn to their Spheres when they were feeling upset, experienced stress, wanted to calm down after an incident, or needed cheering-up. Those more successful uses led staff to evaluate the Spheres as an additional, yet in contrast to other more 'hospitally' tools, more personal and stimulating coping strategy to offer to the women.

I further described how the women's engagements with their Sphere would at times differ between them as influenced by their personal interests; motivated by their understanding of more personal and potential therapeutic uses of the Spheres; their mental health at the time that engagements were possible, desirable or proposed; and the extent to which they could access their Spheres, as moderated by the general robustness of the artefacts and known risk behaviours of the individual woman.

In addition, the women's engagements with their Spheres was moderated by challenging contextual factors including difficulties around introducing new care concepts and practices related to DBT, a therapy model that was newly introduced and therefore mostly unfamiliar to the ward staff; limits on staff facilitation of interactions with the Spheres in light of other work commitments; and while staff came to evaluate the Spheres as useful addition to existing services and to fit well with desired hospital practices of person-centred care, DBT and an integrated therapy model, I described how attempts to integrate uses of the Spheres into existing ward activities or treatment services such as OT or PTS revealed a number of additional challenges.

ion and Conclusions

9.1 Overview

In this final chapter I revisit the research questions posed at the outset of this thesis by discussing the findings, limitations and implications of this work for designing and evaluating mental health and wellbeing technologies for people with severe mental health problems and within hospital services.

9.2 Understanding of Mental Health and Wellbeing in HCI

The design of technology for mental health and wellbeing is a new and under-researched area in HCI. Responding to the first research question as to *how mental health and wellbeing are understood in HCI and how has this shaped the design of digital technology interventions*, I presented the literature relating to two main perspectives of the fields of Healthcare and (Clinical) Psychology and how they have informed technology design for mental health promotion. I described a pathology-based formulation of mental health as absence of mental illness, and how the recent increase in occurrences of mental illness has led to explorations as to how HCI can improve access to, engagement with, and the outcomes of, treatment (e.g. Doherty et al., 2010a). Existing technologies address a wide range of mental disorders, client groups, and therapeutic strategies (e.g. self-monitoring, exposure); with the majority of them closely following the format of traditional psychotherapy models, and being targeted at outpatient services and adults with mild-to-moderate symptoms. However, research and design for people with severe mental disorders and for individuals in hospital or other medical care settings, who often present the most vulnerable and challenging to treat groups, is largely under-explored. In addition, and although individuals with a Learning Disability (LD) are one of

the client population that are most at risk of developing mental health problems (e.g. Lew et al. 2006), few designs consider the implications of cognitive limitations in their proposals (with exception of children, e.g. Sa & Carrico, 2012).

Given this strong focus on treatment, HCI has to date paid little attention to approaches to, and technology designs for, preventing mental illness, averting relapse, and promoting mental wellbeing. To this end, I offered a definition of mental wellbeing as positive emotional, psychological and social health that is informed by conceptualisations of the hedonic and eudaimonic tradition in Western Psychology and the Eastern Buddhist concept of mental balance; and presented examples of how existing designs in HCI have the potential and are beginning to respond to this mental wellbeing agenda. Prompted by recent discussions in Healthcare and Psychology (e.g. Keyes, 2014), I argued for considering approaches both to the treatment of mental illness and the support of mental wellbeing to holistically address important challenges for mental health and wellbeing promotion with a view to continue advancing state of the art technology design in this area.

Nevertheless, I have to acknowledge that the component based description of mental wellbeing that I provided in this thesis, is reductionist and may not account very well for the complexity and fluidity of the subjective experiences that accompany a person's process of self-realisation and flourishing. In this regard, the list of wellbeing factors and approaches to achieving mental wellbeing is by no means exhausted. Instead, I regard the conceptualisation of mental wellbeing provided in Section 2.4 as a working definition that is intended for other researchers to build on, critique and adapt; and to invite more research and debate on the topic. Moreover, since mental health within HCI has mostly drawn on the literature and concepts from the fields of Healthcare and (Clinical) Psychology, little consideration has been given so far to how the general public understands mental health promotion and engages in wellbeing activities. More research is therefore needed that meaningfully involves people in research and design activities on positive mental health.

9.3 Doing Experience-Centred Design in this Context

In this section, I respond to the second research question that explored some of the complexities of *following an experience-centred methodological (ECD) approach to design in the context of the severe mental health problems of the women and their specific secured hospital setting*. I discuss how especially my conversations with hospital staff, who were sharing their expertise of the women and the specific care context; my own involvement with the women during the co-creative process; and my engagements with them and the ward staff as well as debriefings with

local research collaborators in the evaluation of the Spheres research were fundamental to gaining an empathic understanding of this particular context. As an example of establishing a new collaboration that brought together researchers in HCI and clinical practitioners in a process that required close, long-term engagements for understanding and addressing the complexities of the design context within the real-world setting of a medium secure forensic hospital unit and for women with severe mental health problems and challenging behaviours, presents a rather unique example that contributes rich insights to recent debates in HCI on the role of empathy and for conducting ECD within sensitive health and care contexts (Wright & McCarthy, 2008; 2010).

9.3.1 Hospital Staff Sharing their Expertise and Observations

Because of stringent ethical requirements, I was restricted in my engagement with the women in the early stages of the design process. In the following I therefore discuss some of the opportunities and challenges of collaborating closely with a range of different hospital staff *for gaining insights into the specific requirements of the design context* (research question 2a) and the governance-related and ethical challenges of this research, and how I came to balance these with the researcher team's intend for a sensitive and more holistic mental health and wellbeing design. Furthermore I highlight the fundamental role that staff had played in offering additional insights into the women's experiences with their Spheres through their sharing of observations of the women and also how their interpretations were, at times, meaningfully informed by their previous engagements with individual woman.

9.3.1.1 Collaborative Design Process with Hospital Staff

The target participants of this research presented a very vulnerable population due to the severity of their mental health problems and need for secured care. Since strict ethical considerations and procedures regulate access to sensitive care settings or direct contact with highly vulnerable populations, any direct engagements with the women were restricted in the early stages of the research. To gain an initial understanding of the design context, I therefore consulted the literature on the mental health characteristics of, and proposed therapies for the women, and engaged in long-term collaborative process with mental healthcare professionals at the hospital, who are in continuous contact with and have extensive experiences of working with the women; which is a common approach in designing mental health interventions (e.g. Coyle & Doherty, 2009). However, hospital staff could only act as advocates for the women, meaning that my understanding of the women's wider emotional and social needs of the women

and design preferences was limited by the staff member's interpretations, values and ideas (cf. Muller, 2014), which has to be acknowledged as a general limitation of the design process.

Nevertheless, as experts of this context, the hospital staff were well placed to provide insights into women's mental health needs, their challenging behaviours, and some of the constraints of their specific hospital environment. Especially during meetings in which hospital staff would assist in the brainstorming of design ideas (cf. Section 4.4), shared different contents and materials that they would use in therapy and explained how they typically engaged the women in practice (cf. Sections 3.5.1-3.5.2) provided rich, tangible insights. Matthews et al. (2014) too have recently described how role-play can be an important format for generating empathy and gaining an understanding of therapy at different stages of the technology design and development process.

Moreover, in this project, an effort was made to also explain the field of HCI and common research practices to healthcare professionals. To help create and foster an understanding of the opportunities offered by digital technology, members of the research team and I presented examples of previous research projects that were characteristic of person-centred, empathic approaches to design and that enabled us to describe the value that resulting interventions had brought to the respective settings. In general, hospital staff presented as very open and open-minded towards these example technologies and expressed a strong interest in identifying a technology that could benefit the women. Our examples further enabled staff, especially the ward staff, to bring forward concerns especially regarding the safety of the design (due to the women's risks behaviours of self-harm, impulsivity and aggression) with a view to safeguard the women and ward staff. Higher level clinical managers further wished for the technology to fit with the hospital ethos of person-centred care and practices of newly introduced Dialectical Behavioural Therapy (DBT). Moreover, a range of hospital staff made valuable contributions to informal iterations of Spheres prototypes; and assessed their appropriateness for use in the women's service and as an addition to their therapy. In addition, my relationship with in particular the research team at the hospital was crucial for informing my understanding of, and to appropriately address the unique challenges and risks of this project with regard to ethics and issues around research governance. This was of fundamental importance in order to receive ethical approval for this research, which is often a complex process and challenging to achieve especially for nonhealthcare professionals (e.g. from the HCI community).

Through the perspectives offered both by my reading of the literature and through my engagement with hospital staff, I was initially particularly sensitised to: the complex mental health problems of the women and related challenges for motivating engagement; their

potentially extreme risk behaviours and associated dangers for technology design; limitations in their cognitive abilities that can challenge their ability to sustain attention and understand complex, or new things; and, being confined to the hospital, a lack of independence and risks of social isolation. While existing mental health technologies typically respond to, and often closely follow, *medical* approaches to treatment (i.e. by narrowly translating existing therapy models into digital design), it was important to me not to unnecessarily foreground the psychosocial impairment of the women, or emphasise constraints of their care environment. Instead, I sought to not only assist the women in therapeutic skills practice, but to also identify approaches to enhance their mental wellbeing and sensitively engage them with their Spheres. It was my intent to create something that would not feel *stigmatising* but *personal* to the women, and that would help *empower* them to perceive themselves as individuals with unique interests and personal strengths. Therefore, the design specifications of the Spheres respond to aspects identified both in the literature and by the hospital staff, as well as ideas for a sensitive, person-focused design in this context that build on qualities of creativity, physicality, and personal significance.

To negotiate between the requirements of the healthcare context and the more open-ended ideas of the research team for a technology that would avoid an over-reliance on traditional healthcare procedures (in order to move away from a conventional, often formal and more generic medical design towards something that could feel personal and empowering), however presented a challenge. In this regard, I have to note that positioning the design of the Spheres in relation to DBT therapy (instead of mental wellbeing alone) greatly assisted both in articulating the purpose and potential value of the Spheres to mental healthcare professionals at the hospital (especially to clinical managers), and in gaining approval by the hospital and ethics committee (for the trial). The importance of clearly communicating desired outcomes and benefits of a system to healthcare staff has also previously been emphasised by Coyle et al. (2007). Thus, to introduce new technology designs in this area required a careful balancing of the safety, therapy-focused, ethical and organisational requirements of the clinical context (to safeguard the women and enhance their treatment) with some of our more open-ended ideas and methods for the design (to sensitively promote facets of their mental wellbeing).

This was considerably facilitated by the fortunate circumstance that especially the two local research collaborators and key enablers of the project on-site (the R&D Manager/ Local Investigator and the Research Nurse) were both clinically experienced and research-oriented; and they were generally very open towards my design ideas and activities, and offered constructive support in addressing any concerns that arose. I have further described how

especially the R&D Manager/ Local Investigator, as a well-respected professional and who had long-standing experience of working in this care context, had played a fundamental role in liaising with different hospital staff for arranging meetings with members of the women's clinical care team, for supporting the recruitment of participants (women and ward staff), and for organising and overseeing the research activities on the wards. All of this highlights the importance of building and maintaining relationships with key members of the care setting for informing and iterating the design of the technology, and also for the planning and conduct of the research.

9.3.1.2 *The Role of Hospital Staff in the Evaluation of the Spheres*

My engagements with hospital staff did not only play a crucial role in the design of the technology, they were also fundamental in understanding the women's uses and experiences with their Spheres. The ward staff's continuous contact and extensive experiences of working with the women meant that they were well placed to recognize new or noteworthy behaviours, and to more accurately interpret the women's experiences or motivations (e.g. example of woman trying to exercising control, Section 8.7.1). Moreover, the staff would also talk about their observations of the women for example refusing engagements with the Spheres or trying to break their Calming Sphere for purposes of self-harm (Section 8.7.4.1). This was essential in counter-balancing a researcher effect that I had observed whereby the women often presented as reluctant to admit and talk to me about any less pleasant experiences with the artefacts, or that would relate to problems in their mental health. In this regard, observations and interpretations of the women's behaviours by the ward staff assisted in building a more holistic picture of the women's experiences with the technology.

Some of the ward staff however also expressed uncertainty about their personal interpretations about the women's experiences. Staff's difficulties to articulate their perspectives on the women's interactions with the Sphere were not only related to challenges around empathy; as a practice that required the documentation and sharing of their personal opinions, it was also something that contrasted to the more 'factual reports' that were typically required of them in the completion of clinical care notes. During the course of the fieldwork, I thus tried to establish relationships with a multitude of staff involved in the women's care (in total I recruited 47 staff members) to explain the project. I explained my interest to understand the personal experience of the individual woman and also of the staff members with regard to their interactions with the Spheres and within their everyday context. All of this involved a lot of time and commitment from my side and also required interest, willingness and the resources

of staff to get empathically engaged with the research (cf. Thieme et al., 2014a), which was complicated by the large size of the staff team that is responsible for the 24-hour delivery of care for the women (see further Section 9.4.3.1).

The findings further showed how the ward staff came to acknowledge a lack in understanding of DBT and mindfulness-based practices, and described difficulties to enable cross-service engagement and to create space for facilitating person-centred care activities on the MSU. In this regard, the project and the introduction of the Spheres into the service, gave staff an opportunity to reflect on the ward environment and their work practices (especially with regard to the scope of creative activities that could be supported for the women), which can help in transforming the same (cf. Wright & McCarthy, 2010).

9.3.2 *Creative and Object-Focused Involvements with the Women*

The women's mental health condition and their mild-to-moderate LD can cause them difficulties to be aware of, understand, remember, or articulate their own emotions and experiences, which posed specific challenges for gaining an empathic understanding of their experiences with the creative activities and for evaluating their uses and interpretations of the Spheres. It was therefore important to carefully consider *how the women can actively and sensitively be engaged in the research and in dialogue* (research question 2b) to invite them to tell something about their self and personal interests as well as to share their stories about how they made sense of the Spheres and appropriated them within their everyday life. Considerations of careful approaches to participation that are respectful of the person's abilities and avoid risks of stigmatisation find increasingly consideration and discussion in HCI research that engages especially with ethically sensitive and emotionally challenging contexts (e.g. Branham et al., 2014; Thieme et al., 2014a; Vines et al., 2013). This therefore brings importance to the identification of sensitive strategies for involving very vulnerable population groups in research activities.

9.3.2.1 *Careful Configuration of the Creative Activities*

The creative activities marked a starting point in my involvements with the women and in building a relationship with them. The activities were set-up in a manner that would ensure that everyone engaged in the process was safe (from any potential physical harm) and were carefully scaffolded to assist the women to make pieces that would appeal to them. Moreover, the ward staff and I made a couple of arrangement to create a place that would feel safe and comfortable for the women to be in, and to engage in conversation. This included the conduct

of the sessions in a relatively quiet room outside the women's flat, enabling the women to have a break from the often unsettling ward environment, and to pay focused attention to the activities; the decoration and set-up of the room that would foreground the making activities and the women's creations; the hands on material engagement with the women that was described by the women and the ward staff to have felt very versatile and stimulating; and the inclusion of informal tea breaks and conversations amongst everyone present. A key factor contributing to the creation of an environment that felt comfortable to the women and would invite them to open up in conversation was the role of the Research Nurse. She had many years of experience working on the MSU and was very familiar with four of the women participants. She was instrumental in recognising if the women had difficulties to engage, knew how to gently assist them in conduct of the activities (e.g. by breaking tasks down), how to overcome communication barriers (e.g. re-formulating or repeating certain explanations), and how to supporting them in feeling safe and comfortable in my presence (especially initially as a stranger and outsider of this hospital context).

In Section 7.3.1, I have described how the Research Nurse had also played a fundamental role in supporting me during the creative activities to tentatively build a relationship with women that developed over time, which enabled me to gain a better understanding of, and to respond more appropriately to, the abilities of, the individual woman. Moreover, I described how her pre-existing (work-related) relationship with the women had a positive impact on the process of engaging the women in dialogue; and also how casual conversations were initiated by the women, showing interest in the personal lives of Research Nurse and myself. I further outlined how conversations, especially about the women's personal likes and interest, were supported through the 'conversation token' activity. Nevertheless, the careful structuring and organisation of the sessions for supporting the physical making of pieces for the Spheres and for adhering to the strict hospital safety regulations, often left little scope for more open-ended engagements and conversations with the women that would enable them to bring in more of their personality and passion, and to more openly and happily talk about things that they find exciting. Thus, the clearly defined agenda of these activities and also a general power imbalance between me myself/ ward staff and the women limited, at times, the scope for more open-ended input and control by the women. Through my conversations with especially the Research Nurse and the Local Investigator, and observations of some of the women having been overwhelmed by a multitude of choices that were offered to them during the activities, I came to understand that a clear structure was also required to assist the women in better understanding the

purpose of the activity at hand, to avoid risks of them potentially feeling insecure, or bored, and to build trust in me (as a skilled and organised facilitator of the activity) and the project.

I therefore recommend to other researchers intending to design research activities that respond sensitively to the emotional and cognitive abilities of vulnerable participants, to identify and work closely with the care staff or people, who have extensive knowledge of the target group (e.g. family members or friends, who know the person well) in the planning and conduct of any such activities.

In the scope of this project, the creative engagements with the women presented not only a gentle invitation for them to reflect and open up about themselves as a sensitive strategy for gaining insights into the women's personal interests and experiences (cf. Wright & McCarthy, 2010); it also enabled them to personalise the design of their Spheres, which was found to have facilitated bespoke artefact designs and to have shaped a more personal relationship between the women and their Spheres.

Moreover, the activities themselves were greatly enjoyed by the women and had positive consequences for their mental wellbeing. Through these activities the women engaged with a range of different materials, colours and techniques, which enabled interesting and enjoyable experiences (*emotional wellbeing*); supported the learning of new skills (*personal growth*); enabled feelings of pride (*positive self-image*) in their almost professionally looking creations that were created in short periods of time; and experienced positive interactions with staff (*social wellbeing*), who socially affirmed their achievements (*positive self-image*).

That the creative activities provided opportunities for the women to feel good about themselves presents a finding that is rarely talked about in the HCI literature. However, the benefits that arose as a consequence of the women's participation in the creative process had a number of implications for sensitively engaging vulnerable populations in research. In this regard, I respond to Fails and Guha (2014), who recently brought attention to the ethical importance of ensuring that participants (and not just the researchers) benefit from their participation in design activities. Reporting on their long-term research with children, who they actively involve as 'design partners' throughout the design process, they present initial evidence of increases in the children's level of confidence, experiences of empowerment and joy; improvements in their communication ability; and learning. The potentially very positive impact that design activities can have on participants, particularly in contexts where wellbeing is a concern, suggests that HCI researchers should give more careful consideration as to how they construct such activities (Marshall et al., 2014). Thus, in the following I present some of the

lessons learned from the creative sessions for sensitively engaging individuals with mental health problems.

Personally & Meaningfully Investing in Participants: The creative sessions had offered the women something positive to focus on, look forward to, and feel good about each week. Considering the women's challenging mental health problems, the ward staff further remarked on the high level of involvement and commitment that the women exhibited in relation to the sessions. Their commitment can in part be understood as an act of positive reciprocation (e.g. Fehr & Gächter, 2000) to the effort that I had put into the careful preparation, set-up and composition of the materials that were used within this co-creative process between the women, myself and the Research Nurse. Moreover, while the creative engagements with the women could be regarded as mundane activities, in the context of their care, and, compared to other mostly group-based and generic activities that they typically engage in, these were distinct in the extent to which they involved significant levels of purposeful personal attention in a one-to-one interaction; and in how they were set up to respond to the personal interests of each woman. This was further reflected in adaptations of session materials – made by me as I got to know the women more over time – to the women's individual likes (e.g. favourite game characters that were used as materials for stopmotion animations), which was noticed and positively acknowledged by the women. Thus, since much care was put into the preparation of the activities and consideration given to respond positively to the women's individual interests, this likely contributed to perceptions of the activities as enjoyable and personally meaningful.

Respectfully Foregrounding the Person (their Abilities, Decisions & Strength), not their Illness: In feedback by the ward staff, they recognised that the creative activities provided the women with a lot of individual support and reassurance; and they conjectured that the women relished the fact that their engagements in the activities were their personal responsibility. All members during the activities were focused on encouraging the women to make their own choices, and responded positively to any suggestions they brought forward, or the pieces they created. While there was a tendency to simplify the various steps in the making process, this was an attuned process that was respectful in the way that the Research Nurse and I interacted with the women to avoid being perceived as patronizing and instead acting as assistants in a shared activity that was owned by the women and led by their own ideas and commitments to it. Careful attention was further given to the creation of an environment that was free of any judgment or error, that would be very accepting of the women and their explorations with the materials, and that was not only focused on moving the person forward,

but also to simply spend time together engaging in something that felt a little different and pleasurable (and without labelling it as therapy).

As a result, the problems and challenging behaviours of the women, which often cause disempowerment (Fish, 2013), were less prevalent during the sessions. Instead the women presented as individuals with personal interests, their own ideas and unique tastes; and as capable of enjoying themselves, learning new skills and committing to the task at hand. This can help change the women's self-perception of vulnerability and powerlessness towards developing a positive self-image that reflects their individuality and personal strength, as they recognise their individual achievements and growth. To break-off any self-invalidating cycles and foci on the vulnerabilities and limitations of the person, and to regard them instead as individuals with strengths, interests and talents, who possess the skills and ability to progress and develop, should also find closer consideration in the design of mental health promoting interventions. Furthermore, instead to many traditional mental health applications that commonly focus on peoples' symptoms and difficulties and that reward users for engaging with a technology, future designs should bring more attention to approaches that are accepting of the person and that they may dis-engage (with a technology or activities). This requires the offering of strategies for re-engagement that are respectful of potential feelings of self-guilt in this regard.

While such a positive focus on the person can feel empowering to them, in the context of this research it also meant that I had difficulties remaining aware of the women's risk behaviours, which caused me to compromise important safety regulations (staff members present therefore often had to actively remind me to stay in safe distance to the women). This lack of understanding that was rooted in my personal inexperience of potentially impulsive and aggressive behaviours that the women can exhibit, highlights some of the challenges for understanding the complexity of the women's mental health problems, and (having to be physically distant) for developing a close, empathic relationship with them.

9.3.3.2 Considerations for Individual Interviews

In addition to my involvement with the women as part of the creative activities, I met with them at various stages during the initial deployment of the Spheres to engage them in dialogue about their understanding of, and experiences with, their Spheres. I described in Section 5.9.1 how the space in which our conversations were situated could impact on our engagements. Whereas the women generally appeared more relaxed and comfortable to talk to me in private and in their bedrooms, the surrounding ward dynamics of staff checking in on the women, would frequently

cause interruptions that considerably impacted the women's ability to concentrate on the conversation.

Moreover, I observed how the women had, at times, difficulties to remember certain events or the details of these events, and that their descriptions of how they were making use of the Sphere for themselves were often brief and more factual with a focus on describing their actions rather than feelings or motivation (which is a direct consequence of the women's difficulties to understand their own emotions). Thus, to make the women feel more at ease during our conversation and to support them in articulating their thoughts and feelings about their Spheres, I typically asked them to show me how they were physically engaging with each of their objects. The handling and playing with each Sphere created a more playful and less pressured atmosphere for exploring with the women their experiences with the artefacts. To remind the women of their uses of the Spheres and invite reflection on their engagements, I would carefully and step-by-step prompt them to tell me about the various instances in which they had or had not made use of the individual Spheres and what might have motivated their use. To reduce complexity and respond to limitations in the women's literacy skills, I was careful to not overwhelm them with too long or complicated sentence structures, and was considerate to balance questions that appeared to be easier for the women to answer with more challenging, self-reflective ones.

The women's handling and physical demonstrations of the Spheres during our conversations, and especially how they were referring to the artefacts while describing their interactions to me as well as showing the artefacts to any additional ward staff present in these meetings, enabled rich insights into how the women were making sense of their Spheres and what personal meaning they had assigned to these artefacts. This included verbal expressions that were captured in the audio recordings of our meetings, and also a range of very expressive physical responses in terms of body language (e.g. clutching the Mindfulness Sphere close to their cheeks) and facial expressions, which added important layers to my understanding of the women's relationship with their Spheres.

9.3.4 Personal Experiences of the Context & Debriefings with Local Collaborators

In addition to insights gained as part of my conversations with the women and hospital staff about the women's experiences of the Spheres and the hospital context, and more general descriptions of medium secure hospital services and the women's population in the academic literature; my own involvement with the women and personal experiences of the ward

environment helped in building up a picture over time of what life in a medium secure unit (MSU) might be like for the women (research question 2c). My understanding in this regard was particularly informed or altered by events and encounters that felt unfamiliar to me, or that differed considerably from previous experiences and prior expectations.

For example, when I was first shown around the medium secure unit – being introduced to the door locking mechanisms, the robust furniture design and the body-worn, personal alarm systems – I gained a rich sense of what safety and security meant in this services, which was a key consideration for the design of the Spheres of Wellbeing. In terms of the creative activities, I had been carefully prepared and was sensitised in advance of the sessions towards potential problems that could arise due to the risk behaviours of the women and limitations in their ability and motivation to engage in any complex activities. However, through my own interactions with the women in this creative process, my understanding shifted from regarding the women as people with severe mental health problems, challenging behaviours and limitations in their ability to process information, to seeing them as individuals that were very well behaved, polite and funny and who were ambitious, committed and capable to concentrate for longer periods of time.

Moreover, having been actively involved in the research activities and present on the wards (low and medium secure) when meeting the women or the ward staff (i.e. to talk about their experiences with the Spheres) allowed me to experience and form an own understanding of this care environment. For example, in Section 8.6.2, I described my witnessing of how one woman appeared visibly troubled, was kicking against furniture, and screaming or crying. My experience of this instance, which felt emotionally distressing, helped me in imagining how it might feel like for the women to be regularly exposed to such situations. Such contextual observations and my personal experiences of being in the women's ward also assisted me in the analysis and interpretation of the research findings (e.g. Alex frequently described how she turned towards her Spheres to 'escape unsettling ward dynamics'). The value that the researchers' own emotions and experiences of the settings can bring to understanding the research context is increasingly recognised within empathic user research in HCI (e.g. Bardzell, 2010; Moncur, 2013).

However, to be able to interpret my emotional responses to the context required the ability to step back and make sense of the situation as well as of different perspectives that were shared by the women and the ward staff. In this regard, my regular debriefings and discussions with local research collaborators, the Local Investigator and Research Nurse, played a fundamental role. The Local Investigator in particular, who had long-standing knowledge of this

particular hospital and in working with the women population on the MSU, helped to address general worries (e.g. about upsetting the women, see Section 7.3.3) or emotionally distressing experiences (e.g. when I witnessing severe wounds of self-harm); provided advice as well as important context information (e.g. about certain work responsibilities of the staff); and frequently discussed with me the research activities and related observations that I made of the women, the ward staff and the hospital environment. All of this considerably helped in the analysis, interpretation and integration of the different perspectives that were collected through the research data.

Nevertheless, I have to acknowledge that frequent engagements between me and the women or staff, and the formation of a relationship between them, influenced how they were approaching and responding to the Spheres (e.g. investment in the project and my visits created enthusiasm around the Spheres), which can become a confounding factor in evaluations of their effectiveness (cf. reflections on real-world deployments by Johnson et al., 2012; Rogers, 2011). While my interpretations of the research findings are not free of bias or distortion, I paid careful attention to transparently describe my involvements and to selfcritically reflect about my own interest in, and interpretations of, the research. Furthermore, I paid careful attention to the analysis and presentation of the findings to respectfully present the different perspectives that were offered by the women and the ward staff. I have to also acknowledge that the insights that I gained about the women's uses of the Spheres are restricted to patterns in the women's experiences with these artefacts (as outcome of our thematic analysis), but do not capture nuances for example of how the women's relationship with their Spheres developed over time. This is however important considering that the women's understanding of the Spheres and the roles they might fulfil is fluid and informed by their interactions with the artefacts as well as staff's propositions of use, and the environment (i.e. the ward staff frequently prompted the women to use their Spheres as tools for coping when they were unsettled, Section 8.6.1). Other analysis approaches such as narrative inquiry (e.g. Connelly & Clandinin, 2000) may be better placed to capture those aspects.

9.4 Challenges for Mental Health and Wellbeing Design in this Context

Contributing in particular to HCI research and design for mental health; for conducting healthcare fieldwork within sensitive settings; and for deploying and sustaining uses of new technology within complex real-world contexts, the following sections outline some of the *opportunities and challenges that I identified for technology design in promoting mental health*

and wellbeing for people with severe mental health problems in hospital settings (research question 3). At first, I discuss how interactions with the Spheres, as interactive physical artefacts, demonstrated potential in promoting the mental health and wellbeing of the women and their implications for the future designs in this area (research question 3a). I then highlight some of the complexities of this specific context that constrained the women's uses of the Spheres and also the ward staff's engagement in the research (research question 3b). These include considerations of problems in the women's mental health, safety risks associated with the Spheres, and contextual factors (e.g. ward culture, staff resources).

9.4.1 Interactive Physical Artefacts for Mental Health & Wellbeing

Through the Spheres I explored *how interactive physical artefacts can become vehicles for promoting mental health and wellbeing* (research question 3a). The findings (described in detail in Chapter 8) reported on a variety of interactions and experiences with the Spheres that relate to a range of often interwoven mental health and wellbeing factors. These included their use for social and internal identity performances that related to the women feeling proud, empowered (feeling important and to be achieving), and reminded of their individuality; and thereby support the construction of a *positive self-concept*. The Spheres were used as a means for positive, person-focused (instead of problem-focused), social engagements with the ward staff, hospital peers and their families, which strengthened important social ties and nurtured a sense of belongingness, and thus, enhance *social wellbeing*. They were further used for relaxation, a sense of connectedness to others, stimulation and positive self-distraction, which supported the women in protecting their wellbeing (*positive psychological functioning*) and in *tolerating distress* (DBT skill to *reduce illbehaviours*). The majority of these interactions were also described to have been enjoyable (with exception of feelings of sadness in relation to some of the women's Identity Sphere videos when missing their families), which contributes to *emotional wellbeing*. Although much of the use was prompted and directed by the ward staff (and my presence), the women had, and at times made use of, the opportunity to choose or refuse use of their Spheres, which can nurture a sense of *autonomy* within this otherwise highly regimented and heavily supervised care environment. While use of the Spheres for *mindfulness* (DBT skill to promote *mental balance*) remained low (Section 9.4.3.2 expands on this), the artefacts were explored as tools for *coping in crisis*. This, however, was often unsuccessful, as the women declined or were unable to engage with the artefacts when they experienced severe emotional difficulties. Although the Mindfulness Sphere was specifically designed for the context of the women living in a MSU, future work could continue to explore the potential of

this artefact in supporting the learning and practice of mindfulness mediation skills in other populations such as children with ADHD, and also expert meditators to explore their experiences of mindful awareness and how it could be supported through technology design more deeply. Furthermore, the women's interactions and experiences with their Spheres demonstrated a range of opportunities as to how technology can be designed and employed to promote facets of the mental health and wellbeing of people suffering from severe mental health problems.

Creative and Personal Investment (Care & Motivation): The women's creative involvement in personalising the contents and components of their Spheres impacted on their relationship with the artefacts. The artefacts became personal possessions that the women mostly liked to engage with, were proud and took ownership of, and that they were protective of. This was evident in their descriptions of commitments to treat their Spheres with care and displays of concern about accidentally breaking them. This gave the ward staff hope that the women would not destroy their Spheres (in moments of distress). Apart from one instance, where one of the women had broken parts of her Calming Sphere off, which was ascribed to reasons of intentional self-harm, all artefacts remained intact. However, it has to also be acknowledge that the ward staff were careful in managing any risks around the Spheres and restricted access to them, when the women appeared unsettled, so as to ensure that they would not be damaged by the women. In order to maintain benefits related to the women's relationship with, and interest in, their Spheres, however, future work has to give more consideration as to how space for continued creative and personal investment can be created (e.g. by adding-on new videos to their Identity Spheres).

Symbolic and Sentimental Value (Non-Stigmatising & Comforting): While the physical form of the Spheres responds to aspects of conventional femininity, which can be criticised for being 'stereotyping' (this can be problematic in terms of issues around genderdiscrimination; cf. Barron, 2002; Clements et al. 1995), it facilitated perceptions of the artefacts as something that felt personal rather than medical. Embedded personal content and the value associated with the creation of the components of the Spheres (e.g. self-made plastic charms inside the Mindfulness Spheres, stop-motion animation videos inside the Identity Spheres) also attached sentimental value to the Spheres. This had two main implications: Firstly, a more personal perception of the Spheres, particularly when compared to other as more generic and 'hospitally' tools that existed on the wards, helped avoid stigma, as the women were reported to have been *proud* of their artefacts, were *happy to 'show-and-tell'* others about them, and also gave their Calming Spheres as *gifts* to family members. Secondly, it meant that

the Spheres turned into *objects of comfort* that reminded the women of the positive experiences of their creation and provided a reference to the people that they cared about most (cf. Belk, 1988; Miller, 2008; Turkle, 2007).

Bridging Physical and Digital Features (Accessibility & Stimulation): To respond sensitively to the women's LD, the Spheres were designed to be of low complexity, yet highly visual and sensual, so as to be perceived as both accessible and stimulating. The women described to have appreciated the bright colours of their Spheres, to have liked especially the smooth feel of the Mindfulness Spheres, and, following initial practice, exhibited technical mastery of their artefacts. The ward staff also valued that the Spheres were interactive, and how the Identity Spheres videos stimulated a wide range of senses due to their multi-modal format that combined imagery with video and music. Moreover, as real-world objects that embody aspects of the women's identity, the Spheres had a physical presence, which added opportunities for identity performances (e.g. example of ward staff who saw Sally's Spheres in a clinic room, which invited conversation on their origin) (cf. Banks, 2011).

9.4.2 Accounting for Mental Health Problems of the Women

Responding to research question 3b, and as described in Sections 7.3.3 and 8.7.3, some of the challenges for facilitating the research activities (creative sessions, interviews) with the women and inviting them to interact with the Spheres related to unpredictable, temporal declines in, and general difficulties related to problems with, the mental health of the women through which they were not able, or willing to engage. Doherty et al. (2012) and Lederman et al. (2014) also reported on cases in their research of how the mental health of the participants influenced their motivation for technology engagement. It is important to note that while mental health related difficulties can occur (particularly for a diagnosis of severe mental illness) and do not need to be related to the research, or proposed intervention, they should be accounted for in the planning of the research to allow for sufficient time and flexibility to dynamically respond to them without having to compromise a pre-set agenda.

For example, I experienced difficulties in balancing the time spent during the research activities in 'being' with the women (e.g. having a casual conversation, providing comfort and reassurance) with the need to also get through a set of interview questions, which the women were generally less interested in, and which meant that both their motivation and attention for the activity could drop quickly (which is also related to the impulsivity-nature of their personality disorder). The creative activities can be considered an exception in this regard, as they were explicitly designed to foreground the personal interests of, and to empower, the

women. Yet, they also required a lot of preparation and personal investment. While the women showed remarkable levels of self-motivated commitment to the creative activities, these required a carefully scaffolded and managed the process (safety, materials, time frame) that restricted my ability to be receptive to, and get to know and to focus on building a relationship with the women. In Section 7.3.1 I therefore described how the role of Research Nurse was of importance as an expert facilitator and third-person observer.

Furthermore, the wellbeing of researchers/ practitioners working with people who have (severe) mental health problems and challenging behaviours deserves consideration. The conduct of the creative activities, for example, was a highly focused process that demanded a lot of attention and emotional investment by myself and the Research Nurse. We both experienced our involvement as often cognitively and emotionally draining. In addition, to be witnessing scars and new wounds of self-harm on the women's bodies, or situations when the women were unsettled, crying or screaming loudly from distress, were at times upsetting. As an external researcher without any prior experiences of this specialist care environment or the target participant group, I also often felt (at least initially) uncertain, concerned, and helpless as to how to appropriately and sensitively respond in situations in which I, for example, observed an incident happening. In this regard, I have described the value and importance of both in-situ support by the ward staff and debriefings of my experiences especially with the Local Investigator on site (e.g. Section 5.4 and 7.3.3). Moreover, and in line with recommendations made by Moncur (2013), it is important for researchers to make time for regular 'breaks' from the environment.

9.4.3 *Technology Adoption in this Context*

The adoption of the Spheres technology by the women was significantly influenced by a range of context factors including: restricted access to them for some of the women (due to their risk behaviours); conflicting work responsibilities of the ward staff; a hospital environment that was still in the early stages of adapting their culture to practices of DBT (acceptance vs. coping strategies); and difficulties around integrating the artefacts into existing hospital services, challenged and constrained their use. The following therefore provides insights into some of *the complexities of this particular context and how they impacted on the conduct of the research* (research question 3b), which contribute to an understanding of the challenges that are involved in deploying new technologies, sustaining peoples' interactions with them, and for conducting HCI research and fieldwork within sensitive healthcare contexts.

9.4.3.1 Artefact Safety & Access vs. Work Responsibilities of Staff

In light of the women's risk behaviours of self-harm, impulsivity, and aggression, the safety of the designs was a major concern that was raised in conversations with staff throughout the design process of the Spheres. In response to these concerns, I agreed with the hospital staff to use specific techniques and materials in the fabrication of the Spheres that would ensure a robust finish and the safe encasing of the electronics. Although staff described the two digital Spheres as *fairly robust* and *low risk items* compared to other objects (e.g. game consoles or CD players), they preferred the Identity Sphere to the *solid* and more *fragile* Mindfulness Sphere, which could hurt somebody or might break, if thrown by the women (e.g. when experiencing emotional distress). In addition, some of the women had the tendency to try and break off, or insert small pieces into their body for purposes of self-harm, which restricted their access to their Calming Spheres. The perceived safety of the Spheres in relation to the women's risk behaviours determined the extent to which they had free access to their Spheres (or instead needed to request their Spheres from staff). This re-emphasised the importance of safety in this context, which, to some extent was compromised in the design of the Mindfulness and Calming Spheres to create artefacts that were also visually appealing and that responded to, or could be worn on the women's body. However, with safety being the primary concern in this context, its compromising considerably reduced opportunities for their use in practice.

Since the use of the Spheres was intended by me to be in the responsibility of the women – to assist them in developing ownership of, and a more personal relationship with, the artefacts – safety concerns regarding the Spheres and restrictions in access meant that the majority of the women were dependent on the ward staff for facilitating interactions with their Spheres (e.g. unlocking cupboards, supervising use). This placed a lot of responsibility on the ward staff, who described difficulties in finding time to enable such engagements within the hectic, often unsettled ward environment, and in light of their other work commitments for organising the women's basic care that were governed by strict and explicit hospital guidelines. Moreover, having to respond to the complex and demanding needs of the women (cf. Fish, 2013) in addition to often long work shifts meant that in practice, there was little space for facilitating any additional (especially individual) activities.

9.4.3.2 Hospital Culture around Coping vs. Acceptance-based Practices of DBT

While the Spheres were intended to support the women in practices of *mindfulness* and other acceptance-based DBT skills such as *distress tolerance* (see 'keeping well' theme, Section 8.5),

there were only few instances of their use for such purposes. A lack of adoption of the Spheres for such mental health enhancing activities can partly be ascribed to the circumstance that DBT had only recently been introduced to the hospital, which meant that a large number of the ward staff were not yet familiar with, or trained in, this new therapy model; nor had a culture of DBT been fully established on the MSU. This restricted opportunities to integrate uses of the Spheres into any existing therapeutic, ward-based activities, and also challenged staff's ability to provide support and guidance to the women in the pursuit of mindfulness and other acceptance-based exercises.

Instead, the ward staff often described to have prompted and directed the women to use their Spheres as a means for 'coping' when they appeared anxious or had difficulties to settle. The use of coping strategies to support the women in crisis situations was a longstanding practice on the hospital wards, and was a concept that both the staff and women were very familiar with, and thus, had shaped its culture. Having adopted the Spheres within this culture around 'coping in crisis' and having been hopeful that the artefacts would have positive effects on the women, staff expressed disappointment that the women often refused engagements with their Spheres when they experienced emotional difficulties, or, if they had accepted their use, reported that their use did not help them cope, or prevent incidents from happening. While the Spheres were not designed for such use, the staff's expectations of, and hopes for, the Spheres as a tool that could support the women when they were distressed indicated an underlying wish for an effective coping strategy for these most difficult moments.

Thus, the role of the Spheres and their potential effectiveness are not only determined by the design of the technology in itself, but its incorporation into certain practices. The Spheres were not designed as a standalone technology that could independently and step-by-step teach the women in the practice of mindfulness, nor can it be expected of the Spheres (by themselves) that they will alter hospital culture or practices. Instead, the Spheres were designed to be embedded in a process that would allow the women to learn or exercise important therapeutic skills as well as to nurture facets of their mental wellbeing.

While I had facilitated guided practices that involved the use of the Mindfulness Sphere with the individual woman and, supported by the Local Investigator, also the group of women, uptake on the wards remained low. This highlighted the need for support by a local 'champion' (e.g. staff member of the women's direct care team) as well as more guidance and continued training for both the women and the ward staff. However, the opportunity for this was limited within the short duration of, and the resources available to (e.g. additional staff time), the project. This was further complicated by the context itself, which involved a large number of

staff in the women's care, rotations in their shifts as well as staff sickness, or leave. For example, the Research Nurse, who had been involved in the planning of the Spheres and assisted the creative sessions, had been moved to another ward by the time of the deployment. These findings align with recent reports of other researchers conducting fieldwork in hospital or residential care settings. Taneva et al. (2015, p.42) for example reported how the environment in highly specialised hospitals is often in constant flux and characterised by a large volume of often changing staff. This further means that some of the staff have little or no prior experience of working together. Moreover, with evolving policies, their roles and responsibilities adapt to the requirements of the situation, making it difficult to work out peoples' roles and status, and to develop rapport with the staff. Webster and Hanson (2014) too described how, despite a person-centred ethos to care, staff often have little time in their day for engaging in any activities that are not directly related to physical care.

9.4.3.3 Difficulties for Technology Integration within Treatment Services

Theoretically, the concept of the Spheres was considered by hospital staff to fit with existing practices and an integrated therapy model. However, in practice, explorations of how the Spheres could be integrated into treatment services (as an attempt to shift the focus from the project perception as a research field trial towards a process of adopting uses of the Spheres into hospital practices, cf. Taylor et al., 2013) revealed a number of additional challenges.

I have described, how my involvement with members of the Occupational Therapy (OT) team – who were natural candidates to take on and continue the creative activities with the women (e.g. to add-on new videos to the women's Identity Spheres) – through discussions about how these activities could be translated into their services had raised a number of safety concerns about their conduct and supervision within shorter time-frames and a group-based format, and also demanded additional staff training; all of which reduced opportunities for their incorporate into future service provision.

Similarly, while clinicians were generally very supportive of the Spheres (and contributed to their design from the outset), an integration of their uses into existing Psychological Treatment Services (PTS) proved challenging due to: (i) the limited number of women who possessed Spheres (instead of them being rolled out across the NHS), which would have created difficulties for facilitating engagements during group-based DBT skills sessions (risking to exclude women who did not possess any Spheres); and (ii) the limited availability of Clinical Psychologists, to teach and practice with the women uses of the Spheres outside individual therapy sessions. The therapy sessions themselves were considered too important

to substitute with an activity perceived as a test of an un-proven technology and approach, which would have been unethical. As such, this research followed a common protocol for feasibility studies, whereby the technology of the Spheres was not fully integrated into the treatment pathway (cf. Bardram et al., 2013).

Since the use of the Spheres was intended to be the responsibility of the women, I have to acknowledge however that, during the design stage, I had given insufficient consideration to how the artefacts could be integrated more closely into hospital practices (e.g. the design of specific ward activities around the Spheres that could be facilitated by the staff). Future research aiming to design technology for longer-term hospital deployments should explicitly discuss strategies for their integration within existing services, or for creating new services, from the outset; including considerations of staff training needs and approaches to maintain the technology (see also real-world deployment guidelines by Hansen et al., 2006). In this regard, and based on my own experiences of coming into the hospital environment, as an external researcher proposing alternative ways for participant engagement to domain experts, it is important that this process is carefully approached and managed in order to maximise the likelihood for the technology or service to be accepted.

9.5 Conclusions

The research presented in this thesis explored the design and evaluation of technology for promoting the mental health and wellbeing of extremely vulnerable women, who had very complex mental health needs and lived in a medium secure hospital service. While research on mental health and wellbeing is still a relatively new and under-developed area in HCI, I described how the field has recently begun to address important challenges in the treatment of mental illness. Prompted by current discussions in Healthcare and Psychology, and to advance state of the art technology design, I argued for a more holistic approach to improving mental health and wellbeing that includes strategies to enhance and protect a person's mental wellbeing (defined as positive emotional, psychological and social health) alongside approaches to treating mental illness to more effectively combat mental health problems and support peoples' quality of life.

I provided insights from collaborating closely with hospital staff in gaining a rich understanding of the design context and described how we balanced important identified safety, ethical and organisational requirements of the clinical context with sensitive approaches to, and some more open-ended ideas for, the design. This led to design specifications that were intended to be less associated with often generic and more formal medical practices, and

instead felt personal and unique to participants. Addressing the therapy goals, safety and wellbeing needs of our participants, the design sought to reduce stigma by foreground the person (not the illness) and to support engagement in mental health promoting activities through qualities of creativity, physicality and personal significance.

Responding to the need for identifying ethically-responsible avenues to engage in particular very vulnerable participants in research or design activities, I described a sensitive approach to involving the women in a co-creative personalisation process of their Spheres. In describing the qualities of this creative process and their outcomes, I drew out implications for future research aiming to construct activities that have the potential to maintain and contribute to participant wellbeing as part of the design process (and not just the designed intervention). In this regard, I highlighted the importance to consult 'local experts' of the participants for designing the activity, for learning how to appropriately respond to their emotional needs and cognitive abilities, and for building a relationship with them.

I introduced the specifications of the Spheres as interactive physical artefacts that were designed to promote the mental health and wellbeing of a group of women, who had severe mental health problems and a mild-to-moderate Learning Disability (LD), and who lived in a medium secure unit (MSU) of a forensic hospital in the UK. I explained how the women's use of, and experiences with, their Spheres contributed to important facets of their mental health and wellbeing (as well as their limitations), and discussed design qualities related to: opportunities for creative and personal investment; symbolic and sentimental value; and bridging physical and digital attributes, as strategies for enhancing motivation to engage with, and increasing accessibility of, the technology.

Discussing some of the challenges of working in this sensitive hospital context, I described how (severe) mental health problems of the participants can impact on the conduct of research and the wellbeing of the researcher, and discussed challenges for technology adoption in hospital settings. I re-emphasised the importance of 'safety' for technology design and for staff support in this context and described how a hectic, often unsettled ward environment and strictly regulated work responsibilities of the staff (e.g. physical care and safeguarding of the women) conflicted with their ability to attend to the Spheres. Moreover, I outlined how the existing hospital culture and the circumstance that Dialectical Behavioural Therapy (which informed the design of the Spheres) had only recently been introduced to the wards, restricted opportunities to integrate the Spheres into more acceptance-based mental health activities. This revealed the need for more and continued staff training, and also a local

technology 'champion' to sustain uses of the artefacts. Additional management challenges for integrating new technology or services within existing treatment practices were discussed.

Finally, I described my strategies for gaining an empathic understanding of the women's experiences with the technology that focused on gently building a relationship with the women and involved the collecting and incorporating of multiple perspectives that were offered by the women and the ward staff. I further highlighted the importance of my own involvement in, and experiences of, the women and their care context. Furthermore, I brought attention to how my understanding evolved over time, and how debriefings of my personal experiences of the context in conversations with clinical experts of this setting helped support my wellbeing and also the analysis, interpretation and integration of the research findings.

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Appendices

Appendix A: Thinking Objects

- Appendix A.1 Course Format, Methods & Findings
- Appendix A.2 Questionnaire Appendix
- A.3 Interview Guide

Appendix B: Spheres of Wellbeing

- Appendix B.1 Ethical Approval Process & REC Form
- Appendix B.2 List of Staff Professions
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- Appendix B.4 Event Card & Staff Diaries
- Appendix B.5 Example Tools List
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Appendix A: Thinking Objects

Appendix A.1 Course Format, Methods & Findings

Appendix A.2 Questionnaire

Appendix A.3 Interview Guide

Appendix A.1 Course Format,

Methods & Findings

THINKING OBJECTS

The following presents the pre-questionnaire of the Thinking Objects evaluation as it was presented to participants on the 1st November 2012. The post-questionnaire, which was administered on the 15th November 2012, is identical to the pre-questionnaire, however it omits the first page about personal data and the questionnaire items of each scale are counterbalanced.

Thinking Objects: Origin and Format

Thinking Objects is a three-day course led by Lindsay Allason-Jones, who until recently was the Director of the Centre for Interdisciplinary Artefact Studies (CIAS), Reader in Roman Material Culture and Director of Archaeological Museums for Newcastle University. The Thinking Objects course was originally developed by her as an educational strategy for teaching archaeology and museum studies students how to identify objects, explore and question their meanings. Since her students engaged very well in the course, Lindsay started to offer it as an outreach activity for a variety of groups interested in the subject over the last 10 years. Her experiences with the course suggested that there was considerable potential for using museum artefacts to engage people with mental health issues as a way to contribute to their general sense of well-being. In 2010, Lindsay co-organized an event called Feel Good that explored the potential use of ancient artefacts as a therapeutic medium for mental health issues that included mental health care providers and users, who all reported they had thoroughly enjoyed the Thinking Objects activities and wished to participate in them again. Shared conversations about this event and the format of the course more generally between Lindsay and me led us to initiate an evaluative study to investigate how the course might be of benefit to peoples' wellbeing. The Thinking Objects course consists of three weekly sessions, each of which is introduced below.

Session 1: The Green Plastic Bubble Bath Dinosaur

Over the years of teaching students how to identify ancient object, Lindsay noticed that they were initially very cautious and a little worried about holding ancient artefacts. Since the questions that archaeologists ask to identify an artefact can be applied to any object (see Table 1), Lindsay decided to introduce this interrogation method through a more modern artefact. Her object of choice is a green plastic dinosaur (see Figure 1), which had been a container for bubble bath. It is a light object, whose body is made of plastic while its neck is of rubber and can

be taken off to open the container. The object shows signs of it being used many years. As a toy, it is a safe object to be played with in the bathroom or classroom. The dinosaur has high emotional value to Lindsay, as she originally received it as a gift and it reminds her of her godchildren.



Figure 1. Lindsay Allason-Jones' green plastic bubble bath dinosaur.

In order to let the group explore the artefact, it is handed from person to person, while Lindsay asks a series of questions (see Table 1). Whoever is holding the dinosaur at the time a question is posed is expected to answer it. This gives everyone the opportunity to participate and presents the exercise in the nature of a game. The questions start with basic physical features such as the colour, size or texture of the artefact; followed by fundamental questions about how the object was constructed and used; and whether it was well designed for its intended purpose. Finally, the significance of the artefact is explored from its sentimental values to its social, economic or historical relevance. Some of these questions require the application of own life experiences, whilst others rely on participants being able to empathise with the people of the past.

Table 1. Artefact analysis questions used in the Thinking Objects course.

Characteristic	Question
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Physical features	What does it look, smell, feel like? What colour, shape and size is it? What is it made of? Is it made of one substance or several? Is it complete? Has it been altered or adapted? Has it been repaired? Have bits been added or taken away? Is it worn?
Construction	How has it been made? Machine, mould, press, by hand? All at once or over a period of time? By one person or several? Has it been glued, glazed, soldered? Has it got rivets, handle, sharp edge, fasteners?
Function	What purpose was the object made for? How has it been used? Has the use changed?
Design	Does it do the job it was intended to do? Were the most appropriate materials chosen? Is it aesthetically pleasing? Is it decorated? Why is it decorated? Is it well-designed or ad hoc?
Significance	What are its symbolic connotations? What are its sentimental connotations? What are its social connotations? What are its economic connotations? What are its historical connotations?

Session 2: The Deconstruction of Ancient Artefacts

Once the participants had learned how to identify and think about objects, they were invited in a second session to approach ancient artefacts using the same set of questions. The ancient artefacts (Figure 2) include fragments of broken pots, a 15th century German pot, a Roman brooch and coin, and a 4000 year old axe head. The objects are small, portable and have been chosen for their various material and tactile qualities.



Figure 2. The ancient artefacts of the second session ranging from fragments of broken pots, a Roman brooch, a 15th century German pot, a Roman coin and a 4000 year old axe head.

Session 3: Personally Meaningful Objects of the Participants

In the last session, participants were asked to bring an own object, which should be a real artefact (e.g. not a photo of an artefact), of personal significance to the individual and a reminder of a pleasant experience. The aim is to avoid objects that may trigger sad memories. Together with Lindsay and the other participants, the owner of the object then explores, similar to the previous session, why they brought the chosen object, by telling their personal story about this object and what constitutes its personal significance.

Evaluation Methodology

Recruitment and Participants

To recruit participants, information about the course was distributed via posters and flyers that were showcased on information boards and digital displays at Newcastle University, in public libraries and send out as attachments to selected email lists of university students and staff. Places on the workshop were awarded on a first come, first served basis.

Eight participants were invited to the workshop, two of which were male. Five of our participants indicated to fit in the age range of 26 to 35; one was between 36 and 45 years and two were between 56 and 65 years old. Of all participants, three were students, three were employed and two were self-employed. Two of the participants had worked with ancient artefacts before. Most of the participants did not know each other before the project started. One participant dropped out after the first week for personal reasons, and another two participants could not attend the last session due to vocational and child care commitments.

Since participants were self-selected to take part, a series of wellbeing measures were applied to help describe our sample. We found that participants generally reported *good levels of wellbeing* (WEMWEBS: $M = 32.75$ out of 56, $min=21$, $max=41$, $SD = 7.67$; PWBS-PG: $M=46.1$ out of 54, $min=31$, $max=54$, $SD=9.2$; PWBS-PLS: $M=40.6$ out of 54, $min=25$, $max=53$, $SD=10.2$; PGWB-S: $M = 14.75$ out of 30, $min=9$, $max=23$, $SD = 5.23$); and indicated that they felt *fairly often* stressed (PSS: $M=29.38$, $min=15$, $max=43$, $SD=9.3$). Three of eight participants had notably lower wellbeing scores than the remaining participants (WEMWEBS values of 21, 25 and 27, PGWB-S scores of 9, 10 and 13), and also reported higher levels of stress (PSS values of 31, 35 and 43).

Course Procedure and Assessment Tools

Each session was held in a small room in a University building called Culture Lab, and lasted 1 hour. Refreshments were offered throughout the course. Before Lindsay started the first session, I informed participants again about the purpose and procedure of the evaluation attached to the course and sought their informed, voluntary consent in writing. I then asked participants to generate a six digit anonymous identification code, which allowed for the confidential treatment and allocation of collected data across the three weeks to the same person. Participants were further given a questionnaire asking for basic personal information, such as their age, occupation and potential previous experiences with ancient artefacts. The questionnaire (see Appendix A.2) also included a variety of scales to assess the wellbeing and stress level of our participants.

The Warwick-Edinburgh Mental Well-being Scale (WEMWEBS, Tennant et al., 2007) is a positively worded 14 item measure to assess peoples' mental well-being, where participants indicate how often they experienced statements such as "*I've been feeling relaxed*" over the last two weeks. The questionnaire also included the 9 item versions of the Personal Growth (PG) and Purpose in Life (PL) scales of the Psychological Well-Being Scale (PWBS, Ryff & Keyes, 1995), since the course might lead participants to learn something new or to reflect about important aspects of their lives. Additionally, we applied the short version of the Psychological

General Well-being Index (PGWB-S, Grossi et al., 2006) to assess participant's perception of their psychological well-being. It includes only six statements asking participants, for instance, how often they felt "tired, worn out, used up, or exhausted during the past month". We also added the 12 item Cognitive and Affective Mindfulness Scale-Revised (CAMS-R, Feldman et al. 2007) to assess participants' ability to be mindful, and the Perceived Stress Scale (PSS; Cohen et al., 1983), a widely used 14 item measurement that assesses how often, over the last month, participants felt stressed. The questionnaire was given to participants once at the beginning and the end of the course, with items being counterbalanced.

To assess short-term effects that the sessions might have on participants' wellbeing, we designed mood charts asking participants to indicate on a scale of 0-100% how *happy* and *well* they felt at this exact moment in time. These were handed out to participants at the beginning and end of each session, and build closely on the visual analogue scale (VAS) to assess peoples' health status and general wellbeing that has previously been applied in wellbeing-related artefact studies (e.g., Thomson et al., 2012, p.737). The principal researcher (AT) also attended the course and acted as an additional participant to gain a better insight into the dynamics of the course. On completion of the course, the principal researcher invited participants to take part in a short semi-structured interview, which took on average 46 minutes (*min* = 34 min., *max* = 66 min.), were audio recorded, transcribed and carefully analysed using Thematic Analysis (Braun & Clarke, 2007). Participants were remunerated for their time spent completing the questionnaires and taking part in the interview with £10.

Participants Experiences of Thinking Objects Course

During our interviews, participants revealed different motivations for their attendance of the course that ranged from a primary interest in museums and artefact studies to being intrigued to identify new approaches to coping with stress. For some these motives were intertwined.

Enjoyment of the Session: Happiness, Wellbeing and Mindfulness

Participants experienced the atmosphere during the sessions as positive, friendly, warm and pleasant, as well as personal and intimate. They enjoyed the course, described it as fun and its content and style as both interesting and insightful.

Intellectual Stimulation: Coping with Everyday Life & Opportunity for Personal Growth

As part of the course, participants learned a new strategy of looking at and reflecting about objects, which they described as an enjoyable and intellectually stimulating experience. While the artefact questionnaire (Table 1) provided participants with "*a framework for looking at*

something new" (P6, male), insights shared by LAJ challenged at times participants' assumptions about the purpose of artefacts and required participants to extend and adapt their assumptions of certain objects, and to pay closer attention to detail.

Three participants described how they found the course relaxing and calming, as it made them bring their full attention to one thing at a time - the object that was being handled by the group. They found the activity both intellectually stimulating and also successful in taking their minds away from other stressful issues of lives. Having been asked to concentrate on something that one is interested in felt intrinsically rewarding; like "*thinking for the fun of it*" (P3, female). For one participant (P5, male), attending the course also felt "*like an escape in some ways*". He described it as a "*mental distraction*" where he could put "*all these other things that were going in [his] head on a day to day basis*" to one side and concentrate on something else, "*for the purposes of enjoyment*" and as "*a way of developing myself (...) developing the way that I think*" (P5).

Another participant regarded the course as a way to establish new skills that allow her "*to create a calm-relaxing place for my thoughts*" (P2, female) and that would help her to take herself away from day to day stresses. This participant had strong positive and emotional associations with the personal object she brought to the third session, which is removed from her work context, but could sit as a visual reminder on her desk to be there for her if she needs to ground and distract herself. She explained how using the artifact questionnaire in relation to her personal object could be a useful guide to help take in taking her mind of other things in her life. As such, she valued the artefacts potential to be used as a vehicle for mediation exercises, describing: "*I like the way it was described at the end as a way of meditation. Cause I kind of have this idea of meditation being sat in a room with legs crossed and, like this position, so it was a nice way of being able to introduce a way of self meditating without actually suggesting it is a bit hippy and mumbo jumbo you know*".

Session Enjoyment: Happiness and Wellbeing Scores

Results from the mood charts that were given to participants at the beginning and end of each session showed constant increases in both participants wellbeing and happiness scores at the end of each week's session (see Figure 3). Results of a 2-tailed Wilcoxon test (to avoid α inflation) for each of the six 6 pairs further revealed that these differences were significant in the first week, showing higher reported wellbeing scores ($Z=-2.023$, $p=.043$; $MD_{\text{before}}=.73$, $SD_{\text{before}}=.2$; $MD_{\text{after}}=.8$, $SD_{\text{after}}=.18$), and improved happiness ($Z=-2.375$, $p=.018$; $MD_{\text{before}}=.69$,

$SD_{\text{before}} = .19$; $MD_{\text{after}} = .79$, $SD_{\text{after}} = .15$). Whilst we need to be careful in the interpretation of these findings with regard to participants' general health and wellbeing, the results could be understood as an indication of their enjoyment of the sessions.

Wilcoxon tests for participants' pre and post course assessments of their wellbeing and stress levels, revealed significant improvements only for the WEMWEBS ($Z = -2.032$, $p = .042$; $MD_{\text{pre}} = 32.75$, $SD_{\text{pre}} = 7.67$; $MD_{\text{post}} = 36$, $SD_{\text{post}} = 7.21$) with a high effect size of Cohen's $d = 0.93$. Measures of the PWBS showed a trend towards increases in participants wellbeing scores with medium effect sizes of $d = 0.67$ for Personal Growth and $d = 0.47$ for Purpose in Life. The scores of the PGWB-S (general wellbeing) and PSS (perceived stress) scales that focus on an extended period of time (over the last month), and also the scores on the CAMS-R (cognitive and affective mindfulness) remained unchanged.

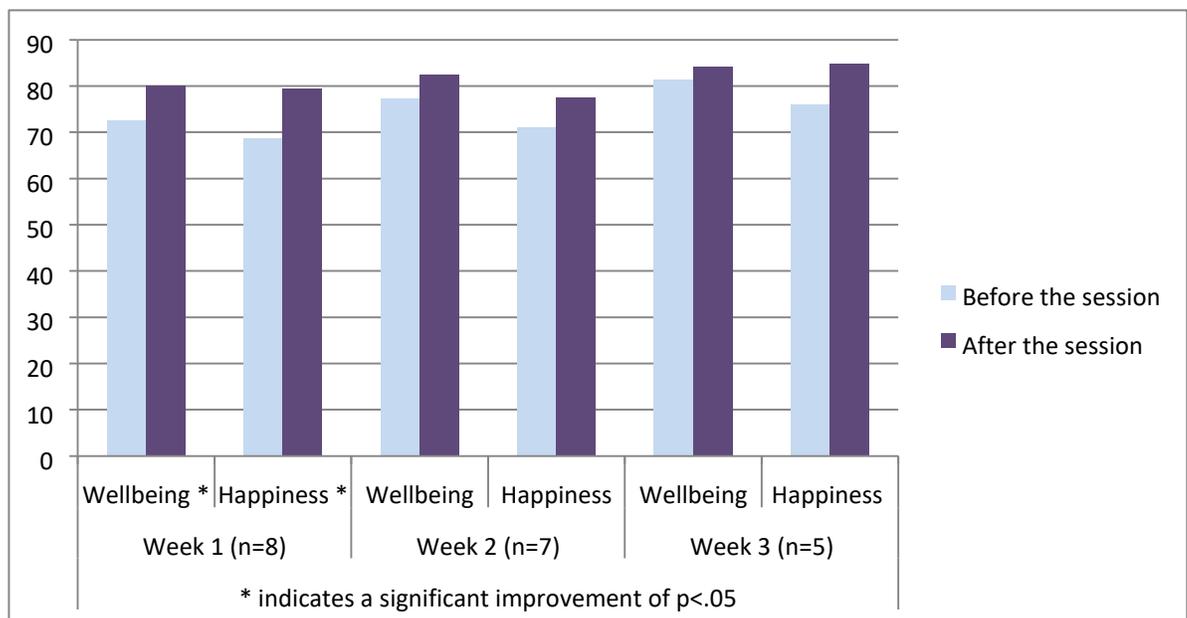


Figure 3. Findings of the mood charts showing participants' wellbeing and happiness scores (on a scale of 0-100%) before and after each session and over the period of the 3 week course.

Group-Process of Learning a new Perspective on Artefacts

Participants perceived the course as an object handling class, where new knowledge was not formally taught or imparted, but instead evolved through conversations between members of the group, sharing their opinions and previous experiences about objects.

Equal Expertise

The interrogation of artefacts was done in a staged way, beginning with the plastic dinosaur, which set up a procedural framework for the subsequent sessions. While most participants initially felt a little apprehensive, nervous and unsure about what to expect of the course and the group, such worries diminished quickly with the introduction of the dinosaur. Through

handling and questioning this artefact, participants came to realise that the activity was also less serious, less theoretical and more fun than they expected.

Participants liked the dinosaur, not for its aesthetic or material qualities, but because it was an interesting and fun artefact with a unique story whose personal significance to LAJ was considered worthy of attention. Participants felt generally comfortable with handling it, taking it apart, and talking or making jokes about it. They also thought of it as a good icebreaker that lightened the mood and helped lower barriers. It removed any fears that participants needed specialist knowledge to engage in this course; instead they felt on a level footing with the other participants.

Equal Engagement: The Challenge of Empowering each Group Member

The course format involved the passing of artefacts from one person to another, taking turns in answering questions; this allowed everyone to become engaged in the activity. One participant describes how: *“holding the object gave the participant a certain degree of power within the group and it meant that they were empowered to speak and that there was an expectation that other people would listen to what they had to say. (...) So it had this effect of drawing everybody in the room into the activity.”* (P5, male).

Less confident participants, however, reported that it was a little nerve wracking to be put on the spot and talk in front of a group of strangers. There was also an underlying expectation to contribute new thoughts or insights to the discussion, which can feel pressuring. Over the weeks, participants generally reported feeling more relaxed with a better understanding of both the course contents and the other participants. To empower participants and assure equal engagement of all involved without risking making individuals feel uncomfortable, requires very good group facilitator skills.

Sense of Privilege: Handling Museum Artefacts

Difference to Museum Experiences: Own Interpretations & Handling of Objects

The removal of the objects from the museum context and thus from an often prescriptive context of how they would usually be interpreted, creates a certain ambiguity around the artefacts that invites reflection and sense-making processes that otherwise would not be stimulated. This can nurture feelings of curiosity about an object and offers opportunities to create stories around it (e.g., who would have made it, owned it, or used it?). While some ambiguity can be reduced by LAJ sharing her archaeological expertise (e.g., where an artefact has been found, its age), attempts to resolve the remaining uncertainties allow for unusual and inspiring discussions.

Not only were participants invited to share their own assumptions about an artefact, they also felt privileged to be allowed to touch these museum artefacts that are usually in glass cases. As this enabled much richer sensual experiences, participants reported being fascinated by the detail on the surface of the coins, imperfections in the texture or glazing of the pot, the sharpness and flexibility of the pin of the brooch or how its shape held fabrics together, and the sleekness of the axe head and its uses as a tool.

Personal Worries of Handling Ancient Artefacts vs. Permission by Lindsay

Since handling a variety of ancient artefacts was a special and unique opportunity for most participants, they treated these objects respectfully, assuming they had high archaeological or monetary value. Handling these objects came with the responsibility to avoid dropping or breaking them, which led participants feel slightly nervous, hesitant or worried when passing the artefacts around, particularly the more fragile objects like the pot or brooch. Such worries, however, decreased quickly over the course of the session and were ameliorated by the fact that LAJ trusted the group and had given them permission to touch and explore these artefacts.

Connection to Past vs. Indifference to Age of the Artefacts

Participants enjoyed exploring the old artefacts and they reported feeling a connection to the past in handling them, as they were aware they were holding objects that someone made and lived with thousands of years ago. However, the majority of participants said that the underlying age of the object was not of particular importance to them, and that they would have got a lot out of the course even if they had engaged with more modern artefacts instead.

Identity Construction & Reconstruction: Exploration of Self in Relation to Objects

As part of the third session, the process of selecting an object of their and showing it to the group whilst articulating the story behind it, helped clarify and make more explicit to participants why their chosen object is of personal significance to them.

Manifestation of Self through Personal Objects

Participants brought a truly diverse and highly individual range of objects, from several pieces of jewellery (e.g., rings, earrings) to a handmade shirt, a door knob showing Jesus and a plastic tray with miniature food. Participants' artefact choice was informed by practical concerns (e.g., availability, could it be carried safely); its personal relevance (significantly important, but not too personal); and its suitability for telling a positive, interesting and coherent story. Most objects were either souvenirs from trip abroad that reflected unique, meaningful travel experiences; objects which reminded the owners of their important relationships; or had been owned by the person for a long time.

Almost all the participants were emotionally attached to their object and would not have wished to give it away, unless to someone very special. One participant attributes this to ownership: *“Because it would be like giving away parts of myself. And my worry would be that they would see it as a plastic object that was you know, not very attractive or that they wouldn’t value it in the same way” (P4, female)*. For her, the biggest value of objects is the narratives attached to them through which she can say something about herself: *“It’s the power of the stories. It’s the fact that I can pick this up and tell you something about my life rather than anything else that is the value to me”*.

Identity Performance through Object Handling within the Group

In telling their story about an artefact, participants not only reconstructed or constructed their relationship to it, but also provided the other participants with an interesting snapshot into the person behind the object. Participants reported having enjoyed listening to the individual stories, because *“That was when you got a really good insight into people’s character, by what they’d chosen to bring along” (P1, female)*. She continued to explain that *“this [the last session] was kind of obviously the bit where it was really about us almost, rather than the objects. Because the objects were there but it was kind of more about what the people, inevitably they were talking more about themselves than about the objects. So you really learned things about people I think.”*

Being linked to the person’s identity, objects can be used to perform socially and reveal aspects of the person, when their stories were narrated to the others. Participants had also revealed something about themselves in previous sessions through the way they approached and handled the different artefacts. Behavioural observations of how confident others were in passing objects around, what they were particularly focusing on or commenting on etc. provided insights into their personality and helped identify if someone, for instance, was likely to be contemplative and curious, or rather shy. While participants started to build up a picture of each other, and felt they had got to know one another a little bit better towards the end, they did not engage in any socialising activities beyond the completion of the course.

Limitations

Although our findings indicate that participants experienced the course as a stimulating, socially interesting and personally meaningful activity, we have to acknowledge that our evaluation is based on a small sample, that participants have been self-motivated to attend, and generally interested in the topic. Moreover, whilst the Thinking Objects course valuably contributed to different facets of peoples’ psychological wellbeing, it remains subject to future research to

investigate how pleasurable outcomes from the sessions can be maintained and translated into longer term benefits.

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Appendix A.2 Questionnaire

THINKING OBJECTS

The following presents the pre-questionnaire of the Thinking Objects evaluation as it was presented to participants on the 1st November 2012. The post-questionnaire, which was administered on the 15th November 2012, is identical to the pre-questionnaire, however it omits the first page about personal data and the questionnaire items of each scale are counterbalanced.

THINKING OBJECTS

Questionnaire

1st November 2011

Generation of your anonymous identification code:

To ensure the confidentiality of your data we would like you to generate a 6-digit identification code before filling out the questionnaire.

This identification code allows us to allocate the information to the same - yet anonymous - participant.

It encompasses:

The day of your birthday (e.g. 29.07.1980):

(e.g., 29)

The first two letters of your mother's maiden name (e.g. Smith):

(e.g., SM)

The second and third letter of your birth place (e.g. Liverpool):

(e.g., IV)

Personal Information

To which age group do you belong?

- | | |
|-------------------------------|-----------------------------------|
| <input type="radio"/> 18 – 25 | <input type="radio"/> 56 – 65 |
| <input type="radio"/> 26 – 35 | <input type="radio"/> 66 – 75 |
| <input type="radio"/> 36 – 45 | <input type="radio"/> 76 and over |
| <input type="radio"/> 46 – 55 | |

Are you currently...

- ... a student?
- ... employed
- ... self-employed
- ... unemployed
- ... other (please specify): _____

Have you ever worked with ancient artefacts before?

- No
- If yes, please specify in which context:

Recent Thoughts and Feelings

Below are some statements about feelings and thoughts. Please tick the box that best describes your experiences of each over the last 2 weeks:

Statement	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling relaxed	<input type="radio"/>				
I've been feeling optimistic about the future	<input type="radio"/>				
I've been feeling useful	<input type="radio"/>				

I've been feeling interested in other people	9	9	9	9	9
I've had energy to spare	9	9	9	9	9
I've been dealing with problems well	9	9	9	9	9
I've been thinking clearly	9	9	9	9	9
I've been feeling good about myself	9	9	9	9	9
I've been feeling close to other people	9	9	9	9	9
I've been feeling confident	9	9	9	9	9
I've been able to make up my mind about things	9	9	9	9	9
I've been feeling loved	9	9	9	9	9
I've been interested in new things	9	9	9	9	9
I've been feeling cheerful	9	9	9	9	9

Relation to Thoughts and Feelings

People have a variety of ways of relating to their thoughts and feelings. For each of the items below, rate how much each of these ways applies to you.

Statement	Rarely/ Not at all	Sometimes	Often	Almost always
It is easy for me to concentrate on what I am doing.	1	2	3	4
I am preoccupied by the future.	1	2	3	4

I can tolerate emotional pain.	1	2	3	4
I can accept things I cannot change.	1	2	3	4
I can usually describe how I feel at the moment in considerable detail.	1	2	3	4
I am easily distracted	1	2	3	4
I am preoccupied by the past.	1	2	3	4
It's easy for me to keep track of my thoughts and feelings.	1	2	3	4
I try to notice my thoughts without judging them	1	2	3	4
I am able to accept the thoughts and feelings I have.	1	2	3	4
I am able to focus on the present moment.	1	2	3	4
I am able to pay close attention to one thing for a long period of time.	1	2	3	4

Interests and Daily Activities

Please circle the number that best describes your present agreement or disagreement with each statement.

Statement	Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewhat	Strongly Agree
I am not interested in activities that will expand my horizons.	1	2	3	4	5	6

I don't want to try new ways of doing things – my life is fine the way it is.	1	2	3	4	5	6
I think it is important to have new experiences that challenge how you think about yourself and the world.	1	2	3	4	5	6
When I think about it, I haven't really improved much as a person over the years.	1	2	3	4	5	6
I have a sense that I have developed a lot as a person over time.	1	2	3	4	5	6
I do not enjoy being in new situations that require me to change my old familiar ways of doing things.	1	2	3	4	5	6
For me, life has been a continuous process of learning changing, and growth.	1	2	3	4	5	6
I gave up trying to make big improvements or changes in my life a long time ago.	1	2	3	4	5	6
There is truth to the saying that you can't teach an old dog new tricks	1	2	3	4	5	6

Statement	Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewhat	Strongly Agree
I live life one day at a time and don't really think about the future.	1	2	3	4	5	6

I tend to focus on the present, because the future nearly always brings me problems.	1	2	3	4	5	6
My daily activities often seem trivial and unimportant to me.	1	2	3	4	5	6
I don't have a good sense of what it is I'm trying to accomplish in life.	1	2	3	4	5	6
I used to set goals for myself, but that now seems like a waste of time.	1	2	3	4	5	6
I enjoy making plans for the future and working to make them reality.	1	2	3	4	5	6
I am an active person in carrying out the plans I set for myself.	1	2	3	4	5	6
Some people wander aimlessly through life, but I am not one of them.	1	2	3	4	5	6
I sometimes feel as if I've done all there is to do in life.	1	2	3	4	5	6

Feelings of Nervousness, Vitality or Stress

Have you been bothered by nervousness or your “nerves” during the past month?

- Extremely so – to the point where I could not work or take care of things..... 0
- Very much so..... 1
- Quite a bit..... 2
- Some – enough to bother me..... 3
- A little..... 4
- Not at all..... 5

How much energy, pep, or vitality did you have or feel during the past month?

- Very full of energy – lots of pep..... 5
- Fairly energetic most of the time..... 4
- My energy level varied quite a bit..... 3
- Generally low in energy or pep..... 2
- Very low in energy or pep most of the time..... 1
- No energy or pep at all – I fell drained, sapped..... 0

I felt downhearted and blue during the past month.

- None of this time..... 5
- A little of the time..... 4
- Some of the time..... 3
- A good bit of the time..... 2
- Most of the time..... 1
- All of the time..... 0

I was emotionally stable and sure of myself during the past month.

- None of the time..... 0
- A little of the time..... 1
- Some of the time..... 2
- A good bit of the time..... 3
- Most of the time..... 4
- All of the time..... 5

I felt tired, worn out, used up, or exhausted during the past month.

- None of the time..... 5
- A little of the time..... 4
- Some of the time..... 3
- A good bit of the time..... 2
- Most of the time..... 1
- All of the time..... 0

Have you been under or felt you were under any strain, stress, or pressure during the past month?

- Yes – almost more than I could bear or stand..... 0
- Yes – quite a bit of pressure..... 1
- Yes, some – more than usual..... 2
- Yes, some – but about usual..... 3
- Yes – a little..... 4
- Not at all..... 5

Personal Stress

In each of the following statements you will be asked to indicate how often you felt or thought a certain way.

Statement	Never	Almost never	Sometimes	Fairly Often	Very Often
In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
In the last month, how often have you dealt successfully with irritating life hassles?	0	1	2	3	4
In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?	0	1	2	3	4
In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
In the last month, how often have you felt that things were going your way?	0	1	2	3	4
In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
In the last month, how often have you been angered because of things that happened that were outside of your control?	0	1	2	3	4
In the last month, how often have you found yourself thinking about things that you have to accomplish?	0	1	2	3	4
In the last month, how often have you been able to control the way you spend your time?	0	1	2	3	4
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Thank you very much!

Appendix A.3 Interview Guide

THINKING OBJECTS

The following presents the interview guide and -questions asked as part of the Thinking Objects evaluation.

Interview Guide

General Questions

How did you find the workshop? What did you like and dislike the most?
Can you remember how it felt like when you first arrived at the workshop?
How would you describe the workshop (to another person)?
What do you think this workshop was aiming at?
What did you personally take from the workshop with Lindsay? Which was your favourite session? Can you explain why?

First Session

What were your first impressions of the green plastic dinosaur?
What did you think when Lindsay introduced it to the group?
How would you describe the dinosaur?
If you would have to give it a name, what would it be called? What personality would it have?
Do you like the dinosaur? What is it about it that you like or dislike?
How easy or difficult was it for you to talk about the dinosaur in front of the group? Did you like talking about it? Why/ why not?

Second Session

What were your impressions of the second session?
How did you feel about handling the objects? [display artefact pictures] Did you find one of the objects particularly interesting/fascinating? Why?
How would you describe how other people handled the objects? How did they approach them? How did they feel about them? (Are there any differences?) How did you feel about the object itself?
Was it in any way different to visits to museums? How?

Third Session

In the third workshop session, what kind of artefact did you bring from your home?
How did you decide which artefact you wanted to bring?
How did you decide which artefact to choose?
What makes this artefact personally meaningful to you?
What qualities of this artefact do you value the most? Why?
When you look at this artefact now, do you look at it any differently? What are you associating with it?
Did your perception of the objects in your home change through the sessions?

Other

Did handling the artefact and answering the questions make you think about other objects in your life? Did you think about other things as well (e.g. the relation of the session to your work, life or more fundamental things in life)?
Do you think the workshop may impact on your next museum's visit? How/ why or why not?
Did you know any of the workshop participants beforehand? During the three weeks of the workshop, did you have a chance to get to know any of the other workshop participants?

Appendix B: Spheres of Wellbeing

Appendix B.1 Ethical Approval Process & REC Form

Appendix B.2 List of Staff Professions

Appendix B.3 Information Sheet & Consent Form for Service Users

Appendix B.4 Event Card & Staff Diaries

Appendix B.5 Example Tools List

Appendix B.6 Fabrication

Appendix B.7 Example Transcript & Coding

Appendix B.1 Ethical Approval Process & REC Form

SPHERES OF WELLBEING

The following presents a timeline overview of the overall process of gaining ethical approval and an anonymised copy of the NHS Research Ethics (REC) form. The timeline includes (i) the gathering of required application documents such as the research protocol, research materials, independent reviews and the confirmation of funding and sponsorship of the project; (ii) the submission of applications for PAF and REC and R&D approval by the NHS and the hospital Trust,;and (iii) training and permissions needed for the principal researcher including Breakaway training, a signed agreement to govern the conduct of the post-graduate studentship with the hospital, and a Research Passport to receive a Letter of Access (LOA).

Month	Dates	Required Application Documents	Submission Process (Project Approvals)	Researcher Approvals
July	26.07.2012	Research Protocol and attachments finalised		
August	03.08.2012	Independent external reviews completed		
	06.08.2012		Portfolio Application Submission (PAF) for NIHR CRN (Clinical Research Network) support	
	16.08.2012	Application for sponsorship by Newcastle University/ NUH† (Newcastle University Hospital Trust)		Application for Research Passport
September	11.09.2012			Research Passport signed by HR (Newcastle Univ.)
	14.09.2012			
October	04.10.2012		Approval of PAF (Study eligible for inclusion on NIHR CRN)	
			Registration of study on CSP (Coordinated System for gaining NHS Permission)	
	11.10.2012	Sponsorship rejected by Newcastle University & NUH†		
	17.10.2012	Confirmation of sponsorship by Calderstones Partnership NHS Foundation Trust		
	31.10.2012			
November	07.11.2012	CLRN/LTHTR: Arrangement for financial support by NIHR CRN	Submission of NHS REC, R&D and SSI forms via IRAS for ethical review by NHS REC Newcastle & North Tyneside 2	

	21.11.2012	NHS REC meeting (Newcastle & North Tyneside 2)	
December	06.12.2012	NHS REC approval (Favourable Opinion)	
	17.12.2012	R&D approval Calderstones Partnership NHS Foundation Trust	
	20.12.2012		'Breakaway' Training
	21.12.2012		Studentship Contract
January	02.01.2013		Letter of Access (LOA)

Welcome to the Integrated Research Application System

IRAS Project Filter

The integrated dataset required for your project will be created from the answers you give to the following questions. The system will generate only those questions and sections which (a) apply to your study type and (b) are required by the bodies reviewing your study. Please ensure you answer all the questions before proceeding with your applications.

Please enter a short title for this project (maximum 70 characters)
Spheres of Wellbeing: Technology to promote mindfulness and self

1. Is your project research?

Yes No

2. Select one category from the list below:

- Clinical trial of an investigational medicinal product
- Clinical investigation or other study of a medical device
- Combined trial of an investigational medicinal product and an investigational medical device
- Other clinical trial to study a novel intervention or randomised clinical trial to compare interventions in clinical practice
- Basic science study involving procedures with human participants
- Study administering questionnaires/interviews for quantitative analysis, or using mixed quantitative/qualitative methodology
- Study involving qualitative methods only
- Study limited to working with human tissue samples (or other human biological samples) and data (specific project only)
- Study limited to working with data (specific project only)
- Research tissue bank
- Research database

If your work does not fit any of these categories, select the option below:

Other study

2a. Please answer the following question(s):

- a) Does the study involve the use of any ionising radiation? Yes No
- b) Will you be taking new human tissue samples (or other human biological samples)? Yes No
- c) Will you be using existing human tissue samples (or other human biological samples)? Yes No

3. In which countries of the UK will the research sites be located?(Tick all that apply)

- England
- Scotland
- Wales
- Northern Ireland

3a. In which country of the UK will the lead NHS R&D office be located:

- England
 Scotland
 Wales
 Northern Ireland
 This study does not involve the NHS

4. Which review bodies are you applying to?

- NHS/HSC Research and Development offices
 Social Care Research Ethics Committee
 Research Ethics Committee
 National Information Governance Board for Health and Social Care (NIGB)
 Ministry of Justice (MoJ)
 National Offender Management Service (NOMS) (Prisons & Probation)

For NHS/HSC R&D offices, the CI must create Site-Specific Information Forms for each site, in addition to the study-wide forms, and transfer them to the PIs or local collaborators.

5. Will any research sites in this study be NHS organisations?

- Yes No

5a. Do you want your NHS R&D application(s) to be processed through the NIHR Coordinated System for gaining NHS Permission?

- Yes No

If yes, you must complete and submit the NIHR CSP Application Form immediately after completing this project filter, before proceeding with completing and submitting other applications.

6. Do you plan to include any participants who are children?

- Yes No

7. Do you plan at any stage of the project to undertake intrusive research involving adults lacking capacity to consent for themselves?

- Yes No

Answer Yes if you plan to recruit living participants aged 16 or over who lack capacity, or to retain them in the study following loss of capacity. Intrusive research means any research with the living requiring consent in law. This includes use of identifiable tissue samples or personal information, except where application is being made to the NIGB Ethics and Confidentiality Committee to set aside the common law duty of confidentiality in England and Wales. Please consult the guidance notes for further information on the legal frameworks for research involving adults lacking capacity in the UK.

8. Do you plan to include any participants who are prisoners or young offenders in the custody of HM Prison Service or who are offenders supervised by the probation service in England or Wales?

- Yes No

9. Is the study or any part of it being undertaken as an educational project?

- Yes No

Please describe briefly the involvement of the student(s):

The CI is a PhD Student

9a. Is the project being undertaken in part fulfilment of a PhD or other doctorate?

Yes No

10. Will this research be financially supported by the United States Department of Health and Human Services or any of its divisions, agencies or programs?

Yes No

11. Will identifiable patient data be accessed outside the care team without prior consent at any stage of the project (including identification of potential participants)?

Yes No

Integrated Research Application System
Application Form for Research administering questionnaires/interviews for quantitative analysis or mixed methodology study


National Patient Safety Agency
 National Research Ethics Service

Application to NHS/HSC Research Ethics Committee

The Chief Investigator should complete this form. Guidance on the questions is available wherever you see this symbol displayed. We recommend reading the guidance first. The complete guidance and a glossary are available by selecting [Help](#).

Please define any terms or acronyms that might not be familiar to lay reviewers of the application.

Short title and version number: (maximum 70 characters - this will be inserted as header on all forms)
 Spheres of Wellbeing: Technology to promote mindfulness and self

Please complete these details after you have booked the REC application for review.

REC Name:
 Newcastle & North Tyneside 2

REC Reference Number:
 12/NE/0386

Submission date:
 30/10/2012

PART A: Core study information

1. ADMINISTRATIVE DETAILS

A1. Full title of the research:

Collaborative design, deployment and evaluation of a set of interactive digital artefacts (the Spheres of Wellbeing) to engage female inpatients in a medium secure hospital unit, who have a dual diagnosis of Learning Disability and Borderline Personality Disorder, in practices of mindfulness and to strengthen their sense of self.

A2-1. Educational projects

Name and contact details of student(s):

Student 1

	Title	Forename/Initials	Surname
	Miss	Anja	Thieme
Address	Culture Lab - Newcastle University King's Walk Grand Assembly Rooms		
Post Code	NE1 7RU		
E-mail			

Telephone
Fax

Give details of the educational course or degree for which this research is being undertaken:
Name and level of course/ degree:
PhD in Computing Science

Name of educational establishment:
Newcastle University

Name and contact details of academic supervisor(s):

Academic supervisor 1

	Title Forename/Initials Surname
	Dr. Thomas D. Meyer
Address	Ridley Building Institute of Neuroscience Doctorate in Clinical Psychology
Post Code	NE1 7RU
E-mail	
Telephone	
Fax	

Academic supervisor 2

	Title Forename/Initials Surname
	Prof. Patrick Olivier
Address	Culture Lab - Newcastle University King's Walk Grand Assembly Rooms
Post Code	NE1 7RU
E-mail	
Telephone	
Fax	

Please state which academic supervisor(s) has responsibility for which student(s):
Please click "Save now" before completing this table. This will ensure that all of the student and academic supervisor details are shown correctly.

Student(s)	Academic supervisor(s)
Student 1 Miss Anja Thieme	<input checked="" type="checkbox"/> Prof. Patrick Olivier <input checked="" type="checkbox"/> Dr. Thomas D. Meyer

A copy of a current CV for the student and the academic supervisor (maximum 2 pages of A4) must be submitted with the application.

A2-2. Who will act as Chief Investigator for this study?

- Student
- Academic supervisor

Other

A3-1. Chief Investigator:

	Title Forename/Initials Surname
	Miss Anja Thieme
Post	PhD Student
Qualifications	2010 MSc Cognition and Media Sciences 2007 BSc Applied Communication and Media Sciences 2004 Abitur
Employer	Newcastle University
Work Address	Culture Lab King's Walk Grand Assembly Rooms
Post Code	NE1 7RU
Work E-mail	
* Personal E-mail	
Work Telephone	
* Personal Telephone/Mobile	
Fax	

** This information is optional. It will not be placed in the public domain or disclosed to any other third party without prior consent.
A copy of a current CV (maximum 2 pages of A4) for the Chief Investigator must be submitted with the application.*

A4. Who is the contact on behalf of the sponsor for all correspondence relating to applications for this project?
This contact will receive copies of all correspondence from REC and R&D reviewers that is sent to the CI.

	Title Forename/Initials Surname
Address	
Post Code	
E-mail	
Telephone	
Fax	

A5-1. Research reference numbers. *Please give any relevant references for your study:*

Applicant's/organisation's own reference number, e.g. R & D (if available):	2012-03
Sponsor's/protocol number:	1.0
Protocol Version:	1.0
Protocol Date:	26/07/2012
Funder's reference number:	
Project website:	

Additional reference number(s):

Ref. Number	Description	Reference Number

Registration of research studies is encouraged wherever possible. You may be able to register your study through your NHS organisation or a register run by a medical research charity, or publish your protocol through an open access publisher. If you have registered your study please give details in the "Additional reference number(s)" section.

A5-2. Is this application linked to a previous study or another current application?

Yes No

Please give brief details and reference numbers.

2. OVERVIEW OF THE RESEARCH

To provide all the information required by review bodies and research information systems, we ask a number of specific questions. This section invites you to give an overview using language comprehensible to lay reviewers and members of the public. Please read the guidance notes for advice on this section.

A6-1. Summary of the study. *Please provide a brief summary of the research (maximum 300 words) using language easily understood by lay reviewers and members of the public. Where the research is reviewed by a REC within the UK Health Departments Research Ethics Service, this summary will be published on the website of the National Research Ethics Service following the ethical review.*

The proposed research follows a person-centred, collaborative approach in the development of a set of innovative, interactive objects (the 'Spheres of Wellbeing') designed specifically for women with a dual diagnosis of Learning Disability and Borderline Personality Disorder, who live in a medium secure unit of a UK hospital. The women present a client group that is very vulnerable and difficult to treat due to their extremely challenging behaviours, complex needs and a persistent lack of motivation to engage in therapy. Simultaneously, they have a strong need for attention, care and positively-experienced interactions. To this end, the 'Spheres of Wellbeing' are designed to engage the women in practices of mindfulness, to help them tolerate emotional distress and to strengthen their sense of self, which are vital components of Dialectical Behavioural Therapy – an effective, specialist treatment for their complex condition. The functionality of the Spheres is informed by the literature and has been established in meetings with staff to ensure that the objects are safe for the women to use and present a suitable addition to their treatment. The 'Mindfulness Sphere' is a ball-shaped artefact that assesses and reflects a person's heart rate through soft pulsating vibrations and colourful lights, providing a new, experiential way of bringing awareness to one's body. The 'Calming Sphere' is a bead-bracelet that the women can hold on to at times of emotional distress, and the 'Identity Sphere' gently invites the women to engage with short personalised videos, allowing them to explore and reconnect to meaningful experiences and positive aspects of their self. In the spirit of the person-centred agenda, the project actively involves both staff and the women throughout the research process and empowers the women to contribute to a personalised design of their set of Spheres artefacts. The research investigates how technology may provide a useful and effective complement to therapy, helps overcome motivational barriers and enhances the wellbeing of individuals with severe mental health problems. The research is funded by the Research Council UK Digital Economy Hub on "Social Inclusion through the Digital Economy" (SiDE; EP/G0660191/1).

A6-2. Summary of main issues. *Please summarise the main ethical, legal, or management issues arising from your study and say how you have addressed them.*

Not all studies raise significant issues. Some studies may have straightforward ethical or other issues that can be identified and managed routinely. Others may present significant issues requiring further consideration by a REC, R&D office or other review body (as appropriate to the issue). Studies that present a minimal risk to participants may raise complex organisational or legal issues. You should try to consider all the types of issues that the different reviewers may need to consider.

Research aim:

The research investigates the potential of technology to usefully and effectively complement psychosocial treatment programmes of individuals with severe mental illness. To this end, the research develops and deploys a set of objects with incorporated technology (the 'Spheres of Wellbeing') that are specifically designed for women with a dual diagnosis of Learning Disability and Borderline Personality Disorder, who live in a medium secure unit of a UK hospital. It is hoped that interactions with these digital objects will help the women to overcome motivational difficulties to engage in activities that assist them in the learning and practice of mindfulness skills, to tolerate emotional distress,

and strengthen their sense of self. An engagement in such activities can help them achieve a better quality of life and enhance their mental wellbeing.

Proposal and Review:

The idea for the research project was first presented to female inpatients in the medium secure unit of the during a visit of the researchers. The researchers had a chat with three clients who showed interest in the project. The visit and the positive feedback of potential participants and the ward staff initialised the planning of this research. The proposal has been developed in close collaboration with the Research and Development team of the Trust. It has undergone an independent external peer review by

to assess and confirm its scientific quality. It has also been reviewed within the research team of the CI including the educational supervisors of the PhD student.

Funding and Sponsoring:

The study is funded by the programme grant SiDE "Social inclusion through the Digital Economy" (EP/G0660191/1) through the Digital Economy Programme that is led by the Engineering and Physical Sciences Research Council (EPSRC). The Digital Economy programme brings together the work of EPSRC and that of the Economic and Social Research Council (ESRC), the Medical Research Council (MRC) and the Arts and Humanities Research Council (AHRC). The research is sponsored by the Calderstones Partnership NHS Foundation Trust. No commercial organisation is involved in the sponsorship of the research and there is no financial reward.

Recruitment and Process of Seeking Consent:

For the recruitment of service users, the researcher will provide a selection of inclusion and exclusion criteria to the R&D department of the hospital, who will check the criteria against the women's records and thereby arranges the identification of potential participants. The researchers themselves will at no time have access to personal records of potential participants or any other register.

The researchers will explain the project to both members of staff on the unit (accompanied by the R&D manager of the hospital) and the service users (accompanied by ward staff). All potential participants of this research will be provided with a written information sheet and consent form, and they will be given sufficient time to reflect about their potential involvement in the research. The information sheets provide detailed information about the potential benefits and burdens of the research and highlights that their participation is entirely voluntary and that there will be no negative consequences, if they choose not take part in the project. At all times, the researchers will make sure that the participants' own interests are protected. The information sheet and the consent form for service users are designed to meet the abilities and preferences of individuals with Learning Disabilities to support understanding.

The users of these services who are to be recruited for this research will be given one week to carefully reflect on whether they would like to participate or not. During this time period, the women will be encouraged by members of staff to talk with them, family members, friends or their independent point of contact about whether they would like to take part in the research or not. This longer time period and the opportunity to discuss the research and ask questions about it allow for a more careful decision about their participation. After initial consent, and one week after introducing the research, the researcher will seek informed consent in writing from potential participants. In addition, the consent form explains that their data will be treated anonymously, that any personal information is stored safely, and that they can stop taking part in the research at any time without giving a reason for doing so. Particular care will be taken to explain to potential participants that their participation would be entirely voluntary, including an explanation as to what the implications would be if they say "no" to the research. (e.g., that this would be absolutely fine and would not impact negatively whatsoever.)

The capacity to give consent of potential participants (service users) will be assessed by their care team and is reflected in the exclusion criteria of this research. The inclusion and exclusion criteria have been decided based upon various dialogues with the R&D manager at the Trust to ensure not to unfairly exclude potential participants from the research.

Members of staff on the unit will first be approached by the R&D Manager of the hospital who will arrange a meeting with staff and at least one of the researchers, in which they will explain the project and what their potential participation would entail. Staff will be given an information sheet and a consent form, which they can sign and return to the R&D manager or the researcher, if they wish to participate in the research. Members of staff will be given at least 24 hours to decide whether they want to take part in the research or not.

Potential Risks and Burdens of the Research Activities:

The proposed research carries a variety of potential risks and burdens for research participants. Due to their mental health condition, the service users of this research have large difficulties in regulating their emotions. In attempting to regulate their emotions, particularly intense negative emotions, they often show inappropriate anger outbursts, impulsive behaviours or acts of self-harm. To avoid putting the safety of service users at risk, all materials and objects that are part of the research and brought on the women's ward will be carefully checked for their suitability and safety to use by a safety officer of the hospital. The researchers, who will conduct on the research on-site (Anja Thieme and Jayne Wallace) will familiarise themselves with the safety procedures in place and they will attend a specific "Breakaway Training" at the hospital. The health and safety requirements and regulations of the service users and their secured environment have informed the research from the start and have been discussed in meetings with members of staff on the unit and the R&D department of the hospital.

To further maintain the health, safety and wellbeing of all involved, the research and any contact between the researcher and the women will be conducted within the participants' own environment. This not only helps reduce any anxiety that the women may experience, but also provides the benefit of having the staff available if participants should get distressed or display any aggressive behaviour. Staff support on the unit is provided 24/7, safeguarding service users during all research activities. Moreover, staff on the unit and the researchers have to wear the 'Blick' personal alarm system at all times for use in an emergency.

Although participation in this research focuses on creative and hopefully enjoyable activities with service users, the women could potentially experience distress or discomfort when working with the researchers. To avoid talking about topics and themes that can potentially be experienced as distressful if mentioned towards the women (e.g., disrupted relationships), the researchers will be briefed about sensitive topics that should be avoided in relation to individual participants by a member of staff on the unit, or the R&D manager of the hospital. We will also ensure that we immediately act on any signs of distress or discomfort. If one of the women becomes particularly distressed about a certain topic, which may arise from the research activities, they will receive support from the ward staff that accompanies the research activity or their individual therapist from the on-site psychological treatments service (PTS). A referral could be made to PTS if the women are not currently receiving individual therapy. In addition, service users, as well as the members of staff who agreed to participate in the research, are able to withdraw from it at any time.

To further avoid frustration that may be caused through the interaction with the Spheres of Wellbeing, their functionality and robustness will be carefully tested and refined in usability tests with peer users, before the objects are finally handed over to the women.

Furthermore, members of staff will be compensated for their extra time and effort to support the research activities through the Wage Payment Model, compensating their involvement through additional wage payments (e.g., extra hours for taking part in interviews, filling out the weekly research Journal, accompanying the researchers when working with service users). These payments have been agreed with the the NHS care organisation and are covered by the funding of the research (see Table_of_Costs document).

To minimise any risks to the confidentiality of personal information of participants, personal data will only be collected where necessary or unavoidable (e.g., names mentioned during audio recorded interview sessions). If personal data is collected, we ensure their confidential treatment. Furthermore, we will anonymise or encrypt all data before leaving the hospital. When personal information is discussed, for instance between members of the research team, it will be treated with appropriate care. All participants will further be informed about the anonymous treatment of their data within their statement of consent. It will be explained to them that the results of the study will be used for academic research purposes only, and presented anonymously at conferences and written about in academic journals. Results are normally presented in terms of groups of individuals. If any individual data were to be presented, any means of identifying the individuals involved will be removed or replaced with pseudonyms.

Involvement of Service Users in the Design Process:

In the spirit of the person-centred agenda and the importance of meaningful activities for care and wellbeing, the proposed research will invite the women to engage in a series of creative activities with the researchers to collaboratively personalise the design of their set of 'Spheres of Wellbeing' objects. As part of these creative activities, the women will work with different art and craft materials (e.g., polymer clay, crystal growing equipment) to create beautiful little pieces that will feature in the design of their Spheres. In addition, it is hoped that this collaborative and creative activities will be enjoyable to the women, allow them to express themselves in a very visual and practical manner, enable them to learn new skills and empower them as a person. A focus on these hands-on activities when working with the women may also facilitate the dialogue between them and the researchers.

Evaluation:

A mixed-methods approach is suggested for the evaluation of how service users engage with their 'Spheres of

'Wellbeing' to provide rich, in-depth qualitative as well as quantitative data to help answer the questions raised by this research.

The evaluation materials have been designed to fit into a hectic and intense care environment. They also actively involve members of staff in the collection of data. Members of staff are not only in continuous contact with the women (as opposed to the researchers themselves), but their close relations to them also enable a less intrusive and more natural assessment and record of the women's interactions with the Spheres. In addition, staff might also be better at recognising new, unusual or noteworthy behaviours due to their on-going experiences of working with the women. Staff will be given explicit, transparent instructions and clear examples of how they record their research observation, to both provide careful guidance and help reduce observer biases. Our approach for the analysis of collected data is explained and justified in A62.

In the Final Stages:

At the end of the study, all participants of this research, including service users and members of staff, will be informed about the results of the project. This includes a short debriefing at the end of the 4 week deployment period of the 'Spheres of Wellbeing', when interviews with service users and staff have been conducted. To this end, the researcher will leave members of staff and service users with a written document that details the intended aim of the research, acknowledges their contribution to it and provides them with the contact details of the researcher. Once the analysis of the research findings is completed, the researcher will return to the hospital and explain to both staff and service users what has been found out and how the findings may impact on future research and developments. Means to disseminate the findings are outlined in A51.

Service users will be allowed to keep their 'Spheres of Wellbeing' objects at the end of the research activities.

A6-3. Proportionate review of REC application *The initial project filter has identified that your study may be suitable for proportionate review by a REC sub-committee. Please consult the current guidance notes from NRES and indicate whether you wish to apply through the proportionate review service or, taking into account your answer to A6-2, you consider there are ethical issues that require consideration at a full REC meeting.*

Yes - proportionate review No - review by full REC meeting

Further comments (optional):

Note: This question only applies to the REC application.

3. PURPOSE AND DESIGN OF THE RESEARCH

A7. Select the appropriate methodology description for this research. Please tick all that apply.

- Case series/ case note review
- Case control
- Cohort observation
- Controlled trial without randomisation
- Cross-sectional study
- Database analysis
- Epidemiology
- Feasibility/ pilot study
- Laboratory study
- Metanalysis
- Qualitative research
- Questionnaire, interview or observation study
- Randomised controlled trial
- Other (please specify)

A10. What is the principal research question/objective? Please put this in language comprehensible to a lay person.

Principal research questions:

How may the interaction with the 'Spheres of Wellbeing' (as a set of objects with incorporated technology):

- i) support service users in the learning and practice of mindfulness skills, help them calm emotional distress and provide a means to support their identity construction?
- ii) help service users to overcome motivational barriers to the practice of coping skills?
- iii) positively impact on their quality of life and mental wellbeing?

Suggested scientific impact:

This research aims to inform the design and development of future technologies that can usefully complement therapeutic treatment programmes by providing means to improve service users' engagement in the practice of important coping skills and activities that can positively impact on their mental health, which can provide valuable support in their process of recovery from mental illness and help prevent relapse.

A11. What are the secondary research questions/objectives if applicable? Please put this in language comprehensible to a lay person.

Secondary research question:

This research project actively involves service users as well as staff in the design and evaluation of the 'Spheres of Wellbeing'. How does this collaborative process contribute to the design of the interactive 'Spheres of Wellbeing', allow for an increased understanding of service users and their needs with regard to such-like technologies, and help in the interpretation of the research and its findings in this particular context?

Suggested scientific impact:

It is envisioned that critical reflection on the collaborative research approach and the methods followed in this research will inform and improve future developments, research methods and evaluations of interactive technologies to support peoples' mental health.

A12. What is the scientific justification for the research? Please put this in language comprehensible to a lay person.

Good mental health is fundamental to our quality of life, as it enables people to experience life as meaningful, to handle daily stresses, to work productively, and to have stable and fulfilling relationships. Research on mental health and wellbeing is therefore concerned with finding answers to two fundamental questions: firstly, how can we provide more effective support for people who are experiencing mental health difficulties, and secondly, what steps can be taken to maintain, strengthen and nurture positive emotional wellbeing, thus improving people's quality of life and reducing the risks of mental health difficulties?

Recently, these important research questions have begun to be explored in the field of Human-Computer Interaction (HCI) – a research discipline that studies the use of technology in people's everyday lives. A growing body of research suggests that HCI research, in collaboration with the fields of Health Care and Clinical Psychology, can play a valuable role in supporting people who experience mental health problems. For example, a number of computer-based systems have recently been developed specifically to support mental health interventions, including online Cognitive Behavioural Therapy interventions, therapeutic computer games, virtual and augmented reality exposure therapies and relational agents designed to provide emotional support.

In this general scope of research on mental health supporting technologies, the proposed research here aims to extend our understanding of how interactive technology can be developed to enhance the mental wellbeing and quality of life of people who undergo treatment for severe mental health problems in intense care environment, which has been largely under-explored so far.

To this end, the research proposes to develop and deploy a set of innovative objects with incorporated technology (the 'Spheres of Wellbeing') that are specifically designed for women with a dual diagnosis of Learning Disability and Borderline Personality Disorder, who live in a medium secure unit of a UK hospital. It is hoped that interactions with these 'Spheres of Wellbeing' will help service users to overcome motivational barriers to engage in activities that assist them in the learning and practice of mindfulness skills, to tolerate emotional distress, and that strengthen their identity.

The ability to be mindful, to be able to tolerate emotional distress and to acquire a positive and strong sense of self, are also vital skills of Dialectical Behavioral Therapy (DBT). DBT is a comprehensive and effective psychosocial treatment, particularly for individuals with Borderline Personality Disorder (BPD), and has been identified as suitable for a variety of other more severe mental disorders as well (e.g., major depression, post-traumatic stress disorder). The effectiveness of this specialist treatment for individuals with BPD has been shown in a multitude of clinical trials. DBT has also been successfully applied in the treatment of anxiety, mood disorders and trauma-related disorders of

individuals with Intellectual Disabilities.

Importantly, it has been found that a continued practice and application of learned DBT skills increases individuals' coping abilities at times of personal and emotional distress and helps reduce impulsivity and incidences of self-harm, which are all characteristic for individuals with Borderline Personality Disorder. Yet the mastery of important DBT skills – such as mindfulness skills, emotion regulation skills, distress tolerance skills and interpersonal effectiveness skills – requires the individual to learn, practice and apply these skills.

The service users of this research, however, present a client group that is very vulnerable and difficult to treat not only because of their extremely challenging behaviours and complex needs, but also because of their persistent lack of motivation to engage in therapy. In addition, individuals with BPD often have limited understanding of how they can best practice skills which help them gain more control over themselves.

Against this background, it is hoped that the design and functionalities provided by the 'Spheres of Wellbeing' objects – which are explained in more detail in A13 and the research protocol – will provide service users with a very visual, practical and interesting opportunity to engage in activities that promise to support their abilities to be mindful, to tolerate emotional distress and help form and maintain their identity, which may valuably complement their therapy programme. In addition, this explorative research and pilot study may help identify new areas and opportunities for the development of future interactive technologies aiming to enhance peoples' mental health in severe care contexts.

This project also builds on previous research of the researchers on this project (Anja Thieme and Jayne Wallace), in which they explored the potential of technology to nurture positive, personal and meaningful experiences and uncovered novel ways to support individuals sense of self through interactive technology (i.e., research in dementia care, where individuals experience a gradual erosion of selfhood).

Early documentations of the 'Spheres of Wellbeing' design and its intended research and evaluation methods have also been presented and discussed as a poster at the 11th International Conference on the Care and Treatment of Offenders with a Learning Disability (12-13 April 2012, Northumbria University) and have been accepted for publication as part of the workshop on 'People, Computers and Psychotherapy' at the British Human-Computer Interaction Conference (BSC HCI, 10 September 2012, Birmingham University).

The originality and quality of the proposal has further been assessed through two independent external reviews by

A13. Please summarise your design and methodology. *It should be clear exactly what will happen to the research participant, how many times and in what order. Please complete this section in language comprehensible to the lay person. Do not simply reproduce or refer to the protocol. Further guidance is available in the guidance notes.*

The idea for the research project was first presented to female inpatients in the medium secure unit of the [redacted] during a visit of the researchers (Anja Thieme and Jayne Wallace). The researchers had a chat with three clients who showed interest in the project. The visit and the positive feedback of potential participants and the ward staff initialised the planning of this research. The basic design and functionality of the 'Sphere of Wellbeing' objects were then informed by the literature (see the protocol for more detail) and were established in meetings between the researchers and staff at the hospital – including members of the R&D department, staff nurses and a psychologist working with the women – to ensure that the objects are safe for the women to use (e.g., minimised risk of self-harm), present a suitable addition to their treatment and care plan, and offer an enjoyable experience through their aesthetic appeal and proposed interaction.

The 'Spheres of Wellbeing' are three objects, which are called the Mindfulness Sphere, the Calming Sphere and the Identity Sphere. The Mindfulness Sphere is a ball like artefact that, when touched, assesses and reflects a person's heart rate through colourful lights and soft pulsating vibrations, and thereby provides a new, experiential way of bringing awareness to a person's heartbeat and body. As biofeedback it further enables the observation and regulation of arousal. The Calming Sphere is a non-digital bead bracelet that the women can hold on to at times of personal distress. A repetitive rolling of the beads between one's fingers can help release inner tension and facilitate the toleration of emotional distress. The Identity Sphere gently invites the women to engage with their personal space and body through colourful wall stickers and body transfers. These wall stickers and body transfers also act as visual tags that can be recognised by a device designed to resemble a female leather wallet, and which incorporates technology that responds to these tags by displaying short personalised videos envisioned as helping to strengthen the women's sense of self.

This basic design concept of the Spheres creates the starting point in a collaborative design process between the researchers and the women, through which the three artefacts will be personalised for each woman. To this end, each woman will be invited to take part in 4 to 5 creative sessions with the researchers, where they will work with different art and craft materials (e.g., polymer clay, crystal growing equipment) to create beautiful little pieces that will feature in the design of their set of wellbeing Spheres. These collaborative sessions with the researchers and the creative activities

that they will pursue together are further hoped to be enjoyable to the women, to allow them to express themselves, enable them to learn new skills, and thus, empower them as a person. A focus on these hands-on activities when working with the women may also facilitate the dialogue between them and the researchers.

After this series of creative activities, the researchers will ask the women if they are allowed to use small pieces that they created together for the design of a set of objects that they will return to them in a few weeks time. Crafted materials by women and the insights the researchers gained about their interests and preferences from the sessions will feature into a personalised design of each set of Spheres. Once all objects have been finalised, the researcher will return and hand-over the objects to each woman. This will be the starting point of a 4 week evaluation period that investigates if, and how, the women use their set of 'Spheres of Wellbeing'. This includes open-ended, semi-structured chats with each woman at the day of deployment and at the end of the 1st and 4th week of the deployment period. Two of the 'Spheres of Wellbeing', the Mindfulness Sphere and the Identity Sphere, incorporate technology that is able to log and record when and for how long they are used. In addition, staff on the unit will be invited to record any observations they make of how the women engage with their objects.

To this end, the staff on the unit who agree to participate in the research will be given semi-structured 'Eventcards', with two open-ended questions to assist them in the recording of their observations. They will receive a briefing by the researchers and be presented with examples of what constitutes an "observed engagement" and how they should report it, to minimise bias effects. Up to three members of staff will further be invited to keep a weekly journal to document any observations they may have made of each service user with their 'Spheres of Wellbeing' over the course of each week. These recorded observations will be used as prompts in discussions with staff, who will be invited to join semi-structured open-ended interviews with the researchers at the end of the 1st and 4th week of the evaluation period. Staff will be reimbursed for their extra time and effort through the Wage Payment Model.

Interviews with service users will take place in a quiet room on the medium secure unit and accompanied by a member of staff. Interviews with participating staff on the unit will either take place in a spare room in the R&D department or in a free staff meeting room on the secure unit.

At the end of the 4 week evaluation period, both service users and staff will be debriefed. To this end, the researcher will leave members of staff and service users with a written document that details the intended aim of the research, acknowledges their contribution to it, and provides them with the contact details of the researcher. Once the analysis of the research findings is completed, the researcher will return to the hospital and explain to both staff and service users what has been found out and how the findings may impact on future research and developments. The women who participated in the research will be allowed to keep their Spheres of Wellbeing objects.

If any of the service users continue to use the objects beyond the evaluation period, the researchers plan to return for a 3-month follow-up interview with both members of staff and the women. The women and staff on the unit will leave the research at this point at the latest. The researchers, however, will retain contact with members of staff of the R&D department for the purposes of analysing, interpreting and disseminating the findings of the research.

It is intended to report and disseminate the results of this research in peer reviewed scientific journals and in international conference presentations, as well as in internal reports. Results will further be included in the PhD thesis of the research student. The findings of this research will further be presented to other inpatients in the hospital and the R&D team.

The following presents a broad, preliminary timetable of the different stages of the research :

Ethical Review

10/2012 - 11/2012 Submission to R&D and REC

Breakaway training for researcher (Anja Thieme, Jayne Wallace)

Upon approval:

Recruitment Process

12/2012 Introduction of the research to staff on the unit and seeking of consent

12/2012 Identification of service users through their care team (organized by the R&D team of the Trust)

01/2013 Introduction of the research to service users on the unit

01/2013 Service users will be given a period of 1 week to reflect on and discuss their potential involvement in the research

01/2013 Seeking consent in writing of service users

01/2013 Briefing of researchers by staff about topics/ themes to be avoided in conversations with service users

Design and Development Activities

01/2013 Security check of art and craft materials for creative sessions

01/2013- 02/2013 Creative Sessions between researchers and each woman

02/2012- 03/2013 Finalisation and testing of the 'Spheres of Wellbeing'

03/2013 Security check of 'Spheres of Wellbeing' objects

Deployment and Evaluation Period

03/2013 Briefing of staff on the observation methods and how they can assist the women to use the 'Spheres of Wellbeing'

03/2013 Meeting with each women to introduce the 'Spheres of Wellbeing' and to gather feedback on their first impressions of the objects

04/2013 Week-long period of staff recording their observations of service users engaging with the 'Spheres of Wellbeing'

04/2013 Week 1 of the evaluation period: Semi-structured, open-ended interviews with members of staff and service users

04/2013 Week 4 of the evaluation period: Semi-structured, open-ended interviews with members of staff and service users

06/2012 It is planned that 3-month follow-up interviews will be conducted with staff and service users

Dissemination

04/2013 - 12/2013 Data Analysis and write-up of evaluation findings (e.g., submission to conferences and peer reviewed journals)

A14-1. In which aspects of the research process have you actively involved, or will you involve, patients, service users, and/or their carers, or members of the public?

- Design of the research
- Management of the research
- Undertaking the research
- Analysis of results
- Dissemination of findings
- None of the above

Give details of involvement, or if none please justify the absence of involvement.

Early in the planning of this research, both researchers on this project: Anja Thieme (CI) and Jayne Wallace, visited and introduced the idea of the project to three of the service users and staff. The project was well received by them, which initialised and informed first steps in the design of the research.

The design of the technology and the planned research methods have been established in meetings with members of the R&D team at as well as staff nurses and psychologists working with the our target service users to ensure that all materials, objects and procedures of the research are safe to use and present a suitable addition to the women's treatment and care plan.

Members of the R&D team and ward staff will also be involved in the management and undertaking of the research. Ward staff will support the identification of service users, they will contribute to the research in recording observations they make of the women in relation to the project, assist research activities with the researchers on the unit and they will take part in interviews with the researchers about the project. Members of the R&D team will assist the researchers in introducing the project to ward staff and help organise and arrange the research activities on the unit.

Members of the R&D team will further be involved in the interpretation and analysis of the research findings as well as the write-up of the results for scientific conferences and journals. In addition, participants of this research (staff as well as service users) will be involved in the dissemination of the findings to the R&D committee at to other services users of the hospital (e.g., the women on the low secure unit) as well as to visitors of the hospital (e.g., as part of a Research Showcase Event).

4. RISKS AND ETHICAL ISSUES

RESEARCH PARTICIPANTS

A17-1. Please list the principal inclusion criteria (list the most important, max 5000 characters).

Female

Age 18-65

Inpatient in the middle secure unit of the

Dual diagnosis of Learning Disability and Personality Disorder (as established by the professional health and care team of the women) and/or experiences emotional dysregulation to the extent that the care team feel she would benefit from inclusion in this creative intervention.

Given informed consent to take part in the research.

Sufficient English language skills in order to understand and express themselves verbally.

A17-2. Please list the principal exclusion criteria (list the most important, max 5000 characters).

Male.

Unable to give informed consent (e.g., clients with a more severe LD and an IQ below 55, making it less that she will be able to give consent) or no consent given.

RESEARCH PROCEDURES, RISKS AND BENEFITS

A18. Give details of all non-clinical intervention(s) or procedure(s) that will be received by participants as part of the research protocol. These include seeking consent, interviews, non-clinical observations and use of questionnaires.

- Please complete the columns for each intervention/procedure as follows:
1. Total number of interventions/procedures to be received by each participant as part of the research protocol.
 2. If this intervention/procedure would be routinely given to participants as part of their care outside the research, how many of the total would be routine?
 3. Average time taken per intervention/procedure (minutes, hours or days)
 4. Details of who will conduct the intervention/procedure, and where it will take place.

Intervention or procedure	1	2	3	4
Introduction of the research to members of staff, answering of questions and hand out of consent forms for staff to sign	1	0	30-50 min	The R&D manager on-site and at least one of the reserachers will brief staff. The procedure will take place in the R&D department or a staff meeting room on the women's medium secure unit (MSU).
Introduction of the research project to potential participants (service users), answering of questions and seeking of initial consent	1	0	30 min.	Introduction of the project to potential participants (service users) by at least one of the researchers, accompanied by a staff nurse on-site. This procedure will take place on the women's MSU.
Process of seeking consent of potential participants (service users)	1	0	7 days	For a period of one week, staff nurses on the women's unit will talk with potential participants about the proposed research and answer any question they may have about the research and their potential involvement. During that time, clients will also be encouraged to let staff arrange a visit with their independent point of contact This procedure will take place on the women's MSU
Consent in writing of service users	1	0	10-30 min.	One week after the introduction of the research, the researcher(s) will ask potential participants whether they would like to take part in the research. If they wish to take part, each women will be given a statement of consent to sign.

Creative session with each participating service user	4- 0 ~ 2 5 hours	<p>This procedure will take place on the women's MSU.</p> <p>In each session, at least one of the researchers and a member of staff on-site will sit with each woman and invite her to engage in creative activities that involve various different materials (e.g., forming of clay beads, colouring in of mandalas).</p> <p>These sessions will be taking place in a room on the women's MSU. One of these creative sessions may take place outdoors.</p> <p>The outdoor activity will also be accompanied by at least one member of staff.</p>
Briefing of staff about evaluation methods of the research (e.g., Eventcards, weekly Journaling) as well as coaching of how staff may best engage the women to use their Spheres of Wellbeing artefacts	1 0 30-50min.	<p>The researchers will brief staff, supported by the R&D manager (if required).</p> <p>This procedure will take place in the R&D department or a staff meeting room on the women's MSU.</p>
Presentation of the 'Spheres of Wellbeing' to participating service users	1 0 1 hour	<p>At least one of the researchers will introduce the final personalised 'Spheres of Wellbeing' objects to each woman.</p>
Deployment period of the 'Spheres of Wellbeing'	1 0 4 weeks	<p>This procedure will take place on the women's MSU.</p> <p>The women on the MSU will be invited to interact with their 'Spheres of Wellbeing' object for a period of 4 weeks (and beyond, if they wish to do so).</p>
'Weekly Journaling' of three ward staff	4 0 ~1 hour	<p>This activity will take place on the women's MSU.</p> <p>Up to three members of staff on the women's MSU who voluntarily agreed to take notes of their observations of the women's interactions with their Spheres will fill out a weekly research Journal for the 4 week deployment period of the study.</p>
Semi-structured, open-ended interviews with the participating service users	2- 0 10-30 4 min.	<p>This procedure will take place in a staff room of the MSU.</p> <p>One week into the deployment of the 'Spheres of Wellbeing' objects, at least one of the researchers will visit the women and to individually talk with each of them about their Spheres of Wellbeing objects. This will be repeated at the end of the 4 week deployment period and potentially repeated in a 3 month follow-up interview.</p>
Semi-structured, open ended interviews with members of staff	2- 0 30-60 3 min.	<p>This activity will take place on the women's MSU (or in the lower secure unit, in case participants moved on).</p> <p>Interviews will be conducted with all members of staff on the MSU, who agree to support the research. These interviews will be conducted at the end of the 1st and 4th week of the deployment period of the Spheres of wellbeing. A 3 month follow-up interview is planned as well.</p>
All members of the research will be informed about the results of the research	1 0 5-20min.	<p>Interviews will either be conducted in a room of the R&D department or in a staff meeting room on the women's MSU.</p> <p>Members of staff as well as the women who participated in the research will be informed about the outcomes of the research and their participation; Service users will be informed on the women's MSU; staff will either be informed in a room of the R&D department or in a room on the women's MSU</p>

A21. How long do you expect each participant to be in the study in total?

Both staff and service users are expected to be in the study for a maximum period of 4-7 month. The first four month cover the primary research activities from initial contact and the creative sessions with the service users to the deployment and evaluation of the 'Spheres of Wellbeing'. The 7-month period includes a potential 3-month follow-up interview with staff and service users.

The CI of the research, however, will maintain contact with members of staff in the R&D department for approximately 12 month to allow for regular follow-up meetings and their involvement in the analysis and dissemination of the research findings.

A22. What are the potential risks and burdens for research participants and how will you minimise them?

For all studies, describe any potential adverse effects, pain, discomfort, distress, intrusion, inconvenience or changes to lifestyle. Only describe risks or burdens that could occur as a result of participation in the research. Say what steps would be taken to minimise risks and burdens as far as possible.

Physical and psychological risks and burdens of the research procedures:

Due to their Personality Disorder, the service users of this research have large difficulties to regulate their emotions. In attempting to regulate their emotions, particularly intense negative emotions, they often show inappropriate anger outbursts, impulsive behaviours or acts of self-harm. To avoid putting the safety of service users at risk, all materials and objects that are part of the research and brought on the women's ward will be carefully checked for their suitability and safety to use by a safety officer of the hospital. The health and safety requirements and regulations of this particular environment and the service users have informed the research from the start and have been discussed in meetings with members of staff on the unit and the R&D department of the hospital.

To maintain the health, safety and wellbeing of all involved, the research and any contact between the researcher and the women will be conducted within the participants own environment. This not only helps reduce any anxiety that the women may experience, but also provides the benefit of having the staff available, if the participant should get distressed or displays any aggressive behaviour. Staff support on the unit is provided 24/7, safeguarding service users during all research activities. Moreover, staff on the unit and the researchers have to wear a personal alarm system (called 'Blick') at all times for use in an emergency.

Although participation in this research focuses on creative activities, interactions with interesting objects and is envisioned to be enjoyable to the women of the MSU, they could potentially experience distress or discomfort when working with the researchers. To avoid talking about topics and themes that can potentially be experienced as distressful if mentioned towards the women (e.g., disrupted relationships), the researchers will be briefed about sensitive topics that should be avoided in relation to individual participants by a member of staff on the unit or the R&D manager of the hospital. Moreover, we ensure to immediately act on any signs of distress or discomfort. If one of the women becomes particularly distressed about a certain topic, which may arise from any of the research activities, they will receive support from the ward staff that accompanies the research activity or their individual therapist from the on-site psychological treatments service (PTS). A referral could be made to PTS if they are not currently receiving individual therapy.

To further avoid frustration that may be caused through the interaction with the Spheres of Wellbeing, their functionality and robustness will be carefully tested and refined in usability tests with peer users. Subsequent testing with peer users and staff at the hospital will then move on to issues of engagement and understanding, before the objects are finally handed over to the women.

In addition, both service users as well as members of staff, who agreed to participate in the research are able to withdraw from it at any time.

Time burdens for participating members of staff.

To compensate members of staff for their extra time and effort to support the research activities, the Wage Payment Model will be applied that compensates all staff involvement in the research through additional wage payments (e.g., extra hours for taking part in interviews, filling out the weekly research Journal, accompanying the researchers when working with the service users). These payments have been agreed with the NHS organisation and will be covered through the funding of the research.

Risk to confidentiality:

Personal information of participants will only be collected where necessary or unavoidable (e.g., names mentioned during audio recorded interview sessions). If personal data is collected, we ensure their confidential treatment. Furthermore, we will anonymise or encrypt all data before leaving the Trust. Personal information, when discussed for instance between members of the direct research team will be treated with appropriate care. All participants will further be informed about the anonymous treatment of their data within their statement of consent. It will be explained to them that the results of the study will be used for academic research purposes only, and presented anonymously at conferences and written about in journals. Results are normally presented in terms of groups of individuals. If any individual data were to be presented any means of identifying the individuals involved will be removed or pseudonymised.

No changes in the relationships between service users and healthcare professionals are expected.

A23. Will interviews/ questionnaires or group discussions include topics that might be sensitive, embarrassing or upsetting, or is it possible that criminal or other disclosures requiring action could occur during the study?

Yes No

If Yes, please give details of procedures in place to deal with these issues:

Although the research targets at positive activities and topics when working with participating service users, it is possible that the women in the medium secure services disclose sensitive, embarrassing or upsetting information during any of the research activities. When working with the women, the researchers are therefore at all times accompanied by, or in close reach of, a member of staff on the unit, who they can ask for help, if one of the women discloses something that requires action (e.g., feelings of being highly upset or suicidal).

It is highly unlikely that the women will make disclosures of unknown previous criminal activity but if any disclosures are made to the researchers during the course of the creative sessions or the interviews, the researchers can respond by acknowledging how important that piece of information is to the client and advising them that they (the researcher) will need to share it with the ward staff so that the client can receive any support they may need to deal with the issues. The research staff nurse who will be supporting the researchers most of the time is a member of the ward staff team and as such knows the women well; she will follow up any issues raised.

No such sensitive disclosures are to be expected in the interviews with staff. However, as part of obtaining full written informed consent, all participants will be advised that they do not have to answer any questions that they are uncomfortable with and that all information disclosed will be treated confidentially within the research team and project.

A24. What is the potential for benefit to research participants?

It is hoped that both service users and staff experience their participation in the project as a meaningful contribution to research and enjoy taking part in the project.

Ideally, the creative activities with the researchers allow the women to learn new skills, to express themselves and to be creative. Created objects or coloured images that come out of these sessions will further feature into the design of the Spheres objects for each women, turning these objects into something very personal that the women are allowed to keep.

Interactions with the 'Spheres of Wellbeing' are further hoped to introduce and engage the women in practices of mindfulness, to support their ability to tolerate emotional distress and to strengthen their sense of self, which promise to valuably improve their mental wellbeing and quality of life. In addition, introducing the women to the concept of mindfulness, which is part of the DBT care model on the lower secure unit, may facilitate engagement with this care path when they move to the lower secure services.

A26. What are the potential risks for the researchers themselves? (if any)

Physical risks:

If any plan of inappropriate or aggressive behaviour is disclosed to the researchers when working with the women, staff on the ward will be notified immediately so that the appropriate care and support can be implemented according to the care plans and local policy guidelines of the hospital. In order to handle problematic situations or behaviours that the women may display at times of personal distress, members of staff as well as visitors and the researchers have to

wear the 'Blick' personal alarm system at all times when they are on the ward. These alarm system has an emergency button that can be pressed (or an emergency line to pull), which would lead to immediate help by members of staff who are available 24/7 and are very experienced in handling incidences. Staff on the ward would also take care of the overall incidence procedure (e.g. filling out incidence forms). In addition, the researchers will familiarise themselves with the security procedures in place and attend a "Breakaway training" prior to their engagements with the women

Emotional burdens:

If the researchers experience some degree of emotional distress from their interactions with the women they can be debriefed by the R&D manager who is also a psychotherapist within the hospital and has many years clinical experience with this client group. They may also choose to seek external support from their own departmental staff support system (e.g., Student Wellbeing; Mental Health & Counselling support at Newcastle University).

RECRUITMENT AND INFORMED CONSENT

In this section we ask you to describe the recruitment procedures for the study. Please give separate details for different study groups where appropriate.

A27-1. How will potential participants, records or samples be identified? Who will carry this out and what resources will be used? For example, identification may involve a disease register, computerised search of GP records, or review of medical records. Indicate whether this will be done by the direct healthcare team or by researchers acting under arrangements with the responsible care organisation(s).

From the inclusion criteria it is clear that the participant sample must be female and residing on the medium secure service of this gives a potential sample of a maximum of 6 women. Other inclusion criteria will then be checked against the women's records by the R&D department and the ward staff team. To this end, the researchers will provide selection of criteria (as outlined in A17) to the R&D department of the hospital to arrange the identification of potential participants.

Members of staff, who work on the women's medium secure unit, will be identified by a member of the R&D department of the hospital.

A27-2. Will the identification of potential participants involve reviewing or screening the identifiable personal information of patients, service users or any other person?

Yes No

Please give details below:

The identification of potential participants involves the screening of identifiable personal information of service users through their existing care team only, in order to review if they fulfill the inclusion and exclusion criteria posed by the project, as outlined in A17. The researchers themselves will at no time have access to personal records of potential participants or any other register.

A27-4. Will researchers or individuals other than the direct care team have access to identifiable personal information of any potential participants?

Yes No

A28. Will any participants be recruited by publicity through posters, leaflets, adverts or websites?

Yes No

A29. How and by whom will potential participants first be approached?

The idea for the research project was first presented to female service users in the medium secure unit of the hospital

during a visit of the researchers. The researchers had a chat with three clients who showed interest in the project. The visit and the positive feedback of potential participants initialised the planning of the research proposed here. As an interest in this project is ongoing, informal discussions about it will be introduced to the women by the research staff nurse before the researchers visit to give detailed information and seek consent.

Once the research starts, at least one member of the research team (Anja Thieme and Jayne Wallace), accompanied by at least one ward staff, will make contact with potential participants to explain the purpose of the study and what their participation would entail. In order to ensure understanding, the researcher will provide the women with written information presented in a manner and format that meets their abilities and preferences, and initial consent to participate would be sought. An additional information sheet will be provided to ward staff, so that they can support and assist each woman during the process of seeking consent as well as during the conduct of the research.

Members of staff on the unit will first be approached by the R&D Manager of the hospital. Ward staff will be provided with a letter and information sheet about the research and they will be invited to attend a meeting about the research if they are interested in the project. In this meeting, one of the researchers (Anja Thieme and Jayne Wallace) or the Principal Investigator on-site will explain the project to staff, details on what their potential participation would entail and will answer any questions that staff may have about the research.

Staff will also be given an information sheet and a consent form, which they can sign and return to the R&D manager or the researcher(s), if they wish to participate in the research.

A30-1. Will you obtain informed consent from or on behalf of research participants?

Yes No

If you will be obtaining consent from adult participants, please give details of who will take consent and how it will be done, with details of any steps to provide information (a written information sheet, videos, or interactive material). Arrangements for adults unable to consent for themselves should be described separately in Part B Section 6, and for children in Part B Section 7.

If you plan to seek informed consent from vulnerable groups, say how you will ensure that consent is voluntary and fully informed.

Service users, who could potentially take part in the research, will be provided with an information sheet about the planned research, written in a manner and format that meets their abilities and preferences. During a period of one week, they will be encouraged by members of staff to talk with them, family members, friends or their independent point of contact about whether they would like to take part in the research or not. This longer time period and the opportunity to discuss the research and ask questions about it allow for a more careful decision about their participation.

After initial consent, and one week after introducing the research, one of the researchers (e.g., Anja Thieme) will seek informed consent in writing from potential participants (service users), accompanied by one member of the ward staff. In addition to the research and participants potential involvement in it, the consent form describes in a very easy to understand and accessible language and through the use of images that participants' data will be treated anonymously, that their information are stored safely, and that they can stop taking part in the research at any time without giving a reason for doing so. Particular care will be paid to explain potential participants that their participation would be entirely voluntary including an explanation as to what the implications would be if they say "no" to the research (e.g., that this would be absolutely fine and would not impact negatively whatsoever).

Consent in writing will also be sought of members of staff, who agree to take part in the research following a detailed explanation of the research by at least one of the researchers (Anja Thieme, Jayne Wallace) or the R&D manager of the hospital and Principal Investigator on-site and a written information sheet.

If you are not obtaining consent, please explain why not.

Please enclose a copy of the information sheet(s) and consent form(s)

A30-2. Will you record informed consent (or advice from consultees) in writing?

Yes No

A31. How long will you allow potential participants to decide whether or not to take part?

To allow service users enough time to carefully consider whether they would like to take part in the research or not, they

will be given at least one week to process the information about the research, discuss it with others and to pose questions and request additional explanations from the researchers or their immediate care team.

Members of staff on the unit will be given at least 24 hours to decide whether they want to take part in the research or not.

A33-1. What arrangements have been made for persons who might not adequately understand verbal explanations or written information given in English, or who have special communication needs?(e.g. translation, use of interpreters)

Unfortunately there is no funding to arrange the presence of a qualified translator, so that the study can only include English speaking participants.

The inclusion criteria specify that participants must have an adequate grasp of verbal and written English. All 6 women currently on the MSU are of British origin and have English as their first language.

Considering the Learning Disability of potential participants, any written information is supported by pictorial prompts and explained to the women verbally as well. We will also provide the contact details of the researchers in case that further explanation or clarification is required.

A35. What steps would you take if a participant, who has given informed consent, loses capacity to consent during the study? Tick one option only.

- The participant and all identifiable data or tissue collected would be withdrawn from the study. Data or tissue which is not identifiable to the research team may be retained.
- The participant would be withdrawn from the study. Identifiable data or tissue already collected with consent would be retained and used in the study. No further data or tissue would be collected or any other research procedures carried out on or in relation to the participant.
- The participant would continue to be included in the study.
- Not applicable – informed consent will not be sought from any participants in this research.
- Not applicable – it is not practicable for the research team to monitor capacity and continued capacity will be assumed.

Further details:

If a service user loses capacity to give consent or withdraws from the study, the research activity (e.g., creative session, interview) would stop and not be carried out any longer. Data already collected in relation to the participant may be retained and used for the purposes for which consent has already been given, provided they are effectively anonymised. No further data will be collected of the participant. Participants will be informed about this in the consent form of the research.

If you plan to retain and make further use of identifiable data/tissue following loss of capacity, you should inform participants about this when seeking their consent initially.

CONFIDENTIALITY

In this section, personal data means any data relating to a participant who could potentially be identified. It includes pseudonymised data capable of being linked to a participant through a unique code number.

Storage and use of personal data during the study

A36. Will you be undertaking any of the following activities at any stage (including in the identification of potential participants)?(Tick as appropriate)

- Access to medical records by those outside the direct healthcare team
- Electronic transfer by magnetic or optical media, email or computer networks
- Sharing of personal data with other organisations
- Export of personal data outside the EEA
- Use of personal addresses, postcodes, faxes, emails or telephone numbers

- Publication of direct quotations from respondents
- Publication of data that might allow identification of individuals
- Use of audio/visual recording devices
- Storage of personal data on any of the following:
 - Manual files including X-rays
 - NHS computers
 - Home or other personal computers
 - University computers
 - Private company computers
 - Laptop computers

Further details:

All personal data pertaining to participants already on NHS computers is password protected and only accessible by Trust personnel, not by the external researchers. This information will be accessed by the R&D and ward staff of the hospital to check inclusion criteria (as outlined in A17) and to brief the researchers of potential risks and safety issues in relation to individual service users.

Personal and sensitive information of participants collected by the research team will be anonymised entirely before leaving the Trust and stored safely in a locked cupboard (for manual files) or on a password protected university computer (for digital files) within the research facilities of the research team at Newcastle University.

Manual files will be stored in a locked cupboard in the research department at Newcastle University and will only be directly accessible to the CI of the research. Digital files of confidential research information will be stored on a password secured university computer. It is ensured that only the immediate research team has access to these files.

Audio recordings of interviews with both members of staff and the women will be first transferred from the recording device to a laptop computer, before the recording will be deleted from the recording device. On the laptop computer the recording will be encrypted and secured by a password so that nobody outside the research team can access the files. Once the recordings are stored on a password secured university desktop computer, the data will then be removed from the laptop computer using appropriate data destruction software. Moreover, the researchers ensure to always logout of the computer system, when their work is finished, and to not leave the computer unattended when logged in. The researchers also ensure that they do not share their login details or passwords with any other person. Passwords are changed on a regular basis.

If data is to be used on a laptop computer (e.g., during visits of the researchers at the hospital), it will be ensured that this data is encrypted and secured by a password at all times. No original, non-anonymised files will be retained by the CI or any other member of the research team, when leaving the hospital.

If data is to be transferred between researchers via email, it will be encrypted during transfer. Similarly, if the transfer of electronic content (e.g., via DVD or memory stick) will be protected by a password.

If electronic anonymised transcriptions of interviews are shared with the on-site researcher for analysis purposes, they will be encrypted on transfer and stored under password protection on NHS computer in the R&D department.

Any direct quotations from respondents that are to be published will be anonymised.

A38. How will you ensure the confidentiality of personal data? Please provide a general statement of the policy and procedures for ensuring confidentiality, e.g. anonymisation or pseudonymisation of data.

To ensure the confidentiality of personal data we apply the NHS Code of Confidentiality to meet the requirements of the Data Protection Act (1998). Thus, from the beginning of the research study, all data collected will be coded and pseudonyms allocated so that confidentiality is maintained and anonymity assured.

Personal data collected from participants may encompass key identifiable information such as participant's name and other unique characteristics of a person, and also indirect identifiers such as the name of the hospital and description of the ward. Such personal information about participants will be changed and anonymised from the beginning. This includes in particular the removal or change of the person's name. When using descriptions of individual cases of

participants, the researchers take care to ensure that they do not risk making the participant identifiable.

We ensure that all personal information of participants is protected and anonymised and that every member of the research team is at all times fully aware of their responsibilities regarding confidentiality. All record keeping of participants will be done accurately and consistently. The data including identifiable information about the person will be kept private and physically secured. Only entirely anonymised materials and encrypted files will be transferred from the hospital to the research facilities at Newcastle University to allow further analysis by the researchers.

Personal information, e.g. when discussed within the direct research team, will be anonymised and treated with appropriate care.

Materials used during research activities and objects made by the women may be stored in a locked cupboard on the ward or transferred to the safety of the R&D department of the hospital for overnight storage in between creation sessions.

Eventcards for the recording of staff observations will be collected in a locked post-box in the staff office on the medium secure unit. Only the CI has a key to the post-box and can access Eventcards completed by members of staff. In addition, both the Eventcards and Journals are designed to only request the initials of the person's name (both of staff and service users) to minimise privacy threads while allowing the CI to identify the person, allowing her to ask for more detail or context information about a recorded event.

When the ward staff are keeping the weekly Journals about the women's interactions with the Spheres over a period of 4 weeks, these Journals can be stored in locked drawers or personal lockers within the ward environment so that only the staff participating in that part of the research has access to their Journal.

Participants are informed through the information sheet and the statement of consent that their meetings with the researchers will be audio recorded. Services users will also be informed that staff will observe and record observations of how they interact with their Sphere's objects.

In addition, participants will be asked at every stage in which audio recording would be foreseen, if they have any concerns or queries about how information is recorded and will be used, and can withdraw from being recorded at any time.

A40. Who will have access to participants' personal data during the study? Where access is by individuals outside the direct care team, please justify and say whether consent will be sought.

At no time will the researchers (Anja Thieme, Jayne Wallace) or the supervisory team of the CI (Thomas Meyer, Patrick Olivier) have access to the women's personal records or forensic histories.

Personal data of participants collected as part of the research will only be accessed by the research team (including the researchers on-site) and treated in strict confidence.

Storage and use of data after the end of the study

A43. How long will personal data be stored or accessed after the study has ended?

- Less than 3 months
- 3 – 6 months
- 6 – 12 months
- 12 months – 3 years
- Over 3 years

If longer than 12 months, please justify:

The storage and access of personal data does not need to extend 12 months. However, the research student conducting the research might require access to the original data within the 3 year of the PhD project.

Once the research is complete, all digital files relating to personal information of participants will be destroyed appropriately, meaning the deletion of digital files and the shredding of manual files.

INCENTIVES AND PAYMENTS

A46. Will research participants receive any payments, reimbursement of expenses or any other benefits or incentives for taking part in this research?

Yes No

If Yes, please give details. For monetary payments, indicate how much and on what basis this has been determined. To compensate members of staff for their time and effort to support the research activities, the Wage Payment Model will be applied that compensates all staff involved in the research through additional wage payments (e.g., extra hours for taking part in interviews, filling out research diaries, accompanying the researcher when working with the women).

These payments have been agreed with the NHS care organisations to reimburse the costs of hosting the research.

A47. Will individual researchers receive any personal payment over and above normal salary, or any other benefits or incentives, for taking part in this research?

Yes No

A48. Does the Chief Investigator or any other investigator/collaborator have any direct personal involvement (e.g. financial, share holding, personal relationship etc.) in the organisations sponsoring or funding the research that may give rise to a possible conflict of interest?

Yes No

NOTIFICATION OF OTHER PROFESSIONALS

A49-1. Will you inform the participants' General Practitioners (and/or any other health or care professional responsible for their care) that they are taking part in the study?

Yes No

If Yes, please enclose a copy of the information sheet/letter for the GP/health professional with a version number and date.

A49-2. Will you seek permission from the research participants to inform their GP or other health/ care professional?

Yes No

It should be made clear in the participant's information sheet if the GP/health professional will be informed.

PUBLICATION AND DISSEMINATION

A50. Will the research be registered on a public database?

Yes No

Please give details, or justify if not registering the research.

It is hoped this project will be adopted onto the CSP portfolio. The author is unaware of any other suitable database for this research.

Registration of research studies is encouraged wherever possible.

You may be able to register your study through your NHS organisation or a register run by a medical research charity, or publish your protocol through an open access publisher. If you are aware of a suitable register or other method of publication, please give details. If not, you may indicate that no suitable register exists. Please ensure that you have entered registry reference number(s) in question A5-1.

A51. How do you intend to report and disseminate the results of the study? *Tick as appropriate:*

- Peer reviewed scientific journals
- Internal report
- Conference presentation
- Publication on website
- Other publication
- Submission to regulatory authorities
- Access to raw data and right to publish freely by all investigators in study or by Independent Steering Committee on behalf of all investigators
- No plans to report or disseminate the results
- Other (please specify)

The results of this research will be presented at conferences and written up in peer-reviewed scientific journals. In addition, they will be included in the PhD thesis of the research student. The research and parts of the results may also be included on the website of the research institute at Newcastle University.

Results of the study will be reported to all research participants, to the R&D team of the Trust (in form of an internal report and in R&D meetings), to other clients in the secure services and to external visitors of the hospital.

A53. Will you inform participants of the results?

- Yes No

Please give details of how you will inform participants or justify if not doing so.

Both, service users and members of staff, who participated in the research will be informed about the outcome and results of the project.

At the end of the concluding interviews with service users and staff after the 4 week deployment period of the Spheres of Wellbeing, the researcher will leave members of staff and service users with a 'debriefing' document that details about the intended aim of the research and provides contact details of the researcher. As part of the debriefing, participants will be asked if they would like to be contacted regarding the results of the study and their preferred method of communication will be taken into account when doing so.

Once the analysis of the research is completed, the researcher will then return to the hospital and inform both staff and service users about the findings and impact of the research and their contribution.

5. Scientific and Statistical Review

A54. How has the scientific quality of the research been assessed? *Tick as appropriate:*

- Independent external review
- Review within a company
- Review within a multi-centre research group
- Review within the Chief Investigator's institution or host organisation
- Review within the research team
- Review by educational supervisor
- Other

Justify and describe the review process and outcome. If the review has been undertaken but not seen by the researcher, give details of the body which has undertaken the review:

Independent external review:

An independent external peer review has been conducted to assess the scientific quality of the "Spheres of Wellbeing" proposal.

The first reviewer,

The second reviewer

The reviews of both external reviewers as well as their contact details are attached to this application.

Research team:

The "Spheres of Wellbeing" proposal has been reviewed and revised within the research team
and Dr. Jayne Wallace (Reader at the School of Design at Northumbria University).

Educational Supervisors:

The "Spheres of Wellbeing" proposal has also been reviewed by the educational supervisors of the research student: Dr. Thomas Meyer (Senior Lecturer in Clinical Psychology at the Institute of Neuroscience at Newcastle University) and Prof. Patrick Olivier (Professor of Human Computer Interaction at the School of Computing Science at Newcastle University).

For all studies except non-doctoral student research, please enclose a copy of any available scientific critique reports, together with any related correspondence.

For non-doctoral student research, please enclose a copy of the assessment from your educational supervisor/ institution.

A56. How have the statistical aspects of the research been reviewed? Tick as appropriate:

- Review by independent statistician commissioned by funder or sponsor
- Other review by independent statistician
- Review by company statistician
- Review by a statistician within the Chief Investigator's institution
- Review by a statistician within the research team or multi-centre group
- Review by educational supervisor
- Other review by individual with relevant statistical expertise
- No review necessary as only frequencies and associations will be assessed – details of statistical input not required

In all cases please give details below of the individual responsible for reviewing the statistical aspects. If advice has been provided in confidence, give details of the department and institution concerned.

Title Forename/Initials Surname
Dr. Thomas D. Meyer

Department

Institution Newcastle University
Work Address Ridley Building
Institute of Neuroscience
Doctorate in Clinical Psychology
Post Code NE1 7RU
Telephone
Fax
Mobile

E-mail

Please enclose a copy of any available comments or reports from a statistician.

A57. What is the primary outcome measure for the study?

This research is qualitative and explorative in nature. It primarily aims to answer the question: If, and how, the 'Spheres of Wellbeing' can support the learning and practice of mindfulness skills, help service users to calm emotional distress and provide a means to support their identity construction?

A58. What are the secondary outcome measures? (if any)

As a secondary outcome of this research, we will investigate the role and contribution of the collaborative design process with service users and the close dialogue with staff during this research. This involves finding answers to the following question:

If, and how, the collaborative research process informs the design of the interactive 'Spheres of Wellbeing'; allows for an increased understanding of service users and their needs with regard to such-like technologies; and helps in the interpretation of the research findings in this particular context?

A59. What is the sample size for the research? How many participants/samples/data records do you plan to study in total? If there is more than one group, please give further details below.

Total UK sample size:	6
Total international sample size (including UK):	6
Total in European Economic Area:	6

Further details:

This suggested number of participants describes the current amount of female inpatients in the medium secure services of th

A60. How was the sample size decided upon? If a formal sample size calculation was used, indicate how this was done, giving sufficient information to justify and reproduce the calculation.

The female inpatients in the medium secure services at the encompasses currently 6 inpatients. All inpatients on this unit are considered to be potential participants for the study (depending on inclusion/exclusion criteria as outlined in A17).

A61. Will participants be allocated to groups at random?

Yes No

A62. Please describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives.

All data collected throughout the research will undergo a systematic and rigorous analysis process. The data to be collected encompasses:

- research notes of the researchers;
- all materials captured during the co-creative sessions with the women – including created materials and audio recordings of the sessions;
- log file data of the interactive Sphere objects (Mindfulness Sphere and Identity Sphere);
- audio recordings of informal discussions or interviews with the women about their set of artefacts;
- Eventcards and the weekly Journal entries of members of staff on the ward; and
- audio recordings of interviews with staff.

This plurality of quantitative and qualitative data is sought to provide rich, multifaceted insights into the unique process of how each woman adopts her 'Spheres of Wellbeing'.

Crafted materials and the audio recordings of the creative sessions with the women will inform the final design of each woman's 'Spheres of Wellbeing'. They will be used to describe the co-creative process and its outcomes, but may also usefully contribute to a better understanding of how each woman relate to her Sphere's objects as part of the data analysis stage.

The log file data will provide descriptive information about the women's engagement with their Spheres, which will be plotted over time to allow insights as to when, how and how often the 'Spheres of Wellbeing' have been used by the women.

Filled out Eventcards as well as weekly Journal entries by staff, will be used as prompts in interviews with the ward staff who recorded these events and observation to facilitate the remembering of them, and help them in articulating their personal observations and experiences during the project.

All audio recordings of the creative sessions and interviews with both staff and service users will be carefully and accurately transcribed. The transcription of the audio will either be conducted by a member of the research team (Anja Thieme) or handed over to a transcription company (e.g., UK Transcription). If a member of the research team transcribes the audio, computer software will be used to support and organise the process of transcription (e.g., Transcriber or Express Scribe Transcription Software) and for the analysis of the data (e.g., NVivo). If transcripts are given to the transcription company, the responsible member of the research team (Anja Thieme) will make sure that the respective audio file(s) are entirely anonymised. Final transcripts will be carefully checked for their accuracy and correctness.

All qualitative data will be analysed in-depth following Thematic Analysis approach. A thematic analysis generally includes an intensive familiarisation with the data, the identification of themes or categories in the data set and a systematic search for re-occurring themes and other topics of interest (e.g. views that are unusual, noteworthy or contradictory). The found themes and categories are then labeled (also referred to as coding of the data). By going backwards and forwards in the transcripts, labels or codes that belong to a higher-level category are then grouped (e.g., code : 'bringing awareness to one's heartbeat' and code 'focus on changes moment by moment' could be grouped to the category 'mindfulness') and higher level-categories developed. It will then be analysed how identified themes are linked to each other.

Why did we choose 'thematic analysis' before 'grounded theory' or the 'framework approach'? Grounded theory traditionally aims at identifying categories as they emerge from the qualitative data in order to generate a new theory. It is a very data driven approach. On the contrary, the 'framework approach', which is more and more used in health care research, is a rather deductive method in that is primarily driven by already existing theories who provide a framework for the data analysis. Since the proposed research here follows an exploratory and open-ended approach, but is also informed by existing theories in the literature, we suggest thematic analysis before the other two common qualitative methods as it is both informed by the data (inductive, data driven) and by theory (deductive, theory driven), and therefore may uncover new areas or ideas that have not been anticipated at the outset of the research.

5. MANAGEMENT OF THE RESEARCH

A63. Other key investigators/collaborators. Please include all grant co-applicants, protocol co-authors and other key members of the Chief Investigator's team, including non-doctoral student researchers.

	Title Forename/Initials Surname
	Dr. Jayne Wallace
Post	Reader
Qualifications	
Employer	Northumbria University
Work Address	City Campus East Newcastle Upon Tyne

Post Code NE18ST
 Telephone
 Fax
 Mobile
 Work Email

Title Forename/Initials Surname
 Dr. Thomas D. Meyer
 Post Senior Lecturer in Clinical Psychology

Qualifications

Employer Newcastle University
 Work Address Ridley Building
 Institute of Neuroscience
 Doctorate in Clinical Psychology
 Post Code NE1 7RU
 Telephone
 Fax
 Mobile
 Work Email

Title Forename/Initials Surname
 Prof. Patrick Olivier
 Post Professor for Human Computer Interaction

Qualifications

Employer Newcastle University
 Work Address Culture Lab - Newcastle University
 Grand Assembly Rooms
 King's Walk
 Post Code NE1 7RU
 Telephone
 Fax
 Mobile
 Work Email

A64. Details of research sponsor(s)

A64-1. Sponsor

Lead Sponsor

Status: NHS or HSC care organisation
 Academic
 Pharmaceutical industry
 Medical device industry

Commercial status: Non-Commercial

- Local Authority
 Other social care provider (including voluntary sector or private organisation)
 Other

If Other, please specify:

Contact person

Name of organisation

Given name

Family name

Address

Town/city

Post code

Country UNITED KINGDOM

Telephone

Fax

E-mail

Is the sponsor based outside the UK?

- Yes No

Under the Research Governance Framework for Health and Social Care, a sponsor outside the UK must appoint a legal representative established in the UK. Please consult the guidance notes.

A65. Has external funding for the research been secured?

- Funding secured from one or more funders
 External funding application to one or more funders in progress
 No application for external funding will be made

What type of research project is this?

- Standalone project
 Project that is part of a programme grant
 Project that is part of a Centre grant
 Project that is part of a fellowship/ personal award/ research training award
 Other

Other – please state:

Please give details of funding applications.

Organisation EPSRC, Research Council UK, Project grant "Social inclusion through the Digital Economy (SIDE): Newcastle University" (EPSRC Reference: EP/G066019/1)
 Address School of Computing Science
 Claremont Tower
 Newcastle upon Tyne

Post Code	NE1 7RU
Telephone	
Fax	
Mobile	
Email	
Funding Application Status:	<input checked="" type="radio"/> Secured <input type="radio"/> In progress
Amount:	
Duration	
Years:	2
Months:	
<i>If applicable, please specify the programme/ funding stream:</i>	
What is the funding stream/ programme for this research project?	
This research is part of the EPSRC (Engineering and Physical Science Research Council) programme grant "Social inclusion through the Digital Economy" (SiDE); reference number: EP/G0660191/1.	
SiDE is funded through the Digital Economy Programme, which is led by the Engineering and Physical Sciences Research Council (EPSRC) and brings together the work of EPSRC and that of the Economic and Social Research Council (ESRC), the Medical Research Council (MRC) and the Arts and Humanities Research Council (AHRC).	

A67. Has this or a similar application been previously rejected by a Research Ethics Committee in the UK or another country?

Yes No

Please provide a copy of the unfavourable opinion letter(s). You should explain in your answer to question A6-2 how the reasons for the unfavourable opinion have been addressed in this application.

A68. Give details of the lead NHS R&D contact for this research:

Title Forename/Initials Surname

Organisation

Address

Post Code

Work Email

Telephone

Fax

Mobile

Details can be obtained from the NHS R&D Forum website: <http://www.rdforum.nhs.uk>

A69-1. How long do you expect the study to last in the UK?

Planned start date: 01/11/2012

Planned end date: 31/07/2013

Total duration:

Years: 0 Months: 8 Days: 30

A71-2. Where will the research take place? (Tick as appropriate)

- England
 Scotland
 Wales
 Northern Ireland
 Other countries in European Economic Area

Total UK sites in study 1

Does this trial involve countries outside the EU?

 Yes No**A72. What host organisations (NHS or other) in the UK will be responsible for the research sites? Please indicate the type of organisation by ticking the box and give approximate numbers of planned research sites:**

- NHS organisations in England 1
 NHS organisations in Wales
 NHS organisations in Scotland
 HSC organisations in Northern Ireland
 GP practices in England
 GP practices in Wales
 GP practices in Scotland
 GP practices in Northern Ireland
 Social care organisations
 Phase 1 trial units
 Prison establishments
 Probation areas
 Independent hospitals
 Educational establishments
 Independent research units
 Other (give details)

Total UK sites in study: 1

A76. Insurance/ indemnity to meet potential legal liabilities*Note: In this question to NHS indemnity schemes include equivalent schemes provided by Health and Social Care (HSC) in Northern Ireland***A76-1. What arrangements will be made for insurance and/or indemnity to meet the potential legal liability of the sponsor(s) for harm to participants arising from the management of the research? Please tick box(es) as applicable.***Note: Where a NHS organisation has agreed to act as sponsor or co-sponsor, indemnity is provided through NHS schemes. Indicate if this applies (there is no need to provide documentary evidence). For all other sponsors, please describe the arrangements and provide evidence.*

- NHS indemnity scheme will apply (NHS sponsors only)

Other insurance or indemnity arrangements will apply (give details below)

Please enclose a copy of relevant documents.

A76-2. What arrangements will be made for insurance and/ or indemnity to meet the potential legal liability of the sponsor(s) or employer(s) for harm to participants arising from the design of the research? Please tick box(es) as applicable.

Note: Where researchers with substantive NHS employment contracts have designed the research, indemnity is provided through NHS schemes. Indicate if this applies (there is no need to provide documentary evidence). For other protocol authors (e.g. company employees, university members), please describe the arrangements and provide evidence.

- NHS indemnity scheme will apply (protocol authors with NHS contracts only)
 Other insurance or indemnity arrangements will apply (give details below)

Newcastle University provides legal liability cover for the design of the study. A letter from the Universities insurers confirming the details of the Universities 2012/2013 Public Liability insurance policy is attached to this application. The project is insured by the University for its entire duration (until the 31st of July 2013).

The protocol of the research has been reviewed by _____ (contact details below).

Assistant Insurance Officer

Insurance & Risk
 Finance and Planning
 Newcastle University
 King's Gate
 Newcastle upon Tyne
 NE1 7RU

Tel:
 Fax:

insurance@ncl.ac.uk

Please enclose a copy of relevant documents.

A76-3. What arrangements will be made for insurance and/ or indemnity to meet the potential legal liability of investigators/collaborators arising from harm to participants in the conduct of the research?

Note: Where the participants are NHS patients, indemnity is provided through the NHS schemes or through professional indemnity. Indicate if this applies to the whole study (there is no need to provide documentary evidence). Where non-NHS sites are to be included in the research, including private practices, please describe the arrangements which will be made at these sites and provide evidence.

- NHS indemnity scheme or professional indemnity will apply (participants recruited at NHS sites only)
 Research includes non-NHS sites (give details of insurance/ indemnity arrangements for these sites below)

Please enclose a copy of relevant documents.

PART C: Overview of research sites

Please enter details of the host organisations (Local Authority, NHS or other) in the UK that will be responsible for the research sites. For NHS sites, the host organisation is the Trust or Health Board. Where the research site is a primary care site, e.g. GP practice, please insert the host organisation (PCT or Health Board) in the Institution row and insert the research site (e.g. GP practice) in the Department row.

Research site	Investigator/ Collaborator/ Contact
Institution name	Title
Department name	First name/
Street address	Initials
Town/city	Surname
Post Code	

PART D: Declarations**D1. Declaration by Chief Investigator**

1. The information in this form is accurate to the best of my knowledge and belief and I take full responsibility for it.
2. I undertake to abide by the ethical principles underlying the Declaration of Helsinki and good practice guidelines on the proper conduct of research.
3. If the research is approved I undertake to adhere to the study protocol, the terms of the full application as approved and any conditions set out by review bodies in giving approval.
4. I undertake to notify review bodies of substantial amendments to the protocol or the terms of the approved application, and to seek a favourable opinion from the main REC before implementing the amendment.
5. I undertake to submit annual progress reports setting out the progress of the research, as required by review bodies.
6. I am aware of my responsibility to be up to date and comply with the requirements of the law and relevant guidelines relating to security and confidentiality of patient or other personal data, including the need to register when necessary with the appropriate Data Protection Officer. I understand that I am not permitted to disclose identifiable data to third parties unless the disclosure has the consent of the data subject or, in the case of patient data in England and Wales, the disclosure is covered by the terms of an approval under Section 251 of the NHS Act 2006.
7. I understand that research records/data may be subject to inspection by review bodies for audit purposes if required.
8. I understand that any personal data in this application will be held by review bodies and their operational managers and that this will be managed according to the principles established in the Data Protection Act 1998.
9. I understand that the information contained in this application, any supporting documentation and all correspondence with review bodies or their operational managers relating to the application:
 - Will be held by the REC (where applicable) until at least 3 years after the end of the study; and by NHS R&D offices (where the research requires NHS management permission) in accordance with the NHS Code of Practice on Records Management.
 - May be disclosed to the operational managers of review bodies, or the appointing authority for the REC (where applicable), in order to check that the application has been processed correctly or to investigate any complaint.
 - May be seen by auditors appointed to undertake accreditation of RECs (where applicable).
 - Will be subject to the provisions of the Freedom of Information Acts and may be disclosed in response to requests made under the Acts except where statutory exemptions apply.
10. I understand that information relating to this research, including the contact details on this application, may be held on national research information systems, and that this will be managed according to the principles established in the Data Protection Act 1998.
11. Where the research is reviewed by a REC within the UK Health Departments Research Ethics Service, I understand that the summary of this study will be published on the website of the National Research Ethics Service (NRES), together with the contact point for enquiries named below. Publication will take place no earlier than 3 months after issue of the ethics committee's final opinion or the withdrawal of the application.

Contact point for publication*(Not applicable for R&D Forms)*

NRES would like to include a contact point with the published summary of the study for those wishing to seek further information. We would be grateful if you would indicate one of the contact points below.

- Chief Investigator
 Sponsor

- Study co-ordinator
- Student
- Other – please give details
- None

Access to application for training purposes *(Not applicable for R&D Forms)*

Optional – please tick as appropriate:

I would be content for members of other RECs to have access to the information in the application in confidence for training purposes. All personal identifiers and references to sponsors, funders and research units would be removed.

This section was signed electronically by Miss Anja Thieme on 24/10/2012 13:33.

Job Title/Post: PhD Student
Organisation: Newcastle University
Email:
Signature:

Print Name: Anja Thieme

Date: 19/10/2012 (dd/mm/yyyy)

D2. Declaration by the sponsor's representative

If there is more than one sponsor, this declaration should be signed on behalf of the co-sponsors by a representative of the lead sponsor named at A64-1.

I confirm that:

1. This research proposal has been discussed with the Chief Investigator and agreement in principle to sponsor the research is in place.
2. An appropriate process of scientific critique has demonstrated that this research proposal is worthwhile and of high scientific quality.
3. Any necessary indemnity or insurance arrangements, as described in question A76, will be in place before this research starts. Insurance or indemnity policies will be renewed for the duration of the study where necessary.
4. Arrangements will be in place before the study starts for the research team to access resources and support to deliver the research as proposed.
5. Arrangements to allocate responsibilities for the management, monitoring and reporting of the research will be in place before the research starts.
6. The duties of sponsors set out in the Research Governance Framework for Health and Social Care will be undertaken in relation to this research.
7. Where the research is reviewed by a REC within the UK Health Departments Research Ethics Service, I understand that the summary of this study will be published on the website of the National Research Ethics Service (NRES), together with the contact point for enquiries named in this application. Publication will take place no earlier than 3 months after issue of the ethics committee's final opinion or the withdrawal of the application.

This section was signed electronically by

on 25/10/2012 15:03.

Job Title/Post:

Organisation:

Email:

D3. Declaration for student projects by academic supervisor(s)

1. I have read and approved both the research proposal and this application. I am satisfied that the scientific content of the research is satisfactory for an educational qualification at this level.
2. I undertake to fulfil the responsibilities of the supervisor for this study as set out in the Research Governance Framework for Health and Social Care.
3. I take responsibility for ensuring that this study is conducted in accordance with the ethical principles underlying the Declaration of Helsinki and good practice guidelines on the proper conduct of research, in conjunction with clinical supervisors as appropriate.
4. I take responsibility for ensuring that the applicant is up to date and complies with the requirements of the law and relevant guidelines relating to security and confidentiality of patient and other personal data, in conjunction with clinical supervisors as appropriate.

Academic supervisor 1

This section was signed electronically by Professor Patrick Olivier on 24/10/2012 13:41.

Job Title/Post: Professor of Human-Computer Interaction
Organisation: Newcastle University
Email:

Academic supervisor 2

This section was signed electronically by Thomas Daniel Dr. Meyer on 24/10/2012 13:54.

Job Title/Post: Senior Lecturer in Clinical Psychology
Organisation: Newcastle University
Email:

Appendix B.2 List of Staff Professions

SPHERES OF WELLBEING

The following lists and gives a brief description of all NHS staff professions that were involved in the design and/ or conduct of the Spheres of Wellbeing research.

Role	Band	Description
Medical Director	Band 9	Medical directors ¹ can have wide ranging roles and responsibilities which often include the lead of the formation and implementation of clinical strategy; the taking of a lead on clinical standards; the provision of clinical advice to the Trust board as well as the provision of professional leadership to medical staff. Thus, they are involved in clinical governance, ensure the quality and safety of care, carry responsibility for education, staff planning and disciplinary issues concerning doctors.
Clinical Nurse Manager	Band 8	Clinical nurse managers ² are generally responsible for directing, organising, supervision and evaluating the performance of qualified nurses to ensure that effective care is provided for service users and the quality standards are met. This includes providing feedback to the nursing team, the development of education programmes, budgeting and maintaining inventory of medicine, equipment and any other supplies. They act as a representative for, and are sought to present the best interests of both the nursing staff and their patients.
Consultant Clinical Psychologist	Band 8	Clinical Consultant Psychologists ³ are highly experienced in working with service users who have mental or physical health problems with the aim to reduce psychological distress and enhance and promote psychological wellbeing.
Ward Manager	Band 7	Ward managers ⁴ are responsible for the organization and management of the ward including the provision of clear direction and leadership to their staff team (comprising of nursing staff and support workers) for the delivery of care as well as financial and business planning (costs and staffing).

¹ <http://www.nact.org.uk/getfile/2161/> [Last retrieved 31.05.2015]

² <http://www.jacksonvilleu.com/resources/career/clinical-nurse-manager-job-descriptionsalary/#.U4pRBSiYGSo> [Last retrieved 31.05.2014]

³ <http://www.nhscareers.nhs.uk/explore-by-career/psychological-therapies/careers-in-psychologicaltherapies/psychologist/clinical-psychologist/> [Last retrieved 31.05.2014]

⁴ [http://www.staffnurse.com/jobseeker/jobs/jobdetails.aspx?APath=2.21.0.0.0&job_id=JHP1MT5ZMNX3LND560](http://www.staffnurse.com/jobseeker/jobs/jobdetails.aspx?APath=2.21.0.0.0&job_id=JHP1MT5ZMNX3LND560&IPath=JRKCV) [Last retrieved 31.05.2014]

Deputy	Band 6	Deputy ward managers ³² assist in leading, monitoring and supervising the nursing staff team and steps in for the ward manager in their absence.
Occupational Therapist	Band 5 or higher	Occupational therapists ⁶ assess and support the treatment of physical and psychiatric conditions using specific activity to prevent disability and promote independent function in all aspects of daily life.
Qualified Nurse	Band 5	Qualified nurses included Learning Disability nurses ³³ , providing specialist healthcare to those with a range of learning disabilities, and Mental health nurses ³⁴ , providing specialist care for people with often complex and demanding needs.
Assistant Practitioner	Band 4 or higher	Assistant practitioners ³⁵ work as part of the nursing team and promote the health and education of service users. They assist in the identification of their health needs and participate in delivering the care needed, often under indirect supervision of a qualified nurse.
Support Worker	Band 3	Support Workers in mental health ³⁶ commonly work within the multi-disciplinary care team of service users to ensure continuity of care. Their responsibilities primarily include the support of service users on the wards in providing them with appropriate assistance and guidance in areas of personal care, in daily living and household skills, and in organizing therapeutic activity. They also support and accompany service users during visits with their family or day trips outside the hospital.
Safet & Security Manager	Band 7 or higher	Safety and security managers ³⁷ are responsible for a range of duties including the management of all safety, security, life safety and emergency operations at the hospital or specific ward(s). To this end, safety and security managers have to be experts in the regulatory requirements to maintain and build safety.

³² <http://www.cpft.nhs.uk/band%206%20deputy%20ward%20manager%20final.doc> [Last retrieved 31.05.2014] ⁶ <http://www.nhs Careers.nhs.uk/explore-by-career/allied-health-professions/careers-in-the-allied-healthprofessions/occupational-therapist/> [Last retrieved 31.05.2014]

³³ <http://www.nhs Careers.nhs.uk/explore-by-career/nursing/careers-in-nursing/learning-disabilities-nursing/> [Last retrieved 31.05.2014]

³⁴ <http://www.nhs Careers.nhs.uk/explore-by-career/nursing/careers-in-nursing/mental-health-nursing/> [Last retrieved 31.05.2014]

³⁵ <http://www.nhs Careers.nhs.uk/explore-by-career/wider-healthcare-team/careers-in-the-wider-healthcareteam/clinical-support-staff/assistant-practitioner/> [Last retrieved 31.05.2014]

³⁶ http://www.hscrecruit.com/uploads/pdf/75613057_jobdescription.pdf [Last retrieved 31.05.2014]

³⁷ https://rew31.ultipro.com/VAL1004/JobBoard/JobDetails.aspx?_ID=*7547F84EBC29F9C5 [Last retrieved 31.05.2014]

R&D Manager	Band 7 or higher	Research and development (R&D) managers ³⁸ are primarily responsible for the promotion, conduct and use of research to improve current and future health care services. To this end, managers support the undertaking of research (e.g. identification of potential study participants) at the hospital and ensure that any research that is carried out complies with any legislation and obtained all necessary regulatory approvals.
Research Assistant	Band 4	Research assistants assist the R&D manager.

Appendix B.3 Information Sheet & Consent Form for Service Users

SPHERES OF WELLBEING

The following first presents the information sheet and consents form used for the recruitment of our service user group, which was adopted for people with a Learning Disability and approved by the NHS Research Ethics Committee North East - Newcastle & North Tyneside 2 on December 6th 2012.

³⁸ <http://www.hra.nhs.uk/documents/2013/10/nhs-rd-summary-ver-1.pdf> [Last retrieved 31.05.2014]

Information Sheet – Spheres of Wellbeing

For “Service Users” on the Medium Secure Unit





My name is Anja Thieme and I am a student at Newcastle University. Jayne Wallace is a researcher at Northumbria University. Together, we are doing a research project with people at [REDACTED].

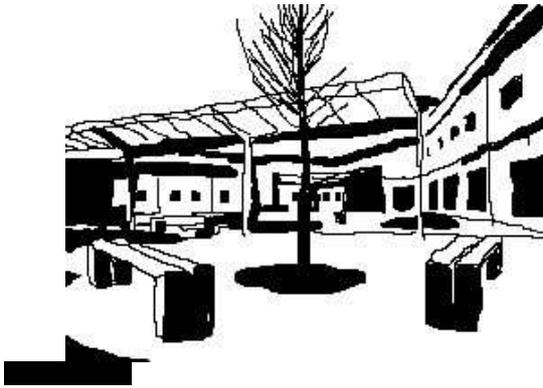
This sheet will tell you about our research.

What is our research about?

- To understand how we can help you feel better
- To create little things together with you
- To give you a set of objects that you can use to meditate or distract yourself

Why are we asking you to volunteer to take part in a research study?

Version 1.1 - Date: 06.12.2012



Because:

- You are accessing services at [REDACTED]
- You will soon be receiving meditation-based treatment

Before you decide if you want to take part, it is important that you understand why the research is being done and what it will involve for you. So please consider this leaflet carefully.



Talk it over with your carers. They can help you if you have any questions. You can also talk to your librarian [REDACTED] [REDACTED] for advice about whether you should take part or not.



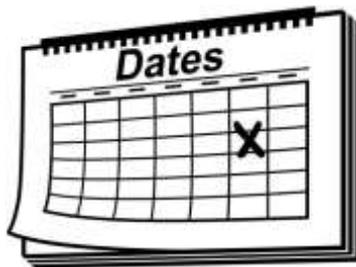
What would you have to do?

We will visit you at [REDACTED]:

- On our first visits we will make things with you. We will draw images, make jewellery or take pictures. We will meet 4 or 5 times.



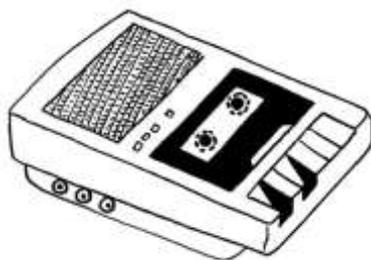
Version 1.1 - Date: 06.12.2012



- A few weeks later we will bring you a set of objects (the Spheres of Wellbeing) that are for you to keep and use, if you like.
- Over a period of 4 weeks, we will come back to ask you some questions about these objects. For instance: If you used the objects and why you liked or disliked them.
- If you give permission, we would like to visit you 3 month later again and talk with you about these objects.

Each meeting will last for about 1 hour, but you can take a break whenever you like.

We will mostly meet in a quiet room in the place you are living. Everything you will tell us will not be told to other people.





Protocol No. 1.0 -REC Reference No.: 12/NE/0386

We will keep everything you say private, but if you talk about any plan to cause harm to yourself or others, then we will have to pass this on to your carers.

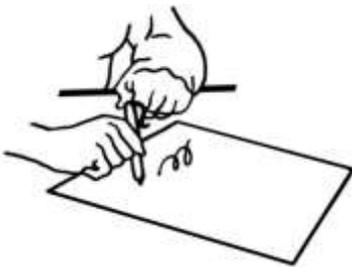
We would like to make sure you are safe. If you become upset or distressed during our meeting, we will stop and get one of your carers to support you.

If we stop, we would still like to use the information that you have given us for this research. We will ask your permission to keep it.

We would like to audio record our meetings so we can listen to them later again. We will ask for your permission to do this.

Only we will listen to the recordings. No one else will have access to the recording or any other information

about you, because we will lock them away.







Protocol No. 1.0 -REC Reference No.: 12/NE/0386

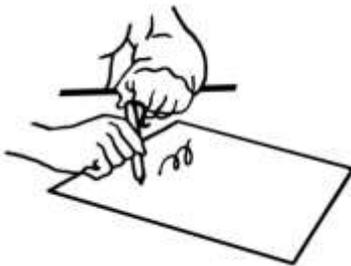
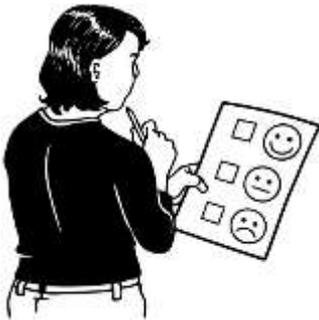
We would also like to interview your carers and ask them how you use the objects that we will give you.

For this research only will your carers take notes of how you use the objects that we will give to you. Some of the objects will also store information about when and how often you use them. If you do not want us to talk with anybody else, we would still like you to take part in this research.

Part of our research is to tell other people what we have done. We will write a report about this research. In this report we may use quotes of what you said. If we do this, your name and your details will be removed so noone will know who said what.

You are free to stop taking part at any time during the research without giving a reason. If you decide to stop, this will not affect the care or support

you receive. No-one will be upset with you.







I cannot promise that the research project will help you but the information may help other people in the future that are in a similar situation like you.

You do not have to take part. It is up to you. You have at least 1 week to think about the project.

If you want to take part:

- We will ask you to sign a form giving your permission.
- We will have to tell your carers and clinician that you take part.

If you do not want to take part:

- This is absolutely fine. It will not affect the care or support you receive.
- No-one will be upset with you.

You can change your mind about taking part. Every time we visit, we will ask you if you are still happy to

take part. You can also ask your
carers to contact us if you changed







Protocol No. 1.0 -REC Reference No.: 12/NE/0386

Before any research goes ahead, it has to be checked by a REC. They make sure that the research project is fair and safe.

This research project has been checked by the Research Ethics Committee Newcastle & North Tyneside 2, UK.

If you have any questions that you wish to discuss, you can talk to one of your carers or ask them to contact us, and we come visit you again. Anja's contact phone number is [REDACTED] [REDACTED] or [REDACTED].

If you have any complaints about any aspect of this research study or our conduct, please contact Anja's supervisor Dr. Thomas Meyer. His phone number is [REDACTED].

Thank you very much for reading this information sheet.

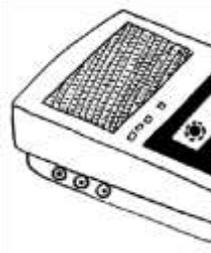
Version 1.1 - Date: 06.12.2012

[This information sheet is informed by NRES, 2009 and CHANGE – How to make information accessible, 2012]

Statement of Consent – Spheres of Wellbeing

For “Service Users” on the Medium Secure Unit





Please sign or tick ()

) one of the boxes for each question:

1. I have read the participant information sheet (version 1.0) and talked about it with the researcher, my carers and friends.

Yes No

2. I know that I can stop taking part at any time and no-one will be upset with me.

Yes

3. I give permission to the researcher to audio record our meetings.

Yes

No





Protocol No. 1.0 - REC Reference No.: 12/NE/0386

4. I give permission for the researcher to keep the information I have given to them.

Yes No

5. I give my permission for the researcher to use what I say to them when they report about the research study, and this might include direct quotes, but I understand they will not use my name or any personal details.

Yes

6. I give my permission for the researcher to talk to my carers too.

Yes

7. I understand that my carers will take notes about how I use the objects that the researchers will bring for me.

Yes

No





Protocol No. 1.0 - REC Reference No.: 12/NE/0386

8. I understand that the objects that the researchers will bring for me will store information about when and how often I use them.

Yes

9. I understand that the researcher will inform my Clinician about my participation in this research.

Yes No

10. I understand that the researcher will have to tell my carers if I talk about plans to cause harm to myself or others.

Yes No

11. I agree to take part in the research study.

Yes No

Name of participant

Date

Signature

Name of person

Date Signature

taking consent

Version 1.0 - Date: 30.07.2012

[Informed by NRES, 2009 and CHANGE, 2011]

Appendix B.4 Event Card & Staff

Diaries

SPHERES OF WELLBEING

The following first presents the design of the *event cards* and then an excerpt of the research *diary* for staff (showing the complete set of questions that were asked about each of the six women for each of the 4 observation weeks), as they were approved by the NHS Research Ethics Committee North East - Newcastle & North Tyneside 2 on the 6th December 2012.

Front and back of the Spheres of Wellbeing *event card*:

OBSERVATIONS OF ENGAGEMENT

Initials of each woman engaging:

Object(s) of engagement:

Where does engagement take place:

Woman engages with the object(s):

- alone
 in the presence of other women

Spheres of Wellbeing Project - Newcastle University



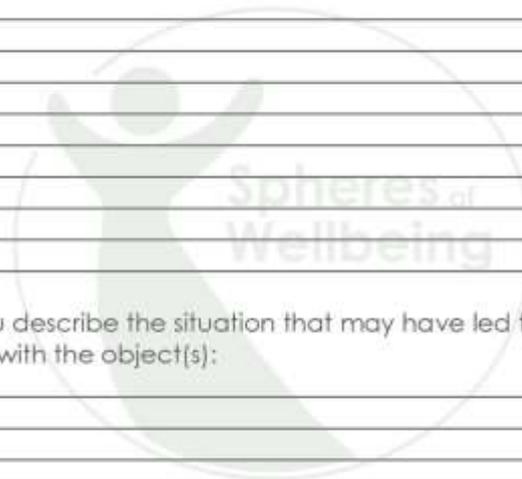
Date:

_____DD/MM/YYYY_

Initials of staff:

Please describe to me how the woman engages with her object(s):

How would you describe the situation that may have led to the engagements with the object(s):





Spheres of Wellbeing

Journal to record weekly observations



Contact Details

Anja Thieme :: Culture Lab :: Space 2
Newcastle University :: King's Walk
Grand Assembly Rooms :: NE1 7RU
Newcastle upon Tyne :: UK

07796046774

ncl.ac.uk



Instructions

This journal offers you the space to write down your personal observations of how the women engage with their Spheres of Wellbeing.

For each week and each woman, you will find a set of questions. Please make a note of the date at the top of the first page and indicate through initials or an anonymous code the woman that your observations relate to.

Please try to answer all questions to the best of your abilities. You can write as little or as much as you like.

Please try to fill out this journal regularly and bring it to our interview at the end of the 4 week study period.

Thank you!



This journal
belongs to:

(Your initials): _____



Observation Week No. 1

Observation week: DD/MM/YYYY – DD/MM/YYYY

Initials/ code of the woman: _____

Did you see her this week? **yes** **no**

Did you see her engage with any of these objects? (Please tick box)

Heartbeat ball **Leather wallet**

Bead bracelet **Stickers or transfers**



None of

these

If **no** engagement took place: Why do you personally think the woman was not using any of her objects? _____

If engagement took place: Where did you see the woman engage with her objects? _____

Please describe to me in as much detail as possible the last time (or a key instance), that you saw her engage with her Spheres object(s):



Was there anything unusual about the interaction, or her behaviour towards the objects? (Please explain)

What do you think might have been her experiences with the objects? (Please explain)

In your opinion what do you think she got out of the interaction with her objects? _____



What do you personally think motivated her to engage with the object(s)? _____



Did you try to motivate her to engage with any of her objects? (Please explain) _____



How often did you try to motivate her to engage with them? (Please tick box)

- Not at all** **Once this week**
- Every other day** **Once a day**
- 1-3 times a day** **>3 times a day**
- Cannot remember**

Did the woman talk about any of her objects with you? If yes, what did she talk about: _____

Why did you try to motivate engagement?
What did you expect or hope to occur? _____



Do you think your encouragements influenced her engagements with the objects? (Please explain) _____

Did you observe a situation where she engaged with her objects with another woman? (If yes, please explain) _____

Appendix B.5 Example Tools List

SPHERES OF WELLBEING

The following shows the tools list template used for the second creative session.

Spheres of Wellbeing Research Project – Tool Check List

W/C 25/2/13 [Name of Hospital Ward]

Session 2 – Bead glazing, Crystal growing & Mandala Colouring: Tools & Items

Tools	Amount	Check
Audio recorder	1	<input type="checkbox"/>
Polaroid camera	1	<input type="checkbox"/>
Camera in purse	1	<input type="checkbox"/>
Varnish for beads (1 small and a 1 larger container)	2	<input type="checkbox"/>
Leather strings (short)	3	<input type="checkbox"/>
Big containers with crystal solution	6	<input type="checkbox"/>
Small containers with crystal solution	6	<input type="checkbox"/>

Item	Amount	Check
Polaroid stickers (<i>amount of used stickers: ____; to be kept on the unit?</i>)	10	<input type="checkbox"/>
Storage box	2	<input type="checkbox"/>
Beads made by participant + extra clay left-overs	(____)	<input type="checkbox"/>
Small storage box with assorted metal beads	2	<input type="checkbox"/>
Assorted metal beads	18 x 5	<input type="checkbox"/>
Plastic container (for beads/ final bead bracelet components)	1	<input type="checkbox"/>
Beads made by participant	(____)	<input type="checkbox"/>
Tooth sticks	(____)	<input type="checkbox"/>

Paint brush for varnish	1	<input type="checkbox"/>
Ice cube tray	2	<input type="checkbox"/>
Pair of rubber gloves	2	<input type="checkbox"/>
Plastic shapes with fabric wrapper around	14 + 4	<input type="checkbox"/>
Straws	14 + 4	<input type="checkbox"/>
Crystal growing sheet	2	<input type="checkbox"/>
Small plastic cups (shot glasses)	4	<input type="checkbox"/>
Measuring cup	2	<input type="checkbox"/>
Safety glasses	1	<input type="checkbox"/>
Spoon to stir	2	<input type="checkbox"/>
Pancetta	1	<input type="checkbox"/>
Plastic funnel	1	<input type="checkbox"/>
Plastic pipette	1	<input type="checkbox"/>
Large container to mix chemical solution	2	<input type="checkbox"/>
Small container to mix chemical solution	2	<input type="checkbox"/>
Sheet with colour sticky dots	1 sheet, 80 dots	<input type="checkbox"/>
Pen	1	<input type="checkbox"/>
Kitchen paper	1 roll	<input type="checkbox"/>
Protective Table cloth	1	<input type="checkbox"/>
Plastic folder with 20 Mandala sheets (amount used: ___)	1	<input type="checkbox"/>
Pack of 10 coloured pencils (<i>to be kept on the unit?</i>)	10	<input type="checkbox"/>
Example mandala imagery	2	<input type="checkbox"/>
Leather bag with 20 conversation tokens made from paper	1	<input type="checkbox"/>
Leather purse with acrylic screen protection	1	<input type="checkbox"/>

Researcher: Anja Thieme

Responsible Escort staff: [Name of Escort staff]

Signed in.....

Date..... Time.....

Signed out.....

Date..... Time.....

Appendix B.6 Fabrication

SPHERES OF WELLBEING

The following presents short descriptions and overviews of the fabrication process of both the Mindfulness and the Identity Spheres.

Fabrication Mindfulness Sphere

Step 1: Mould Making



For the creation of a silicon mould, the so called “negative” for the casting of the resin Sphere, we had to first create a “positive” of the Sphere. This was achieved by attaching two 3D printed plastic grips (here: yellow) to either side of a solid acrylic ball (12 cm in diameter). The plastic grips indicate the places where the copper disks are going to sit on later.



We also drilled a hole at the bottom of the acrylic ball and inserted a M6 screw (top of the image). This construction would leave a hole at the bottom of the silicon mould, which was needed to allowed us to screw the bottom of the *plastic container* safely in place when pouring the resin.



For the silicon mould we used RTV 272 (an extremely high tear strength and long life rubber silicon), which was mixed in a 100:10 ratio with a C272 catalyst. The mixutre was vacuumed to eliminate any air bubbles for receiving a smooth finish before it was poured in two shags onto the “positive” for the resin ball. Prior to the pouringprocess, the acrylic ball had been coted by R7 release agent to allow for an easy removal once the silicon had set (after ~ 4-24 hours).

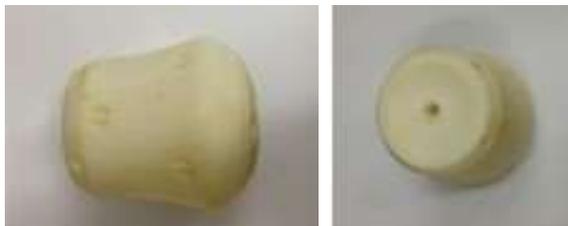


This picture shows the 2 halves of the two-part silicon mould of the acrylic ball. The left half shows the bottom (with the hole for the M6 screw) and the right half is the top of the Sphere (with a hole for pouring the resin in later. The two metal studs that were included in the silicon moulding process facilitate a precise alignment of the two halves.

Step 2: Preparing & Decorating the Core of the Mindfulness Sphere



The *plastic container* with its bottom draw builds the core of the Mindfulness Sphere. These were custom designed and 3D printed. The image shows the six white *plastic containers* as they came out of the printer. They are still attached to black-coloured support-material that was removed/ resolved by placing the pieces inside a hot acid bath.



This image shows how the *plastic container* looked like following the removal of the black supportmaterial.



Sand paper was used to smoothen the surface of the entire plastic body.



To later safely attach the bottom plastic draw to the container, we used screws. To this end, metal screw caps in the size of M4s were inserted into the plastic container using the punctual heat of a soldering iron.



To allow for the six multi-colour LEDs of the Mindfulness Sphere to shine through, small 5millimeter LED lenses were inserted inside 6 holes at the top of the *plastic container*.



To ensure that the *plastic container* is water proof (preventing resin to enter during the pouring process) the inside is entirely covered by several layers of removable silicon-based glue (Copydex).



Nylon thread is then attached to the plastic hooks all around the *plastic container*.



The nylon thread is then used to secure a layer of semi-transparent nylon fabric all around the core, only leaving a hole open at the bottom of the *plastic container*.

		<p>To decorate the fabric covered <i>plastic container</i>, a number of coloured glas beads and nylon ribbons are selected in addition to the plastic charms (shrink plastics) that the women themselves have created.</p>
		<p>The coloured ribbons are then stiched carefully to the fabric cover.</p>
		<p>Finally any glas beads and other decorative elements get attached.</p>
		<p>Once the decoration process is completed, the plastic draw of the container gets inserted and sealed with several layers of Copydex.</p>

Step 3: Pouring & Polishing the Resin

	<p>This image shows the set up and materials that were used for the casting of the resin Sphere.</p>
---	--



We started by preparing the mould for the cast. To this end, R7 Release Agent is applied at the inside of both silicon halves to allow for an easy removal of the Sphere, once the resin had set.



The decorated *plastic container* then gets inserted inside the bottom mould and secured from the other side.



For the resin mixture we used Polycraft Resin (Polylite 32032 clear polyester casting resin). The pouring was conducted in five stages (1 ½ hours apart from each other) in the following ratio:

- Stage 1: 400g resin x 3.2ml cat
- Stage 2: 150g resin x 1.2ml cat
- Stage 3: 150g resin x 1.2ml cat
- Stage 4: 100g resin x 0.8ml cat
- Stage 5: 150g resin x 1.2ml cat



Once the correct amount of resin was added to the mixing bowl, we added the corresponding amount of catalyst to it. The catalyst would slightly alter the colour of the mixture from a light turquoise to a light green.



The mixture is then carefully poured inside the bottom mould.



The first mixture fills 1/3 of the mould.



We then add the top half of the silicon mould and add clamps to either side to keep both halves together so that resin could not leak out.



Any additional resin mixtures are then poured in from the top using a funnel.



Once set (at least 4-12 hours after the last layer has been poured), the resin Sphere can be taken out of the mould.



Any air bubbles that may have appeared at the surface can be repaired by adding small coats of resin (e.g. using a paint brush).

Heat (e.g. a heat gun if carefully used or an industrial oven) can help speed up the curing process.

However, care should be given to not "burn" the resin, which will damage it and lead to changes in its colour (yellow-brown).



The resin can then be polished: first using 'wet and dry' sand paper and then applying an industrial fabric based polishing wheel in conjunction with a polishing emulsion to give it a high gloss finish.

Step 4: Crafting the Metal Contacts



For the crafting of the copper disks, we cut out circles (5cm in diameter) from a 1.5 mm thin copper sheet using a metal saw.



The copper circles were then heated up using welding equipment, left to cool, and then cleaned before the round disks got hammered into a round, steel indentation (see steel block, top right).



Once round, we then used a small flat surface hammer to give the disks a beautiful finish.



Once polished, the six sets of copper disks of the Mindfulness Spheres look like this.



We would then solder the copper wire that connects the copper disks that sit at the outside of the Sphere with the electronics that are incorporated at the inside of the Sphere.

After the copper disks are soldered to the wire and attached to the inside electronics, they get glued on to the resin using Araldite or Epoxy.

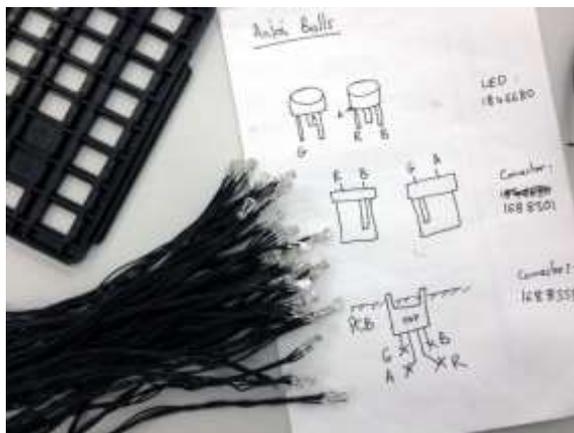


The final Spheres of Wellbeing of the six women.

Step 5: PCB Board, LEDs & Overall Assembly



This image shows the PCB board that is incorporated at the inside of the Mindfulness Sphere. It enables the processing of the electrical signals from both copper disks, provides space for 6 multi-colour LEDs, and has an inbuilt memory for the logging of use data. Underneath the PCB board sits the battery.



Each LED has four pins (for R, G, B and A) that are connected to (soldered on) four wires that lead into a connector so that the LED can be attached to the PCB board (and exchanged easily should it break).



LED Soldering process.



Final assembly of the six Mindfulness Spheres.



Fabrication of the custom made, 3D printed plastic stands and closing draws of the Mindfulness Spheres. Once printed, these were smoothed using 'wet and dry' sand paper, then spray painted (using 'filler'), sanded again, and eventually polished up (using a polishing wheel), to give them a smooth, high gloss finish.



The finished Spheres' stand/ charger.

Fabrication Identity Sphere

Leather Craft: Wet Moulding, Cutting & Dying



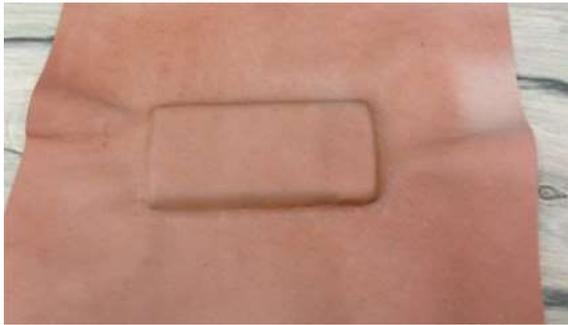
For the fabrication of the leather cover of the Identity Spheres, we used a thin sheet of vegetable leather.



From this sheet, we would cut out two square pieces that were needed to form the front- and back-side of the Identity Sphere.



We would then cover the phone technology that sits at the inside of the Identity Sphere with cling film to make it a bit more resistant to water.



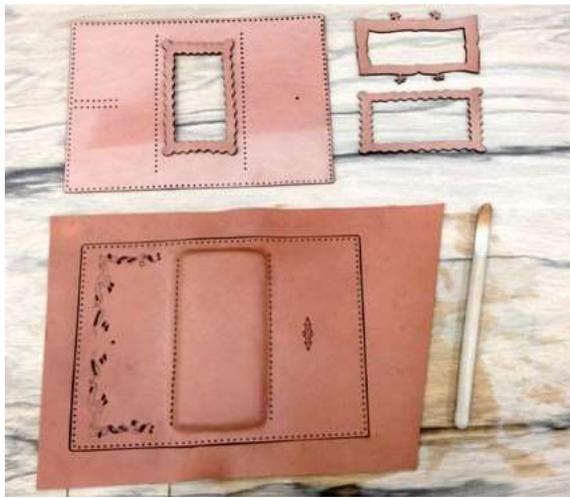
Then, the bottom leather of the Identity Sphere cover gets soaked into warm water for a couple of seconds before placed on top of the cling film wrapped phone. The leather is then carefully and tightly moulded around to the shape of the phone.



Images of the leather sheets as they get moulded and cut into the right shapes and sizes for the fabrication of the Identity Sphere cover.



To achieve a neat and precise finish, the leather pieces are cut out using laser cutting machinery. This allows for the individual pieces to fit and perfectly align with each other.



These are examples as to how the leather pieces look like once laser cutted.



We would then add in three holes to the leather cover: one for the camera of the phone (middle), one to insert a button at the top of the device (top middle), and one for the charging plug (left).



This image shows the hole in the leather cover for the phone camera.



This is how the two leather halves of the cover align.



This images show all the individually cut leather pieces that were needed to assembly the covers of the women's Identity Spheres, carefully following their design brief.



Each leather cover then got dyed into the colour of the women's choice.



These are the leather covers of each of the six Identity Spheres before they were assembled, stiched and glued together. They show at the front the decorations that each woman had chosen, the shapes of the little leather pockets for the inside, and of the screen pass-partout, and also the metal buttons to open and close the purse-like artefact later.



Left image shows the 3mm thick plastic Perspex that is placed on top of the phone scree to protect it from any damage. To the right: the leather gets stiched together before getting sealed by multiple layers of edge kote.



Example of a finished Identity Sphere of the women.



A custom made 3D printed button (spray-painted in different colours) is visible at the top of each purselike artefact (left image).



This image shows how the artefact gets charged.



Left: fabrication of the gift box (insides); bottom: The finished 6 set of Spheres of Wellbeing of the women.



Appendix B.7 Example Transcript & Coding

SPHERES OF WELLBEING

The following presents an example of a transcript of an interview with one of the women to provide insights into the coding and re-coding process as it was conducted as part of the Thematic Analysis.

Interview between principal researcher (Anja) with female service user Sally) on the medium secure unit MSU at the end of the fourth deployment week. The interview is accompanied by support worker Staff-51 (S-51) and takes place in a meeting room outside the women's .

Duration: 0:25:23

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START AUDIO

Transcript	Content Labels	Descriptive Codes I	Descriptive Codes II
<p>Introductions and taking seats in the room</p> <p>Anja: "What do you think about the project? If I have to tell other people about the project and they say, so how did the women find the project, what would you say?"</p> <p>Sally: "It's good."</p> <p>Anja: "It's good?"</p> <p>Sally: "I loved it!"</p>	<p>When asked what she thought about the project Sally <i>It's good</i>" and <i>I loved it!</i>"</p>	<p>Overall project perception: Liking</p>	<p>Overall project perception</p>
<p>Anja: "Would you want us to do something similar again [Sally: Yeah.] in the future? Yeah?What did you like most?"</p> <p>Sally: "That!" [pointing towards her purse]</p> <p>Anja: "The purse? What about it though? Is it the videos, is it the design, is it...?"</p> <p>Sally: "Nah, the little thing inside with [name of boyfriend] on."</p>	<p>When asked what Sally liked most about the project she pointed at her purse <i>Nah, the little thing inside with [name of boyfriend] on."</i></p>	<p>Perception of Spheres: Likes; Ownership & personalisation - Relation to Self</p>	<p>Perception of Spheres <i>Ownership</i></p>

Themes & Subthemes	
Project perception	
Perception of/ Relationship with Spheres	

<p>Anja: "Aww. Have you shown him?"</p> <p>Sally: "No, I haven't seen him."</p>	<p>Sally has not yet seen her boyfriend to show him the leather label inside her Identity Sphere</p>	<p>Show & Tell: Hospital peers</p>	<p>Show & Tell: Hospital peers</p>
<p>Anja: "Aww, you should get to see him and show him, and then tell me what he says. [giggles] Erm, can you remember like in February/ March, it's been like a while since we did these creative things each week Erm, what did you think about those? Did you like them? Did you not like them?"</p> <p>Sally: "I thought they were good."</p>	<p>Sally: <i>I thought they were good</i>;; asked about her favourite session she responds: <i>"The shrinkies and the erm, beads"</i> and she also liked her stop-motion</p>	<p>Experiences of creative sessions Women</p>	<p>Experiences of creative sessions: Women</p>
<p>Anja: "Do you have a favourite session a favourite activity? So we did, I think in the first week we made..."</p> <p>Sally: "The shrinkies and the, erm, beads;"</p> <p>Anja: "And the beads. How about your stopmotion video?"</p> <p>Sally: "Yeah!"</p> <p>Anja: "That? [Sally: Yeah.] Erm, so you "</p>			
<p>Sally: "towards S- ... -motion?"</p> <p>S-51: "Is it the one with the ghosts? [Sally: Yeah.] The scary one?"</p> <p>Sally: "Yeah with the clown</p>	<p>Sally asks Staff if she had seen her stop-motion video yet</p>	<p>Show & Tell: Hospital Staff</p>	<p>Show & Tell: Hospital Staff</p>

Social Identity Performance/ Belongingness	<p>S-5:1: "Yeah. Do you wanna show n</p> <p>Sally: "It has a clown on it. Sally opens the Identity Sphere to scan the code]"</p>		
Experiences of creative sessions	<p>Sally: That's come off. [about the small leather framing around the screen]."</p> <p>Anja: "Yeah, I've got glue. I glue it. I repair everything today before I go. Sorry. [Sally puts the volume up on the Identity Sphere Are you going to make it super loud? giggles]."</p> <p>Sally: "It keeps coming up 'ringvolume', it's not doing anything."</p> <p>the stop-motion video start playing- as a screen appears]</p> <p>Sally: "That's proper freaky."</p> <p>S-5:1: "That's, yeah, that's really good. That's very good."</p> <p>Sally: "[And I made???] a proper..."</p> <p>Anja: "Say again?"</p> <p>Sally: "[And I made???] a proper."</p> <p>Anja: "Exactly, you were with it, all the faces... [Sally: Yeah.], all over it [giggles]. The best was the graveyard, it's just more and more and more..."</p>	<p>The small leather frame on Sally's purse- glued</p> <p>Design limitations - Leather framing</p> <p>When Sally shows Staff-her stop-motion video, the staff says "That's, yeah, that's really good. That's very good." Confirming "That's scary" but that "It's really good, well done."</p>	<p>Show & Tell: Hospital Staff (appraisal) - Identity Sphere videos</p>
Social Identity Performance			

Spheres Design: <i>imitations leather cover</i>	Spheres Artefact Design
Show & Tell: <i>Hospital Staff (appraisal)</i>	Social Identity Performance

<p>Sally: "Oh, yeah!" [Anja giggles]</p> <p>Anja: " And your..." [an evil looking clown appears in the video]</p> <p>S-51: "That's scary."</p> <p>Sally: "I know."</p> <p>S-51: "It's really good, well done."</p> <p>Anja: as the video is about to loop] "You probably have to switch it off again."</p> <p>S-</p> <p>Anja: "Erm, when did you last, can you remember when you last used your purse to see a video?"</p> <p>Sally: "Erm.."</p> <p>Anja: "Don't worry about it."</p> <p>Sally: "Weekend, I think."</p> <p>Anja: "Weekend. Erm, you know when you use the purse, do you prefer using it on your own or rather, or do you like showing it to staff, or the ladies, or..?"</p> <p>Sally: "It depends on what mood I'm in."</p> <p>Anja: "Right, so what mood are you in when you use it on your own, you think?"</p>	<p>When asked if she prefers using her purse on her own or with staff or the other ladies, Sally responds. <i>It depend on what mood I'm in.</i>, when asked what mood she is in when she is using the purse on her own she responds "Probably miserable" and agrees that she</p>
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Private vs. social use of Spheres - Identity Sphere videos	Private vs. social use of Spheres	Personal use of Spheres
Use of Identity Sphere when feeling miserable	Use of Identity Sphere when miserable	Coping with Distress

Sally: "Probably miserable."

Anja: "Say that again? Miserable."

Sally: "Miserable mood."

Anja: "Ah, ok. And when you then watch it, why do you watch it you think? Is it just to, don't know, to distract you a bit perhaps...?"

Sally: "Probably, yeah!"

Anja: "Yeah? Erm, and when you, when you use it with others or show it to other people, how does that feel like? You think, is it ok, is it fun, is it just to show them, to show off? giggles] Perhaps? Don't know..."

Sally: "I don't know, probably a bit of everything."

Anja: "Bit of everything! Erm, [going through her list] this is the wrong list of questions- this is about the ball. Do you have a favourite video?"

Sally: "My name of a female singer] one with the pictures on."

Anja: "Yeah. Have you shown that to, to anybody? Or have you..."

Sally: "I'll show my mum when she comes up next time."

Anja: "Do you know when that's going to be? Is it very soon?"

probably does so to distract herself a bit				
Sally does not know what her motivation for showing her things to others is. When I listed reason such as fun, to show others, or to show off she says "I don't know, probably a bit of everything."	Show & Tell: Fun & Showing off - Identity Sphere	Show & Tell: Fun & Showing off	Social Identity Performance	
Sally: My name of a female singer/ one with the pictures on."	Favourite video Sally)	Identity Sphere: Favourite video	Perception of Spheres	
Sally wants to show her family video to her mum: "I'll show my mum when she comes up next time."	Show & Tell: Family - Identity Sphere	Show & Tell: Family	Social Identity Performance	

Anja: "Fair enough. shows which video?"
Sally:
Anja:
Sally:

<p>Sally: "I'm not sure at the moment, [Anja: Right.] because we are having a bit of a ..."</p> <p>Anja: "Difficult time?"</p> <p>Sally: "Mhm.."</p>				<p>Interpersonal Differences</p>
<p>Erm, so, do you know which one of these</p> <p>"Yeah. [points at the different tags] Stopmotion that one</p> <p>Anja: Yeah., that is my pictures"</p> <p>"The family one?"</p> <p>"Yeah. And that one is myname of football club one."</p>	<p>Sally knows which QR code triggers what video</p>	<p>Understanding functionality of the Spheres – Mapping codes and videos</p>	<p>Technical Understanding of Spheres: QR codes</p>	<p>Interpersonal Differences</p>
<p>Anja: "Did you watch that a few times?"</p> <p>Sally: "Yeah, I love it."</p>	<p>When asked whether she had watched her football video, Sally says "Yeah, I love it."</p>	<p>Perception Spheres: connect to self - Identity Sphere videos</p>	<p>Perception of Spheres: <i>Personal significance</i></p>	<p>Perception of Spheres</p>
<p>Anja: "Have you shown it to any of the staff?"</p> <p>Sally: "I think its this one."</p> <p>Anja: "Just check. Does it work?"</p> <p>Sally: "It's not working. It's not coming on" [Football video starts playing]</p>	<p>Difficulties to trigger video</p>	<p>Understanding functionality of the Spheres – Video triggering</p>	<p>Technical Understanding of Spheres: <i>QR codes</i></p> <p>Mental Health: <i>Impatience</i></p> <p>Spheres Design: <i>limitations QR code</i></p>	<p>Interpersonal Differences</p> <p>Spheres Artefact Design</p>
<p>Anja: "Yeah, that's name of the football club . [laughs] Erm, so</p>	<p>Positive, playful</p>	<p>Researcher-women</p>	<p>Researcher-</p>	<p>Relationship</p>

<p>you ... mumbles something]"</p> <p>[as the chorus starts playing, both Anja and Sally suddenly both start singing]</p> <p>Sally/ Anja: "I say title of fan song " [they both laugh out loudly on the synchrony of their spontaneous singing]</p> <p>S-51: "That's pretty funny."</p>	<p>atmosphere and interactions during the interview</p>	<p>relationship</p>	<p>women relationship</p>
<p>Anja: "So you didn't really have a chance yet to show your mum right, or anybody? [still giggling about Sally's face]"</p> <p>[Sally and Anja keep watching the football video]</p>	<p><i>Sally and Anja watch the football video together</i></p>		
<p>Anja: Towards S-league." This is the finale of the Champions</p> <p>S- "Yeah, she showed me last time."</p> <p>Anja: Towards S-league. "While they all still watch the football video] "2011/2012. Have you ever, erm... Oh the name of boyfriend] label, have you seen that? No? [crosstalking] You know, if you like, you can put like little photos in it as well, in your purse, if you have one I mean.</p> <p>the video stops]</p>			
<p>Anja: Ok, erm, what it is about these objects that, the ball, you've got your purse and you've got the bracelets back now as well, erm, what do you like most about them?"</p>	<p>When asked what she likes most about her objects, Sally: "Because, I like the ball, because I'm the only person who's</p>	<p>Perception of Spheres: Personalised objects that the women have co-</p>	<p>Perception of Spheres: Ownership Perception of</p>

with women	
Perception of Spheres	

<p>Sally: "Because, I like the ball, because I'm the only person who's got her name in it, and, the purses, I like the purse they are like personalised to us."</p>	<p>got her name in it, and, the purses, I like the purse, they are like personalised to us"</p>	<p>created</p>
<p>Anja: "Right, and the bracelet?"</p> <p>Sally: "The bracelet, because it has the beads I made."</p> <p>Anja: "Mhm, do you plan on giving the bracelet away?"</p> <p>Sally: " No."</p> <p>Anja: "No? You are going to keep both?"</p> <p>Sally: "No!"</p> <p>Anja: "So you don't know yet?"</p> <p>Sally: "I don't know if I'm giving one to my Nan for her birthday."</p>	<p>About her bracelet: Sally says to like it because: "The bracelet, because it has the beads I made."</p> <p>Sally does not know yet if she will keep her bracelets: "I don't know if I'm giving one to my Nan for her birthday."</p>	<p>Perception of Spheres: Personalised objects that the women have co-created</p>
<p>Anja: "Aww. And then one you keep to yourself? Righterm, have you ever been wearing your bracelet in the last four weeks?"</p> <p>Sally: "Yup."</p> <p>Anja: "Yeah?"</p> <p>Sally: "I have over the weekend."</p>	<p>Sally has been wearing her bracelet over the weekend</p>	<p>Use of Calming Sphere – Wearing of bracelet (Sally)</p>

Spheres: <i>Personal significance</i>	
Perception of Spheres: <i>Ownership</i>	Perception of Spheres
Defining relationship with family: <i>Giving bracelets away</i>	Social Identity Performance/ Belongingness
Uses of Sphere Wearing of Calming Spheres	Uses of Spheres - Calming Sphere

Anja: "Mhm. Did you? This weekend? Mhm. [Sally: Yeah.]	
Anja: Erm, so, have you shown your bracelet to any other people and what did they maybe say about it, did you show it to any members of staff or, [Sally: Yeah.] or the other ladies?"	
Sally: "All of the staff and the ladies, said that I did a good job, Anja: You did.] and I was telling them that I couldn't get it through the pipe thing. They way it pushes through. I didn't have the strength to do it."	About showing and making her beads to staff and the other women Sally says: of the staff and the ladies, said that I did a good job, [Anja: You did.] and I was telling them that I couldn't get it through the pipe thing. They way it pushes through. I didn't have the strength to do it."
Sally: "I couldn't do it."	
Anja: "That's why I gave it to her [giggles], I couldn't do it. Erm..."	
Sally: "I was sat there where you are and I was like actually trying to do it, I was like 'argh'."	
Anja: "Because we were saying, [name of research staff nurse], I was giving it to [name of research staff nurse] knowing that I don't have the strength, and [name of research staff nurse] is like, 'Ohhh this is really hard', and she was already not very much looking forward to it, because it hurts your fingers as well."	Sally and Anja reminiscence about their bead making session
S-51: "Yeah."	
Anja: "It's really not nice. And then Sally is like 'I can do it!'"	

<p>Show & Tell: <i>Hospital Staff and Peers (appraisal) - Calming Sphere</i></p>	<p>Show & Tell: <i>Hospital Staff and Peers (appraisal)</i></p>	<p>Social Identity Performance</p> <p>Experiences of creative sessions</p>
<p>Researcher-women relationship</p>	<p>Researcher-women relationship</p>	<p>Relationship with women</p>

<p>'eigeelel, and she's like 'Argh'."</p> <p>S51: " Did she manage?"</p> <p>Anja: " Erm, a little bit." [all laugh]</p> <p>Sally: " It got struck in</p> <p>Anja: " And then Steph had to do the rest of it. She did fine. Erm, right so showing the bracelet to staff and, erm, and showing your beads, how did that make you feel perhaps? Was that alright?"</p> <p>Sally: "Happy."</p> <p>Anja: "Happy? Were you kind of a little bit proud of how they look?"</p> <p>Sally: "Yeah."</p> <p>Anja: "Erm, what do you think about the other women's bracelets? Have you seen them?"</p> <p>Sally: "Erm, mhm, they are alright" [we laugh]</p> <p>Anja: "Not as good as yours? [laughs] That's fine..."</p> <p>Sally: "Nah, I like them, but I don't like them as much as I like mine."</p> <p>Anja: "That's right, that's how it should be. Erm, you know, have you ever tried to focus on your beads, like looking at your</p>

<p>When asked how showing her beads to staff made her feel, Sally responds "Happy"; also confirmed when asked her whether she felt a little proud</p>	<p>Show & Tell: Experiences of happy and proud - Calming Sphere</p>	<p>Show & Tell: <i>Happy and Proud</i></p> <p>Perception of Spheres: <i>Pride</i></p>	<p>Social Identity Performance</p> <p>Perception of Spheres</p>
<p>When asked what she thought about the other women's bracelets says <i>Nah, I like them, but I don't like them as much as I like mine."</i></p>	<p>Perception of Spheres: Personalised objects that the women have co-created - Calming Sphere</p>	<p>Perception of Spheres: <i>Personal significance</i></p>	<p>Perception of Spheres</p>

beads perhaps, or play with them?"

Sally: "I like counting"

Anja: "You count them? Have you ever counted them?"

Sally: [giggles] "Yeah. I sit there like that, it looks like I'm scratching myself but I'm not."

Anja: [laughs] "How many beads are there? Do you remember?"

Sally: "I'm not counting how many..."

Anja: "You just like the activity of it?"

Sally: "Yeah."

Anja: "

Yeah. Erm, so how, you know when you do that and it looks like you were scratching yourself, how do staff look at you? Are they..."

Sally: ""What are you doing, say to me what you are doing.' I am playing nicely me"

Anja: "Erm, ok, so that's the bracelet, the ball, can you remember when you last used the ball?"

Sally: "Friday."

Anja: "Friday, is that when we did it all together in the group? Erm, do you like using the ball, you know, when you are rather on your own, or in a group setting like when all the other women are around as well?"

<p>Sally likes counting the beads on her <i>like counting them.</i>, she describes how <i>"Yeah, I sit there like that, it looks like I'm scratching myself but I'm not"</i>, which seem to unnerve staff – Sally describes their <i>responsibilities are you doing, say to me what you are doing: I am playing nicely me"</i></p>	<p>Use of Spheres: Calming Sphere – Playing with beads Sally) - Calming Sphere</p>	<p>Use of Spheres: <i>Stimulation</i></p>	<p>Keeping Well</p>
<p>If Sally is allowed to use her ball on her own she does, if not she uses it with others, <i>"If I'm allowed to use it on my</i></p>	<p>Private vs. social use of Spheres - Mindfulness Sphere</p>	<p>Private vs. social use of Spheres</p>	<p>Personal use of Spheres</p>

Sally: "Depends."

Anja:

Sally:

Sally: "I like watching it light up."

Anja:

Sally:

Anja:

<p>"Depends?"</p> <p>"If I'm allowed to use it on my own then I'll use it on my own [Anja: Right.], if I can't then..."</p>	<p>own then I'll use it on my own, if I can't then..."</p>	<p>Access and risk behaviours (Sally) - Mindfulness Sphere</p>	<p>Use of Spheres: Access and risk behaviours</p>	<p>Interpersonal Differences</p>
<p>Anja: "...then you have to use it with some other people. Erm, what happens when you use it? Can you show me how, how you use it."</p> <p>Sally: towards the ball, she clutches the Sphere closely to her cheeks "I love this."</p> <p>Anja: about the ball "Does it feel cool? Is it like cold?"</p> <p>Sally: "It is. It is pretty cool. I like looking inside it as well."</p> <p>Anja: "How long you use it, you sit with it?"</p> <p>Sally: "Depends."</p> <p>Anja: "Depends?"</p>	<p>Sally says about her ball: "I love this:" and "(...) I like looking inside it as well," as well as "I like watching it light up."</p>	<p>Perception of Spheres Look and feel - Mindfulness Sphere</p>	<p>Perception of Spheres Look and Feel</p>	<p>Perception of Spheres</p>
<p>"Did you ever... Did you ever sat long enough to see colours change?"</p> <p>"Yeah [giggles]."</p> <p>"Yeah? Do you know how many different colours you've</p>	<p>Sally has noticed that the ball changes colour and correctly remembers that it changes between four different colours and that the first one is green;</p>	<p>Use of Spheres: Noticing Colours and Colour Changes (Sally) - Identity Sphere</p> <p>Use of Sphere: Observing and Associating insides with creative sessions (Sally) -</p>	<p>Use of Sphere: Mindfulness</p>	<p>Keeping Well</p>

<p>got?"</p> <p>Sally: "Four isn't it?"</p> <p>Anja: "Mhm. That's right. Does it always start with green?"</p> <p>Sally: "Yip."</p>	<p>and correctly remembers that it changes between four different colours and that the first one is green</p>	<p>Identity Sphere</p>	
<p>Anja: "When you do that, do you, erm, when you look the colours, do you think of anything else, or do you just look at it?"</p> <p>Sally: "I just look at it and think of how I made it and the beads inside. I like the bubble things, she gently knocks the ball on the table! Anybody in? Anyone in? Watch, you knock on it [keeps knocking it on the table] its not now."</p>			
<p>Anja: "Cause it was flashing beforehand didn't it? [Sally keeps knocking the ball on the table] You need to be careful doing this though, because the electronics inside, because they are quite fragile."</p> <p>Sally makes a scream noise 'argh' stops knocking it on the table and checks if]</p> <p>Anja: "It's fine, it looks like it's aying ball because they are handmade, they are like put together...Aww [Sally must be really protective of her ball at this moment, possibly cuddling it], ok..."</p> <p>Sally: "My ball!"</p>	<p>Sally plays with her ball and bounces it a few times on the table, when told that she needs to be careful doing this to not break it – she makes a scream noise, stops knocking it on the table, checks if it still works and takes it into her arms for a cuddle, saying <i>My</i>; as she later accidentally bumps her ball on the table she says <i>Doppy daisy</i>."</p>	<p>Perception of Spheres: Protective (Sally) - Mindfulness Sphere</p> <p>Perception of Spheres: (Ownership Sally - Mindfulness) Sphere</p>	
<p>Anja: "Protective, [giggles] Erm, right, so you already answered it, erm, ..."</p>			

	Perception of Spheres
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<p>Sally: "You can see inside it, if you tip it upside down, look.."</p> <p>Anja: "Yeah. You see some cables don't you? I know, I put them in it."</p> <p>S- "Yeah. "</p> <p>Anja: "True electronics inside. Erm, so you recognise, you see the little things that you've made- you've said that. going through her list of questions] You've answered that as well. So yeah, when do you..."</p> <p>Sally: Accidentally bumps her ball on the table] "Oopsy daisy."</p> <p>Anja: [giggles]"...when, you know what we can do, we can sit it on here [takes the charging strand], when do you..."</p> <p>Sally: [about the copper disks] "Why do they feel all bumpy?"</p> <p>Anja: "Because I hammered them, it's like its been like a flat metal and then I hammered the pattern on, and today, what I can do is, I've brought some, some polish that's gonna make them nice and shiny again [Sally: Yeah.], I gonna polish them off. Because I go tomorrow and I want you guys to.. I glue these back on points towards the leather frame that came loose] I polish those, so they look the best they can. [t's like, erm, you know how silver sometimes turns black [Sally: Yeah.] and then, you know, in films they always have to polish the silver to make it look shiny again. This is copper, it's the same sometimes just have to polish it."</p> <p>Sally: "How are they stuck on? Glue?"</p>	<p><i>Sally asks about why the metal is "all</i></p> <p><i>Anja explains how polishing the copper will make them look shiny again</i></p> <p><i>Sally asks if the copper is glued on and whether it could come off?</i></p>
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<p>Anja: "Yeah, they are like, with a really really strong..."</p> <p>Sally: "A very strong glue?"</p> <p>Anja: "Yeah. It's almost the same glue that this is made off [p]ointing at the resin ball] so really solid. It doesn't come off easily. It can come off in principle."</p> <p>S- "Yeah."</p> <p>Anja: "But, I hope not."</p> <p>Sally: "You can tell, look."</p> <p>Anja: "It's fiddly, yeah. I wanted them to sit on much neater, much closer to it but I didn't get it better on, unfortunately."</p> <p>Sally: "That one looks like it is..."</p> <p>Anja: "It's not coming off, but its, yeah, its not as tight as it could be. But this is the first time we make them."</p> <p>Sally: "I know."</p> <p>Anja: "And that's why its not perfect."</p> <p>Sally: "There is a first time for everything."</p> <p>Anja: "Exactly. That's very true, very true. Erm"</p> <p>Sally: "I can't believe that it has took ages to make those."</p>	<p>Sally says how to took ages to make the Spheres, but then says</p>
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Experiences of creative sessions: Women - Duration	Experiences of creative sessions: Women	Experiences of creative sessions

Anja: "Yeah. Do you think it took too long?"

Sally: "Yeah."

Anja: giggles] "How quickly..."

Sally "No, I mean it took pretty quick to be honest with you, 'cause we only did four week session, did we?"

Anja: "Five, yeah."

Sally: "Four, five weeks session, I think I only did four of them."

Anja: "No you came to all of them I think. I think I've seen you each week."

Sally: "Yeah I did, 'cause I remember in that week we put music on that computer."

2.1:

Anja: "Yeah, exactly. In the last week, we listened to [female music artist] and [male music artist] [Sally: "Yeah, True, erm, 'cause I think I saw you every week. Erm, so when you, when you use it, when would you use it, what is, you know?"]

Sally: "I like using it in the dark."

Anja: "Yeah."

Sally: "I like, I used to - when I was little - I used the lights in the room and something, like sheets, and then get a torch and then kick it on and off"

that it were only 4 to 5 weeks		Mental Health: <i>Impatience</i>	Interpersonal Differences
Sally and Anja reminiscence about the creative sessions and how they played music in the fifth week	Researcher-women relationship	Researcher-women relationship	Relationship with women
Sally says about her ball: <i>I like using it in the dark.</i> "Explaining that "I like, I used to - when I was little - I used the lights in the room and something, like sheets, and then get a torch and then kick it on and off" And that reminds	Use of Spheres: Reminder of childhood memories Sally) - Mindfulness Sphere	Use of Spheres: <i>comfort</i>	Keeping Well

Anja: giggles! "Just play with the lights."

Sally: "Just reminds me of that, when it flashes."

Anja: "You know, have you, on Friday, name of Local

You think so?"

Sally: "Yeah, to help me calm down, yeah."

Sally:

Anja: "

[Redacted]

	<p>me of that, when it flashes."</p>		
<p>Investigator] was showing you how you can use the ball to kind of relax yourself, it's almost like a meditation exercise? Would you ever use it for something like this?</p>	<p>Sally understands how the group activity with local investigator can help her to relax; when asked if she would ever use it for something like that she responds <i>sh'deah, to help me calm down, yeah."</i></p>	<p>Understanding of Spheres(Use for relaxation Sally - Mindfulness) Sphere</p>	<p>Use of Spheres: <i>Relaxation and calm</i> Therapeutically Understanding of Spheres</p>
<p>Anja: "Erm, you know, in, because I will leave now, like I'll come back every month, like every month for the next three months I will at least once a month come around and say hi [giggles], just to check on you, check that everything is working fine, talk to name of Local Investigator and things like that, and the managers... [giggles] all these things. Erm, and in the meanwhile, obviously, you've got these objects and you can use them whenever you want, they are yours, right. Erm, what you could try if you want to, and that's up to you, you could for instance bring the ball to therapy, and say, 'I've got this ball, maybe you can suggest how I can use it'. You found your way of using it, you like looking at it, and you can assess your heartbeat..."</p> <p>"I'm going to show my therapist it tomorrow"</p>	<p>Anja suggests to Sally that she could take her ball to therapy to see if they had some ideas how she could make use of it, she responds <i>I'm going to show my therapist it tomorrow."</i></p>	<p>Understanding of Spheres: Use for therapy (Sally) - Mindfulness Sphere</p>	<p>Therapeutically Understanding of Spheres</p>
<p>You can, and then maybe they have some ideas as well how you can make the most of it for yourself, if you want to [Sally: Yeah.] It's just an idea, you know, while you have it and you have it forever, you might as well see if it</p>			

	<p>can be something else as well. Cool, you've almost answered all my questions.</p>		
Keeping Well	<p>Anja: Erm, do you have a favourite object? The purse, the ball the bracelets, anything you like most?"</p> <p>Sally: "I like all of them to be honest with you."</p>	<p>When asked, if Sally has a favourite objects she says <i>I like all of them to be honest with you.</i>"</p>	<p>Perception of Spheres - Liking of all artefacts</p>
Interpersonal Differences	<p>Anja: "And all for different reasons [giggles]? Yeah. Erm, reading through her questions did you ever talk to staff or the other women about any of the objects?"</p> <p>Sally: "Yeah, we were discussing them the other night. I think it was Saturday."</p> <p>Anja: "With whom did you talk about ..."</p> <p>Sally: "[name of research nurse], we were going on saying about how we had a good time, telling name of the newly admitted woman about what we did."</p> <p>Anja: "Ohhh."</p> <p>Sally: "'Cause me and name of the newly admitted woman] were doing the gangnam style [Anja: Aww.] and that got me and [name of research nurse] keep going."</p> <p>Anja: "Oh wow, that sounds like fun. Was it fun? [Sally: Yeah.] Yeah?"</p> <p>Sally: "We were doing gangnam style down the corridor laughs]."</p>	<p>Sally was discussing her objects with staff the other night when the staff research nurse who accompanied the creative sessions was on duty; Sally describes "Yeah, we were discussing them the other night. I think it was Saturday." When asked who she talked to she responds "[name research staff nurse], we were going on saying about how we had a good time, telling [name of the newly admitted woman] about what we did" Cause me and name of the newly admitted woman] were doing the gangnam style Anja: Aww.] and that got me and Steph keep going.", adding We were doing gangnam style down the corridor"</p>	<p>Experiences of creative sessions: women (Sally) – explaining activities to new admitted woman + reminiscing</p>

Perception of Spheres' favourites	Perception of Spheres
Experiences of creative sessions women	Experiences of creative sessions

<p>Anja: "All of you? Can imagine this must have been fun."</p> <p>Sally: "Me, name of the newly admitted woman] Alex it was."</p>	
<p>Anja: "Despite her knee? Oh, cool [giggles]. Erm, would you like to keep your objects?"</p> <p>Sally: "Yeah."</p> <p>Anja: "Yes. Of course you are going to keep them, it's just you know, you might say, 'no not bothered', but you do want to keep them? Yeah? Ok"</p>	<p>When asked, if she would want to keep her objects, Sally simply replies "Yeah."</p>
<p>Anja: "You know, would you recommend that we do something similar for instance with the women on low secure Would you say..."</p> <p>Sally: "Yeah."</p> <p>Anja: "...it would be good..."</p> <p>Sally: "I'd say the women on low secure would like it but there's nobody on low secure who's done it, is there?"</p> <p>Anja: "Say again, is there any.."</p> <p>Sally: "One on low secure, who's done it."</p> <p>Anja: "Janet. Exactly. Erm, why do you think it would be good for them too?"</p> <p>Sally: "Because some of them might find it hard to talk to staff and that, but they can use these, well I say talk to staff at</p>	<p>When asked, if she would recommend the project to the women on low secure Sally says "Yeah" I'd say the women on low secure would like it(...)</p> <p>Bing enquired to explain why she thinks it would be good for them, Sally says "Because some of them might find it hard to talk to staff and that but they can use these, well I say talk to staff at first, but these help calm down, they are, aren't they. Calm down" - when questioned how the artefacts help to talk to staff, Sally continues "Yeah, because I know all the staff on here. [Anja Right.] But if I went on to</p>

Perception of Spheres: Ownership (Sally)- all Spheres	Perception of Spheres: Ownership	Perception of Spheres
Overall project perception: Recommendation to LSU	Overall project perception	Project perception
Use of Spheres: Calm (Sally)	Uses of Spheres: Calm	Keeping Well
Use of Spheres: Talking to staff (Sally)	Use of Spheres: Talking to staff/ belongingness	Social Identity Performances/ Belongingness

first, but these help calm down, they are, aren't they. Calm down."

Anja: "How do you think the objects help to talk to staff? Do you find it easier to talk to staff because of them?"

Sally: "Yeah, because I know all the staff on here. [Anja Right.] But if I went on to name of low secure service and I knew no-one, then I won't talk to them and I won't, I just keep to myself."

Anja: "Are you more like a private person? [Sally: Yip.] Yip."

Anja: "Cool, do you have anything you would like us to know, I mean we gonna fix this one and we gonna polish this one, erm, is there anything, you know, anything that you are perhaps worried about, we should have done better? We should have done more, anything you can think of? [Sally: No.] Nope. Happy with the objects? In case anything ever, you know, the lights don't come on, you charged it and you don't know what's going on, you know, because it is handmade, the technology as well, it can break, if that's the case, just get, just say to one of the staff 'my ball is not working - how to get it fixed' and then they'll get in touch with me, but just tell them Anja said if it ever doesn't work, you know, just to fix it, the same is true with the purse. I mean usually, if it doesn't switch on, it's just the battery gone flat, or it is just..."

Sally: "If it's flat it comes up with a battery sign. [Anja: I know.] and then an icon on it and then it says 'Ok or Cancel'."

Anja: "And then you can't press anything, but you use the

<p><i>name of low secure service] and I knew no-one, then I won't talk to them and I won't, I just keep to myself."</i></p>			
<p>Sally confirms that she is more of a private person</p>	<p>Private person) Sally</p>	<p>Interpersonal Differences: <i>Personality</i></p>	<p>Interpersonal Differences</p>
<p><i>Managing expectations: Anja tells Sally what she can do if the technology for whatever reasons would not work</i></p>			

Sally: "I was telling my Nan about them."
 Anja:
 Sally:
 Anja:
 Sally:

<p>switch. Erm, with Kim, in the very first week the software on it crashed, so that can happen. It only happened once in the four weeks amongst all of you, but erm, if that happens that the battery went flat, charge it, and then when you switch it on, it restarts, and it's fine, so if ever you feel like there's a blue screen, you know."</p> <p>Sally: "They were the other week on mine, blue screen with numbers on."</p> <p>Anja: "Yeah, and then you just left it?"</p> <p>Sally: "Sometimes it shuts down itself. [Anja: Alright Well, turns of itself off, not shut down [Anja giggles]."</p> <p>Anja: "But usually, when you then charge it and switch it on, press the button, it comes back to life. So it just sometimes takes some time where you can't use it. But in general, it should always work."</p>			
<p>"Aww."</p> <p>"And she said 'I would love to see them'."</p> <p>"What did you say to her?"</p> <p>"I told her when we first started it off, about what we were doing, she went 'Ah I'm glad you liked and you, you know, you have to tell us how you get on with it', so I told her the other night and I was playing her [name of family video]. I was playing it down the phone."</p>	<p>Sally I was telling my Nan about them. And she said 'I would love to see them.'"</p> <p>— when asked what Sally told her Nan she recounts. I told her when we first started it off, about what we were doing, she went 'Ah I'm glad you like it and you, you know, you have to tell us how you get on with it', so I told her the other night and I was playing her name of family video]. I was playing it down the</p>	<p>Show & Tell: Family (Sally) - Identity Sphere</p>	<p>Show & Tell: Family</p> <p>Social Identity Performances/ Belongingness</p>

Anja: "Oh really."	phone", she continues telling: And I went, 'Do you know that picture of me, you, [Name of male person, my other brother, and erm, my granddad on it?'			
Sally: "Yeah."	me, you, [Name of male person, my other brother, and erm, my granddad on it?'			
Anja: "What did she say?"	brother, and erm, my granddad on it?'			
Sally: "And I went, 'Do you know that picture of me, you, [Name of male person, my other brother, and erm, my granddad on it?'	went 'Yeah', 'It's got that on it!' and then when I was a baby and trying to climb into the washing machine, erm, towards S-51] have you seen that one?"			
S-51: "Yes."	S-one? have you seen that one? and that's right."			
Sally: "Where I was climbing into the washing machine giggles?'"	"She started laughing."			
S-51: "Yeah, you did you showed me last time."				
Anja: "What did she say?"				
Sally: "She started laughing."				
Anja: "Yeah, I would have too. [Laughs]."				
Sally: "She were laughing at it."				
Anja: "Wow, brilliant."				
Sally: "But she is going in for an operation soon, so [Anja: Right] I probably struggle..."	Importance of Family: Sally tells Anja how her Nan will have an operation soon on her knee			
Anja: "...to see her? [Sally: Mhm.]"				

<p>Sally: "But she said soon she is having an operation, she is mobile again."</p>			
<p>Anja: "Oh that's brilliant. Is it something on her spine?"</p>			
<p>Sally: "No it's her leg. She is having a knee implant."</p>			
<p>Anja: "Oh, ok. Get's a new knee?"</p>			
<p>Sally: "Yeah, that's it. A new knee..."</p>			
<p>Anja: "A new knee [laughs about the tongue twister], yeah it's hard."</p>	<p><i>Sally and Anja laugh about the tongue twister "new"</i></p>		
<p>S- "A new knee. Yeah."</p>			
<p>Sally: "I can't even speak [giggles] really today. I'm not even going to bother."</p>			
<p>Anja: "Erm, you do brilliantly, seriously. Thank you so much! Yeah, I'm going to come around once a month and if there are any problems, just say to the staff 'There is a problem' [giggles] [jokingly] 'fix it' Sally giggles] and then lets hope they do it."</p>	<p><i>Managing expectations: Anja explains once more how any technology can break and that staff are there to help Sally if she has any problems with it</i></p>		
<p>Sally: "I thought its meant to work."</p>			
<p>Anja: "It is meant to work, but you know how its like, like any technology [Sally: Yeah.] that you can buy..."</p>			
<p>Sally: "Any technology breaks down.."</p>			
<p>Anja: "That's part of it, unfortunately, yeah."</p>			



Sally: "That's life."

Anja: "Yeah. Aww. But a light bulb break, I mean anything, and these are, they are the first six, you know, the newest technology is the most fragile, so I gonna use this now to clean your things and we'll then bring them back. And the same is true with this one, we glue it. Cool, do these go back in the kitchen? Do we have to bring them back in the kitchen? Sally: Yeah. Yeah, or, can you not have them in your room?"

Sally: "I can have them the Mandala stickers] in my room."

Anja: "Ok, well, ok, shall we [S
[S- Yeah.] Thank you!" Right, ok.] bring you back?

END OF AUDIO



