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Designing Emotion-Centred Product Service Systems: the Case of a Cancer Care Facility

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Abstract

Product Service Systems (PSS) designers are increasingly signalling the importance of emotion. However, emotion is yet to be theoretically and empirically studied in PSS design. This paper offers a conceptual model as well as an in-depth field study of the design of an emotion-centred PSS. The paper draws on and extends appraisal theory, uses it as a lens by which to analyse 'emotional chain reactions' in the data, and produces implications for PSS design theory and practice.

Keywords: product-service system design; emotion

1 Introduction

The purpose of this paper is to investigate and understand how the designers of Product Service Systems (PSS) can create positive ‘emotional chain reactions’ for users, based on an in-depth case study of a cancer care unit. Rationalistic perspectives have dominated the study of PSS and their design (Manzini and Vezzoli, 2003:p1; IfM and IBM, 2007; Lush et al, 2008; Bitner et al 2008:p67). But a PSS such as a cancer care facility, is hardly a rational setting – it requires designers to emotionally empathise with users (Cross, 1982:p222). Currently, the systems-based design techniques employed in PSS design lack this capacity (e.g. Morelli, 2003; Bitner, 2008; Baxter et al, 2009; Bertoni, 2013). This is perhaps unsurprising in view of its engineering heritage (Spohrer et al, 2007; Tien and Berg, 2003; Chesbrough and Spohrer, 2006). However, the importance of emotion-centred or empathic PSS design is starting to be recognised, “[PSS firms] need to move into the realm of customer experience management, creating long-term, emotional bonds with their customers through the co-creation of memorable experiences potentially involving a constellation of goods and services.” (Bitner et al, 2008:p.67). This suggests that emotion should be the concern of all PSS (Steiner & Harmor, 2009:p2066; Bertoni, 2013), however it is a necessity where user emotional empathy defines the product, the service and the system that binds them. The consequences of overlooking this is all too plain to see in an abundance of healthcare literature; hospitals make patients feel ill-at-ease, controlled and alienated because they are impersonal and complex (Wells-Thorpe, 2003; Healthcare Commission, 2005; Bate and Robert, 2006). The mental stress of cancer is compounded by such negative designs (Jencks, 1995), and have been blamed for poor recuperation rates (Wells-Thorpe, 2003). UK architecture has begun to take user ‘happiness’ more seriously, such as Buro Happold’s Building Wellbeing initiative, books on Building Happiness (Wernick, 2008) and government Foresight reports (Cooper et al, 2008).

Following the interpretivist tradition (e.g. Easterby-Smith, 2002), this paper seeks to understand the dynamics of emotion in a new PSS design by drawing on Appraisal theory as an analytical lens (e.g.

Arnold, 1960; Scherer, 2005; Lazarus, 1991; Parkinson et al, 2003; Moors, 2009). This established emotion theory conceptualises the process by which people appraise or interpret their experiences. Our rationale for using it is that Appraisal theory has been used in some product design studies (e.g. Jensen, 1999; Norman, 2002; Demirbilek and Sener; 2003; Desmet, 2003; Crilly et al 2004), so it may also be helpful here given the presence of product in a PSS. But PSS are more relational (Goedkoop et al 1999:p.17) and interpretive (Morelli, 2003:p.77) than products per se, on account of their intangibility (Morelli, 2003:p.77). So the lens may be even more apposite here, since PSS involve a great deal of appraising, i.e. interpretative processing and sensemaking concerning the consumption of bundles of products and services (Ifm and IBM, 2007). Appraisal theory has the capacity to uncover discursive clues regarding emotion formation therein. We methodically trace ‘emotional chain reactions’ in a study of a cancer care facility – “Maggie’s”. We chose Maggie’s on account of its putative success - in 2009 it was awarded the prestigious Royal Institute of British Architects (RIBA) Stirling Prize.

The reader can expect seven main contributions to PSS knowledge and practice in this paper:

- (i) The addressing of a knowledge gap that has been expressed in the field (e.g. Bitner et al, 2008) – the deficiency of research into emotion-centred PSS and how it may be ‘designed’.
- (ii) The introduction of mainstream emotion theory into the PSS field.
- (iii) An extension of Appraisal theory with the theory of interpretative schemes (Giddens, 1993) to take account of the interpretive conditions of PSS users.
- (iv) An analytical approach for PSS designers to research and conceptualise ‘emotional chain reactions’ using the extended model of appraisal theory.
- (v) A novel case study of an emotion-centred PSS.
- (vi) A conceptualisation of how designers created an emotionally empathic PSS.

(vii) Suggested ways of adapting service blueprinting in order to take account of and activate user emotion.

We have organised our paper into three parts. Firstly, we establish the theoretical foundations of the work. Secondly we present the case study of Maggie's. Thirdly, we reflect on the case by providing an analysis of how emotional empathy was achieved, a conceptualisation of the design process and a discussion of the implications for PSS design.

2 Theoretical foundations

2.1 PSS Design

It is accepted in the PSS literature that it is insufficient to design products and then just add services onto them (Aurich et al. 2006). A systemic approach is required that considers the mutual interaction of the product, service and people (Kowalkowski and Kindstrom, 2009; Baines et al, 2007) in dynamic configurations (Ifm and IBM 2007). A common kind of systems technique employed by PSS designers is generically called process modeling. For instance, in the design of a manufacturing-based PSS, Baxter et al (2009) used a systems process modeling technique taken from the Design Roadmap method (Park and Cutkosk, 1999). An alternative technique - service blueprinting (Shostack, 1984) – was used both in the design of a transportation (Bitner et al, 2008) and a telecentre PSS (Morelli, 2003). Morelli's (2003) blueprint or process model was informed by use-case analysis, which is a technique borrowed from software engineering (e.g., Jacobson 1993). Other techniques that are used to help gather information for a PSS model include scenario development (Morelli, 2003; Baxter et al, 2009), schematics (Morelli, 2003 citing Vargo and Lusch, 2004), and user analysis (Morelli, 2003 citing Bijker, 1995). PSS designers also make use of a range of physical and digital tools including CAD and frameworks for knowledge reuse (Baxter et

al, 2009). CAD helps integrate representations of functions, service activities, and product behaviors (Hara et al. 2009; Isaksson et al, 2009; Bertoni, 2013).

The above tools and techniques are effective for representing the customer's actions, onstage visible contact, backstage invisible contact, support processes and physical evidence (Bitner, 2008:p.72) However, they have little or no capacity to capture the emotional needs of users. For this to happen, we first need a better understanding of emotion per se. In the next section we review some key emotion theorists.

2.2 Emotion

Appraisal theory is well established in the field of emotion, and has gained a lot of ground particularly since the 1960s, having its roots in Hume's (1738) Impressions of Reflection. It is widely agreed that emotion involves three main interplaying components (e.g. Scherer, 1982; Mesquita and Fridja 1992; Scherer, 2005; Niedenthal et al. 2005; Moors, 2009). Firstly, Stimulus – a social occurrence, an event, object or episode of some kind (Moors 2009) that triggers an appraisal response in us (Scherer, 1987; Callahan and McCollum 2002). Secondly, Appraisal – the interpretation of the stimulus. Thirdly, Consequence – the consequences of the appraisal in terms of intrinsic pleasantness and action-taking terms (e.g. Lazarus 1968, 1991; Scherer, 1987, 2005; Moors, 2009; Callahan and McCollum, 2002; Parkinson et al 2005). The appraisal component is articulated by Parkinson et al (2005) as: “our emotional reactions depend not on the specific characteristics of stimulus events, but rather on the way that we interpret and evaluate what is happening to us (appraisal)” (p.6). This component is considered the most important one to be unpacked in order to understand any emotion (Moors 2009). For this to happen we need to know more about the process and context of interpretation; it does not happen in a vacuum. To address this we draw on the theory of ‘interpretative schemes’. This theory is well-established (Schutz,

1967; Gouldner, 1971; Ranson et al, 1980; Giddens, 1984; Bartunek, 1984) and useful in understanding the contextual aspects of interpretation.

2.2.1 Interpretative Schemes

Communication, the exchange of interpretations, between people involves them drawing on 'interpretative schemes' (Giddens, 1984; 1993; Bartunek, 1984). For example, when a hand is extended in a greeting it is mutually understood that a handshake should follow. When someone visits a general practice because they feel ill it is mutually understood that they are the patient, and the practice has the duty of treating them. If one is asked to play tennis during office hours it will be mutually understandable if the offer is declined because work comes first (Giddens, 1993:p.105). If as two acquainted people walk towards each other and their eyes do not meet, then they do not need to say "hello". Or, when a client and a design practice enter into a contract, it is mutually understood, for now, that payment will be made using a currency other than 'Bitcoins'. These examples of the mutual comprehension of meaning involves unspoken interpretative assumptions in routine settings – i.e. that we should shake hands as a formal greeting and that work takes precedence over play within office hours. These instances involve people drawing upon mutual knowledge that is taken-for-granted (Giddens, 1993:p.105), operating in the background as an 'interpretative resource', to be drawn upon in order to make sense of social encounters. However, it may be necessary that the scheme is openly expressed in order to substantiate or assert particular interpretations, such as rules. This may also involve reference to physical aspects of context, such as a design contract. The appropriation of physical resources in social discourse is a fundamental aspect of agreement, and cannot be severed from a backdrop of largely implicit, mutual knowledge – the former is interpreted in light of the latter (Giddens, 1993:p.105). This appropriation requires agency, i.e. an individual's power, knowledgeable and capability to take (meaningful) action, such as the maintenance or even disruption of human relations (Giddens, 1993:p.97). In summary (see Figure 1), interpretative schemes comprise mutual knowledge that is largely unspoken, taken-

for-granted, assumptive (Gouldner, 1971) and involves the agentic appropriation of physical aspects of context. A note on how this ‘knowledge’ is acquired – it is not ‘endowed’ but ‘learned’ through exposure to and participation in a wide variety of normative processes and situations such as education, training, and upbringing.

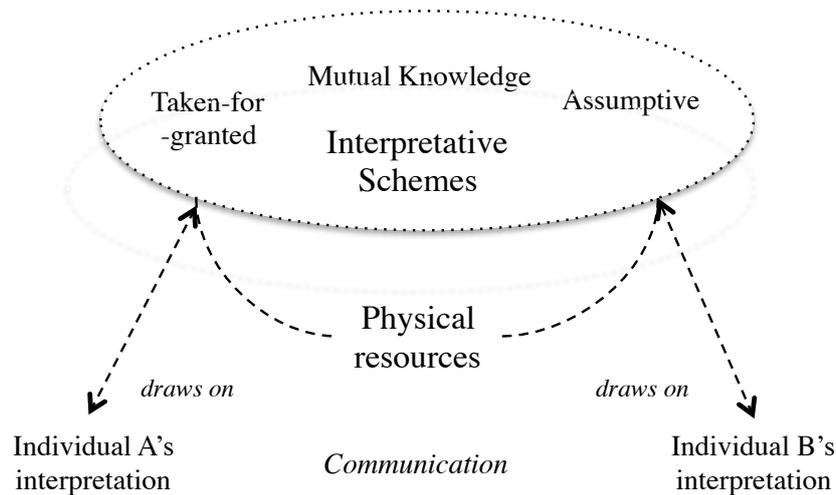


Figure 1: Interpretative schemes in social interaction

The implication for emotion is that it is not an entirely subjective experience but an inter-subjective one, in which interpretative schemes are drawn on to make ‘emotion decisions’ (Shweder and Haidt, 2000), i.e. to ascertain how one is to construe a situation, how one is to feel. Consider the dentist chair or the radiotherapy device; the dentist/doctor and patient employ the mutual knowledge that the health-check activity should be undertaken on the grounds of health; it rationalises the encounter. But this ‘struggles’ with other interpretative schemes that the patient may draw on based on accounts told and re-told regarding displeasurable health visits; it is taken-for-granted that these are relatively intimidating experiences. Therefore there is not necessarily one all-conclusive interpretative scheme per social episode; an assemblage of them and their physical artifacts may be appropriate. It is up to the individuals, whether they be a designer or a patient, to trade-them-off, rationalise, combine, and generally employ them in their social encounters in accordance with their agentic capability (Giddens, 1993).

We extend the basic componential Appraisal model of emotion with interpretative schemes (see Figure 2) in order to gain theoretical depth regarding the means by which people draw on social contexts when appraising their circumstances and forming their emotions. We draw on this as a lens by which to interpret the case study. We now proceed to elaborate on our research approach.

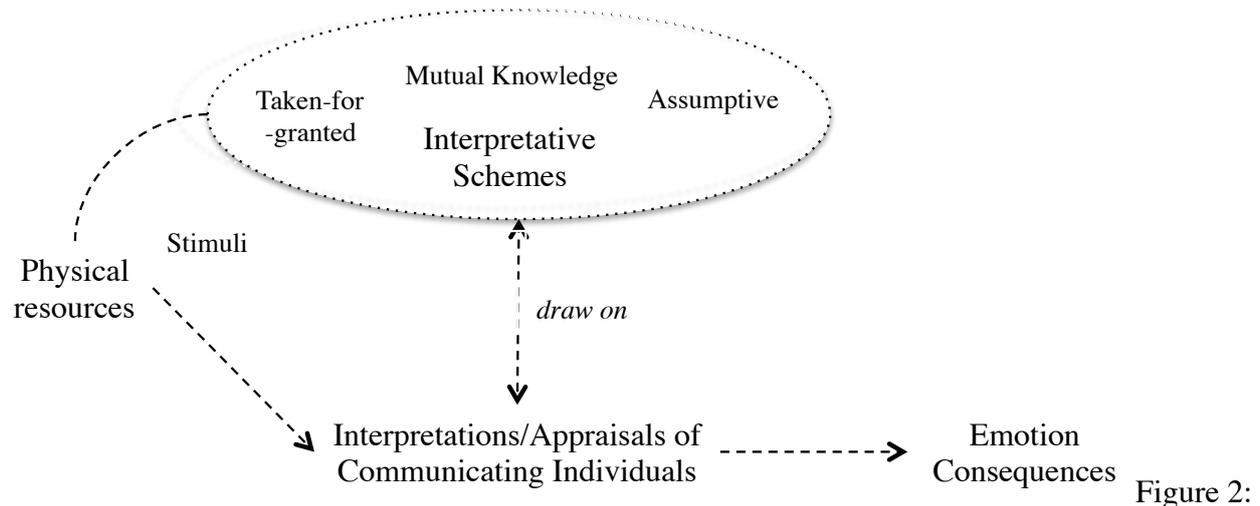


Figure 2:

An extended model of componential appraisal theory

3 Research approach and methods

Our field study of the Maggie’s Centre began in January 2009 and lasted seventeen months. We took an interpretivist approach to the study – interpretivism can enhance our in-depth understanding of social phenomena (e.g. Schon, 1983; Easterby-Smith et al. 2002; Swann, 2002) by accessing the meanings that people create and attach to their social lives (Ngwenyama and Lee, 1997).

Interpretivism is an apposite approach given the study’s deep interest in ‘meanings’, specifically PSS user interpretations, modalities thereof (interpretative schemes), appropriation of design artifacts therein, and implications for emotion.

The Maggie’s Centre was designed and constructed between 2004 and 2008 by the architectural practice Lord Architects (a pseudonym) and partners in association with the user team (project instigators and other stakeholders); the project was co-designed (e.g. Bate and Robert, 2006). All

the data were collected by the lead researcher, who engaged with the participants through first-hand experiences, in order to grasp the meanings ascribed to the design processes. Interviews (semi-structured and informal) were conducted with: (i) project instigators, which included the co-founders, i.e. the client, (ii) designers, including architects, lighting designers, landscape designers, and engineers, (iii) patients of the facility, and (iv) one other stakeholder - the cost accountant – who was also thought of as part of the client team since he had also been a cancer patient (see Table 1). Twenty-five semi-structured interviews were conducted with the users/client and designers; these were all recorded and transcribed. Eight informal conversations were conducted with patients. In accordance with agreed ethical procedures, we have provided pseudonyms for all participants and their respective companies except Maggie's. Interview guides (Rubin and Rubin, 1995) were prepared for the semi-structured interviews. Each interview lasted at least an hour. The designers and users (project instigators, accountant) were asked about the PSS design process and how user emotion was taken into account.

The informal conversations with patients were not planned and occurred during the regular visits the lead researcher made to the facility. Our interviews were conducted after the completion of the facility and hence relied on retrospective accounts of how design decisions developed. Whilst this is a potential weakness of the study, it was motivated by practicalities and the ethos that interviewing offers the researcher a middle-path between getting too involved and not getting involved enough with those in the research setting (Walsham, 1995). Other data sources included observations and secondary materials such as the Maggie's Architectural Brief and emails. These materials were analysed to gain more insight into, as well as verify the interview responses.

Table 1: Study Participants

<i>Name</i>	<i>Position</i>	<i>Organisation</i>
Lorna	- CEO - Co-founder	Maggie's
Bob	- Chairman of professional advisory board - Co-founder - Oncologist	Maggie's
Harry	- Co-founder - Architect	Maggie's
Marsha	- Vice-Chairman - Co-founder - Sculptor	Maggie's
Bernice	- Maggie's Centre Manager - Lead Nurse	Maggie's
Macy	Nurse	Maggie's
Marti	Construction Contractor	White Construction
Markus	Lighting Designer	Sword Studios
Rosie	Lighting Designer	Sword Studios
Alexis	Stirling Prize judge	RIBA
Dan	Landscape Designer	Peace Studios
Martyn	Mechanical, Electrical, and Plumbing (MEP) engineer	Oval Engineering
Ed	Structural Engineer	Oval Engineering
Roger	Lead Architect	Lord Architects
Will	Project architect	Lord Architects
Clare	Designer	Lord Architects
Jonty	Cost Accountant	Hooch and Associates
Patients "A", "B", "C", "D", "E", "F", "G" and "H"	Maggie's Patients	

3.1 Data Analysis

In our interpretive analysis of the primary data, we employed the three-tier coding system described by Miles and Huberman (1984). This is an elicital approach to data analysis that develops theory from the bottom-up (e.g. Brown et al, 2008). The first 'tier' or stage involved descriptive coding - the various design activities, events, incidents, artifacts, expressed emotions and practices of the interviewees were identified. We went through approximately 600 pages of A4 print-outs and highlighted the relevant words, phrases, lines, and paragraphs. This produced hundreds of *in vivo* codes – i.e. codes taken directly from the interviewees' mouths. Staying close to the participants'

text was an attempt by the researchers to prevent them from being seduced into possibly making premature leaps towards higher-order concepts.

The second stage involved interpretive coding, which put the descriptions of activities etc. into context to clarify their significance and dynamics. This involved tracing links between the stimuli, practices and interpretations and the elements of context they were embedded in. This part of the analysis began to interact with theory more (Strauss and Corbin, 1998), so we could make deeper sense of the emerging data groupings. This involved drawing on appraisal theory and interpretative schemes (Figure 2) as a theoretical lens, an approach which is acceptable where a concept, such as emotion in PSS design, is novel and imperfectly understood (Gregor, 2006:p.625). The methodological implication of the theoretical lens is that there is a discursive aspect to emotions, and that we may enter into people's emotional worlds through their uttered appraisals. To help employ the lens we developed a notation based on its main elements – Stim (stimulus), IS (interpretative schemes), App (appraisal), and Con (consequence) (see Table 2). This helped us further tag and trace the emotional 'chain reactions' observed in the text. Table 2 gives an example of how a quote from Lorna was analysed: the stimulus/artifact was the hospital corridor, the interpretative scheme was the mutually understood restriction placed upon cancer patients, the appraisal was the feeling of alienation in the context, and the consequence was heightened mental stress. While interpretative schemes are largely taken-for-granted, peoples' utterances still hold clues as to what they might be. Our articulation of them cannot be described as 'exact', but rather we attempted to 'read between the lines' and provide ones that were plausible (Golden-Biddle and Locke, 1993; Brown et al, 2008) and intimately connected to the words used by the study participants.

The third stage involved pattern analysis in which we analysed the results of the interpretive analysis into patterns within and across the design stimuli, interpretative schemes, appraisals and

their interaction. This was another important analytical process on the way to reaching an empirically-grounded abstraction of emotion-centred PSS design (Comaroff and Comaroff, 2003:p.157). In the next section we present the ‘thick descriptive’ (Geertz, 1973) aspect of the analysis – the participants’ story of how emotion was considered in the design of Maggie’s. We recognise that there is an element of ‘craft’ in creating this homogenised account (Mills, 1970:p.215; Brown et al, 2008), but it is thoroughly suffused with the words, phrases and so forth uttered by the participants.

Table 2: Example of coding using the theoretical lens

<i>Speaker: Lorna</i>	<i>Data</i>	<i>Code</i>
	“For example, there are corridors [in hospitals]	Stim (stimulus)
	that people with cancer are not allowed down,	IS (interpretative scheme)
	so, there’s this sense of secrets and there was the comment that people constantly felt being processed or going from one reception desk to another...	App (appraisal)
	...its mentally stressful”	EmCon (emotional consequence)

4 Case Description

4.1 Background

A Maggie’s Centre is a place to turn to for help with any of the problems, small or large, emotional and otherwise, associated with cancer. There are fifteen of them around the UK. Under one-roof patients, their relatives and friends can find: (i) professional psychological and emotional support for individuals and groups, (ii) courses on stress reduction (iii) a wide variety of information on cancer, care and even benefits advice, (iv) spaces for patients either to be alone or to be with friends and family, and (v) socialisation. There is also a Maggie’s Online service that users can use in

between visits. Such facilities are in demand because cancer frequently undermines patients' self-worth, autonomy and well-being (Bloom and Spiegel, 1984).

4.2 The Brief

The Maggie's Centres were the brainchild of cancer patient and horticulturist Maggie Jencks. She wrote an empathic vision of the centres in 'A View From the Frontline' (Jencks, 1995). It included reflections and accounts of how she suffered with cancer; she describes it as, "a punch in the stomach...Everyone, however, knows that cancer means pain, horrible treatments...Cancer does kill of course – but fear, compounded by ignorance and false knowledge is a paralysing attack in its own right. The myth of cancer kills as surely as the tumours." (Jencks, 1995:p.9) The publication was the foundation of the Maggie's Architectural Brief, which was further developed by the co-founders who cared for her - Maggie's nurse, her husband, her oncologist and her artist/sculptor friend (Table 1). The project architect of the facility "Will" described the Brief as "very inspirational",

"It [the brief] doesn't talk about the facility in terms of metres squared and so forth that you have to adhere to. All those constraints are basically forcing you into a corner already. It talks mostly about the way it wanted you to feel, about the use of natural light and not dark spaces, when you're looking out the windows, how you feel, and the fact that having a kitchen for cups of tea is very important when it involves empowerment and gaining an emotional involvement." (Will – project architect)

It prioritised conveying how facility users should feel rather than what functions and products were available to them, such as the therapeutic advantages of horticulture indoors and out. The designers all said how touched they were by the Brief and some of them could relate directly to it because they or a relative had endured cancer. The project benefitted from such empathic co-designers i.e.

users and designers that expressed insight and empathy with regards to the cancer patient experience and therapeutic design sensibilities. The brief emotionally ‘charged’ the designers and the design process, which followed the standard RIBA phases for architecture: Preparation, Design, Construct and Use. The co-designers’ prior experiences at NHS cancer hospitals further informed the brief, and they kept these in mind throughout the whole process.

4.3 Features of a Nearby Institutional PSS

Although excellent in the application of medical science, the participants mentioned how cancer hospitals impose ‘rules’ on patients, which they had become accustomed to, but with consequences for their emotional well-being. In particular these relate to restrictions on the use of corridors, kitchens, gardens and windows, creating a “sense of secrets” (Lorna, Patient A) and “lack of trust” (Bernice, Patient F). For example, “potentially therapeutic gardens are under lock and key” (Bernice), and “the windows can hardly be opened” (Bernice) - it was ‘accepted’ between the parties that people might abuse them, but with the consequence of “feeling trapped” (Patient F),

“the last thing you want, when your mind is thinking the world’s closing in, is to be walking around a building which feels just like that, like the narrow long corridors and various restrictions.” (Jonty – cost accountant)

Signs reinforced accepted norms that the hospital made patients feel confused, “processed” and stressed (Bernice – lead nurse). Hospital “neon” queue management signs reflected “clinic load”, the patient’s position in that load, and the need to conform to the system,

“Everything is telling you not to approach the receptionist and talk to them. It diminishes communication.” (Lorna - CEO)

Also, Patient “A” mentioned how distressed he felt at seeing a “stack of pamphlets” that included advice on how to prepare your will; it made him feel like he was dying. The empathic co-designers sought to avoid these kinds of norms, restrictions and negative user feelings in the new facility design.

4.4 New Emotion-centred PSS Design

The designers reacted to the cancer hospital accounts by omitting all but the necessary health and safety signage in the new PSS,

“There are no signs to the toilet because actually asking where the toilet is becomes an opportunity for communication, it signals a simpler environment, more informal... we wanted our building to encourage human interaction.” (Lorna - CEO)

The team sought to create a simpler environment than the hospital’s, where more intuitive human interaction was possible drawing on the building’s features. For instance, “door language” was established so that signs indicating room availability were unnecessary. This prompted patients and staff to talk, requiring the patient to be “active” (Will) rather than being passive. Doing away with signs also made the facility feel less institutional and more like a home. All the co-designers pointed out that a key design feature was the kitchen or ‘bothy’. Here patients could make themselves a cup of tea whenever they liked, an activity not allowed in cancer hospitals, where you “wait until the trolley comes round” (Martyn – MEP engineer). It helped them lower their guard and open-up. The project architect elaborated,

“It’s a very comforting thing ... that empowerment. Once somebody’s started to feel a bit more relaxed about themselves, things start to happen. They are able to talk about some of their deeper feelings and harder things such as their mortality. Not only of course. They’re talking about some

very positive things as well. And they're talking about it in an open environment.” (Will – project architect)

To support these conversations the acoustics were empathically designed too - made ‘bouncy’ so as to enhance the patient’s sense of presence,

“So it's not like it's [the indoors] drawing out of you. You sometimes go into a library or a big hospital and you feel like the stuff is being almost sucked out of you, you feel small, whereas here you don't get that feeling. You can hear the noise, you can hear the bounciness, but you feel you can talk about it and not feel like you're being overheard, and that's important as well.” (Will – project architect)

As well as the opportunities for socialisation, the co-designers recognised the need for private places too, for contemplation and professional psychological support services. What mattered was that patients had the freedom to choose where to go, and what to do, depending how they felt; they could have the “quiet pause” or the social kitchen,

“It’s just a far more relaxed environment where you’re in control. You can use the space how you want to use it and there’s just that flexibility in terms of actually... there’s information there if you want it. It’s just the creation of an uplifting space rather than a functional space. What you actually want is somewhere where you can go, you can have a cup of tea, you can have your own space or you can have group space. You’ve got that flexibility.” (Jonty – cost accountant)

An aspect of the relaxed, uplifting environment was the horticulture inside and outside the facility,

“I created spaces that were about feeling...what was most important was creating a space that drew upon a mood or an atmosphere, or heightened it, and then allowed the user to be in it without challenging them.” (Dan – landscape designer)

This design aspect even took into account the therapeutic sound the trees would make when the wind blew through them or when it rained on them, as well as their scent and taste,

“We buffered the whole building with the birch trees, so you get the wind in the birch trees, and then there are these huge leaves in one of the courtyard gardens, on the Tetrapanax [rice paper plant], so when it rains you get this ‘patter’ on the leaves. Then there is the perfume, so that recurs again, again and again in the garden, and then there is taste, so in all the gardens there are edible things... So by stimulating people’s senses you just very naturally get them to tune into a place.” (Dan – landscape designer)

This gave the service provider another design feature that could be drawn on in the service of care to its users. Private support sessions could occur in a variety of rooms that had a variety of sounds and sensibilities, depending on the situation. The buffering through horticultural design reinforced the curtain walling design feature of the building,

“[Will] explained that the double height curtain walling protects us from some of the noise of the street and wraps itself around the building...somebody said it’s like an arm that comes around and hugs you.” (Bernice – Centre Manager)

This “effect” was expressed metaphorically by the designers in several ways, stemming from the lead architect’s concept design; a kidney (Will), a heart (Bernice), a church (Lorna), and a womb (Dan).

4.5 Patient Feedback

There were some unintended consequences of design features. For instance, patient “B” said of a plant, “that leaf is dying, I don’t like it because I’m faced with my mortality, so I would rather see things growing.” Patient “C” said the taps in the toilet operated in an unusual “sliding” fashion, which irritated her, and patient “D” was uneasy receiving care in a facility which he called “a work of art”; it rather overwhelmed him. The centre manager and nursing team thought positively of these reactions however, treating them as “useful tools” that helped them tell if someone was upset, and therefore helped with the delivery of care,

“if these really upset somebody to that extent then something else must be going on” (Bernice – Centre Manager)

Despite these unintended consequences, most patients had strong positive emotional reactions to the facility. Upon visiting the facility for the first time one patient burst into tears on account of the sense of calmness. Patient “E” said they held themselves so tightly whilst going through “the machine over there [the hospital] for the first time”. They were so tense and apprehensive that when they came into the new facility they just let go and had a “cathartic emotional outbreak, crying...”, which was therapeutic in itself. Indeed, patients F, G and H expressed similar reactions.

5 ANALYSIS

The purpose of this section is to share the results of our interpretive and pattern analyses of the case data. The former draws on the theoretical lens (Figure 2), while the latter looks for patterns therein in order to conceptualise how user emotion was taken into account by the designers.

5.1 Interpretive Analysis

We identified three main ‘subjects’ that the study participants spoke of: the Brief, the nearby cancer Hospital, and, the Maggie’s facility itself. The Brief and the nearby Hospital informed the emotional and experiential ‘problem’ that the co-design team wanted to solve. The resulting Maggie’s facility was the enactment of the knowledge acquired from these two sources, i.e. compassionate understandings. In all, we identified twenty-six distinct emotional design stimuli on these three subjects, each of which had one or more associated interpretative schemes and appraisals. We now discuss them.

5.1.1 The Brief

Tables 3, 4 and 5 are structured according to the analytical lens we employed (Figure 2); they display the stimuli, associated interpretative schemes and appraisals. Given the consonance of emotional consequence, these were omitted to avoid repetition.

The Brief referenced a variety of positive design stimuli including horticultured plants and trees, attention to natural light and domestic cues such as the ‘bothy’ (Column 1, Table 3). The architects noted the omission of technical constraints from the Brief which signaled to them that an altogether different kind of cancer healthcare facility was required. The Brief was an inscription of the will to break-free from the healthcare norms that cancer patients had become accustomed to. This became mutually and implicitly understood – an interpretative scheme - between the authors and designers. Further, it was taken-for-granted that personal moving stories were effective communication tools, that plants are therapeutic, natural light is healthy and that kitchens connote tea-making (Column 2,

Table 3). These interpretative schemes were drawn on by the designers in forming appraisals that were positive and expressed inspiration (Column 3, Table 3). A further source of empathic design information was the nearby Hospital, which we now turn to.

Table 3: Interpretive analysis of the Brief (positive emoting)

Stimuli	Interpretative schemes	Appraisals
1.0 Maggie’s Architectural Brief	[mediating authors and designers]	[positive]
1.1 personal stories	cancer connotes mental and physical suffering	“Inspirational” (Will)
_____	moving stories are effective communication ‘tools’	“Touching” (Dan)
specific physical aspects suggested therein:	_____	_____
1.2 horticulture (plants, trees...)	plants are therapeutic	
1.3 natural light	natural light is healthy	
1.4 kitchen/‘bothy’	a kitchen connotes tea-making	“empowerment and gaining an emotional involvement” (Will)
_____	_____	_____
1.5 omission of technical details	technical details are constraining	“forcing you into a corner” (Will)

5.1.2 The ‘Problem’ PSS – the Hospital

The very mention of the Hospital by the study participants revealed an implicit understanding between them; that it connoted detrimental emotional well-being for the patients (see Table 4). The study participants asserted a number of design stimuli including: corridors, kitchens, gardens, windows, signs, neon queue management, and will-making pamphlets (Column 1, Table 4). Bound-up with their use were interpretative schemes that signaled to doctors, nurses and patients that: (i) cancer patients’ access / use of corridors, kitchens and gardens was restricted, (ii) the Hospital was a

complex organisation and needs to manage that complexity, (iii) the patient was subservient to the system, e.g. 'wait your turn', and, (iv) cancer threatens life, putatively warranting the provision of will-making literature (Column 2, Table 4). These were drawn on by the patients and co-designers in their concerted formulation of negative appraisals regarding: (i) secrecy, (ii) feeling trapped, (iii) lack of trust, (iv) confusion, (v) stress, (vi) systematisation (being processed, clinic load), (vii) subservience, and, (viii) facing mortality (Column 3, Table 4). The Maggie's co-designers aimed to disrupt these design norms and transform the negative 'emotional chain reactions' patients were accustomed to in hospitals.

Table 4: Interpretive analysis of nearby cancer hospital (negative emoting)

Design Stimuli	Interpretative schemes	Appraisals
<p>2.0 Nearby cancer hospital</p> <p>specific physical aspects:</p> <p>2.1 corridors</p> <p>2.2 kitchens</p> <p>2.3 gardens</p> <p>2.4 windows</p> <p>_____</p> <p>2.5 plethora of signs</p> <p>_____</p> <p>2.6 neon queue management/customer number signs</p> <p>_____</p> <p>2.7 pamphlets on will making</p>	<p>[mediating patients, nurses and the institution]</p> <p>‘rules’ that place restrictions on the movements of cancer patients, including access to potentially therapeutic sources</p> <p>_____</p> <p>hospital complexes are confusing</p> <p>_____</p> <p>‘wait your turn’</p> <p>the patient is subservient to the system</p> <p>_____</p> <p>cancer is life-threatening</p>	<p>[negative]</p> <p>“sense of secrets” (Lorna, Patient A)</p> <p>“Feeling trapped (Patient F)</p> <p>“your mind is thinking the world’s closing in” (Jonty)</p> <p>“lack of trust” (Bernice, Patient F)</p> <p>_____</p> <p>confusion (Jonty, Patient D)</p> <p>_____</p> <p>“[patients feel] processed” and stressed (Bernice)</p> <p>“clinic load” (Patient G)</p> <p>“do not approach the receptionist” (Lorna)</p> <p>_____</p> <p>Patient A said he felt like was dying</p>

5.1.3 The ‘Solution’ PSS – Maggie’s

The study’s participants revealed that their experience of Maggie’s was largely positive and uplifting. Positive design stimuli (Column 1, Table 5) included: (i) reducing the volume of signs to an absolute minimum, (ii) a bothy-esque kitchen at the heart of the facility, which contained domestic kitchen artifacts, (iii) a welcome service offered to new visitors, (iv) the above were complemented by presence-enhancing acoustics, horticultured shrubbery and care services. These stimuli took on a positive character on account of the interpretative schemes that were coupled with them. These consisted of common assumptions that Maggie’s was not a hospital despite its proximity to one, and therefore did not inherit any of its negative, intimidating properties (Column

2, Table 5). Users understood it was not a complex ‘system’ given the lack of signs, which generally triggered active appeals for help and encouraged more informal cues such as ‘door language’. This signaled a different culture to the hospital – one that was less formal and encouraged the user to be less passive; a domestic environment in which the user could perform simple tasks for themselves such as making their own cup of tea. It was taken-for-granted between the co-designers and users that it was a PSS in which to feel at home then; it connoted safety, with an atmosphere that encouraged effortless deep-talk, in spaces that could mean whatever the user wanted them to mean – they were to be interpreted flexibly. This was heightened through horticultural sensibilities which contributed to the delivery of care. Needless to say this generated a number of positive appraisals (Column 3, Table 5) which conveyed catharsis, simplicity, informality, activity, comfort, empowerment, friendly deep-talk, relaxation, sense of presence, responsiveness and calm.

However, a few negative ‘emotional chain reactions’ were discovered, such as the effect of dying leaves and unusual sink taps (Column 1, Table 6). This revealed a collision of interpretative schemes; on the one hand the patients extreme sensitivity to anything ‘too’ unusual or that resembled or suggested dying, versus the intended designed meaning of being different to the hospital and the value of having plant life on site (Column 2, Table 6). However, the nurses were aware of these reactions and improvised them into their care service, calling them “useful tools” that said something about the state-of-mind of the patient.

Table 5: Interpretive analysis of the Maggie’s facility (positive emoting)

Design Stimuli	Interpretative schemes	Appraisals
<p>3.0 The Maggie’s Facility</p> <p>specific physical aspects:</p> <p>3.1 minimal signs</p> <p>3.2 no toilet signs</p> <p>3.3 no door availability signs / door positions</p> <p>_____</p> <p>3.4 a bothy-esque kitchen (including tea-making facilities and other domestic objects such as a log fire)</p> <p><i>associated services:</i></p> <p>3.5 new visitors are all shown the kitchen and how to make a cup of tea</p> <p>_____</p> <p>3.6 bouncy acoustics</p> <p>_____</p> <p>3.7 configurable spaces</p> <p><i>associated services:</i></p> <p>3.8 clinical psychology therapy</p> <p>3.9 care information</p> <p>_____</p> <p>3.10 horticulture inside and outside - their therapeutic sound, scent, and taste</p>	<p>[mediating Maggie’s co-designers and patients]</p> <p>‘this is not an intimidating hospital’</p> <p>‘this is not a large and complex hospital’</p> <p>absence of physical signs triggers appeals for help</p> <p>“door language”: e.g. a door ajar means available</p> <p>_____</p> <p>‘this is not a formal hospital where you passively wait for tea’</p> <p>‘this is a <i>domestic</i> kitchen’</p> <p>‘no one will mind if I make a cup of tea here’</p> <p>‘make yourself at home’</p> <p>_____</p> <p>‘it’s safe and effortless to talk deeply here’</p> <p>_____</p> <p>relaxed relationship between space and purpose</p> <p>_____</p> <p>getting back to nature’ - relaxing, peaceful</p> <p>‘care requires a special setting’</p>	<p>[the positives:]</p> <p>“cathartic emotional outbreak, crying...” (Patient E)</p> <p>health and safety the only consideration</p> <p>Simpler, informal, “[it] becomes an opportunity for communication” (Lorna)</p> <p>Patients are activated (Will)</p> <p>“less complicated” (Patient G)</p> <p>_____</p> <p>comforting, cosy</p> <p>empowering, e.g. making your own cup of tea (Patient, H)</p> <p>enables talk of “deeper feelings and harder things” (Will)</p> <p>lowers the guard</p> <p>_____</p> <p>unchallenging, sense of presence, “Feel you can talk and not like you're being overheard” (Will)</p> <p>_____</p> <p>the facility can respond to particular needs and feelings anytime: “can use the space how you want to use it” (Jonty, Patient C)</p> <p>_____</p> <p>“spaces that were about feeling... without challenging them [the patients]” (Dan)</p> <p>calming – Patient D</p>

Table 6: Interpretive analysis of Maggie’s (negative emoting)

Design Stimuli	Interpretative schemes	Appraisals
<p>4.0 The Maggie’s Facility</p> <p>_____</p> <p>specific physical aspects:</p> <p>4.1 the dying leaf</p> <p>_____</p> <p>4.2 toilet sink taps</p>	<p>[mediating service providers and patients]</p> <p>‘Maggie’s is not a functionalistic care facility but rather more artistic’</p> <p>_____</p> <p>what a dried out leaf on a plant suggests</p> <p style="text-align: right;"><i>(versus</i></p> <p>plant life therapy)</p> <p>_____</p> <p>‘taps should come on in a usual way’</p> <p style="text-align: right;"><i>(versus</i></p> <p style="text-align: center;">Maggie’s does different)</p>	<p>[the negatives:]</p> <p>Patient “D” was uneasy receiving care in a “work of art”- overwhelmed him.</p> <p>_____</p> <p>“I don’t like it [the leaf] because I’m faced with my mortality, so I would rather see things growing.” (Patient B)</p> <p>_____</p> <p>irritated Patient C</p> <p>a “useful tool” for the nurses to gauge how the patients feel</p>

Having provided a low-level interpretive analysis of the qualitative data, we now proceed with the pattern analysis.

5.2 Pattern Analysis

The purpose of this section is to distill and condense the results of the interpretive analysis into patterns across the design stimuli, interpretative schemes, appraisals and their interaction at Maggie’s. This enables us to develop an empirically-grounded abstraction (Comaroff and Comaroff, 2003:p.157) of emotion-centred PSS design.

The key to analysing and understanding emotion is appraisal (Scherer, 1987; Shweder and Haidt, 2000). Appraisals do not fall out of the air though, they have their context, their dynamics. Appraisals are discourses emotions that draw on interpretative schemes (Giddens, 1993) and their unseverable physical aspects, which also serve as stimuli. We begin with a pattern analysis of the appraisals of the Maggie’s facility.

Table 7: Categorising positive appraisals at Maggie’s

Appraisals	Categorisation
activity, empowerment, friendly deep-talk, sense of presence, responsiveness	taking action
simplicity, informality	simplifying
catharsis, comfort, relaxation, calm	positive intrinsic pleasantness

Drawing on the analytical table of Maggie’s (Column 3, Table 5) we inducted three categories of appraisals: taking action, simplifying and direct references to positive intrinsic pleasantness (Column 2, Table 7). These appraisals were enabled by a set of interpretative schemes, which we Categorise as: non-institutionalising, domesticating and activating (Table 8). The first category involved conceptual ‘retorts’ to the Hospital environment in that they were part of the users’ dis-identification with the stressful hospital.

Table 8: Categorising positive interpretative schemes at Maggie’s

Interpretative schemes	Categorisation
not intimidating, not complex, informal door language, not formal	non-institutionalising
feel at home, safe, nature language (relaxing, peaceful)	domesticating
appeal for help, be less passive, be active and perform tasks, effortless environment for deep-talk, interpretive flexibility of space,	activating

The associated design stimuli were informal, domestic, configurable, on-demand and horticultured (Table 9). Most spaces, artifacts, information and services were configurable and had to be activated by the patient – they were not foisted on them as experienced at the nearby hospital.

Table 9: Categorising positive design stimuli at Maggie’s

Design stimuli	Categorisation
Minimal signs (no toilet or room availability signs)	informal
bothy-esque kitchen, domestic kitchen artifacts, presence-enhancing acoustics	domestic
configurable spaces	configurable
ritualistic one-off welcome service, information and care services available when needed	on-demand information and services
horticultured shrubbery	horticultured

From this pattern analysis we present an empirically-grounded abstraction (Figure 3) of how positive ‘emotional chain reactions’ were designed at Maggie’s. Referring to Figure 3, the emotions of users were lifted by designing stimuli and interpretative schemes that had agency in mind. The design stimuli afforded agency – for instance they were configurable and on-demand. These affordances were interpreted and realised by drawing on interpretative schemes that encouraged agency – appeals for help or ‘make your own tea’, for instance. The designers realised that the patient needed activating and be encouraged to carry out simple tasks that involved exertions of agency. This yielded appraisals that indeed expressed agency – taking action – which was bound-up with expressions of positive emotion.

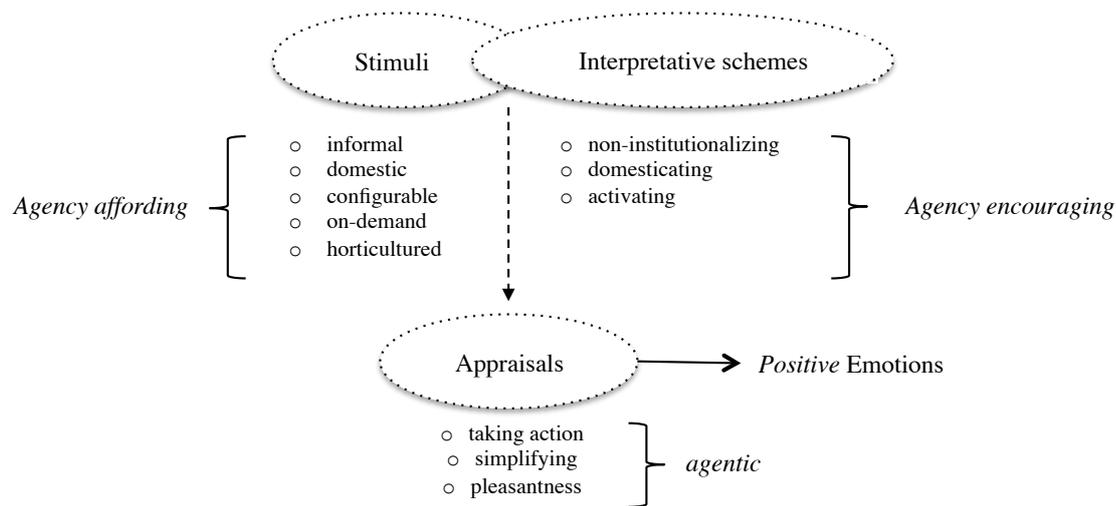


Figure 3: Conceptualising the design of positive emotions in a new PSS

The key here then was a designerly knack for understanding human agency - how to suggest, encourage and realise it. However, there were some unintended consequences such as the negative effects of unusual sink taps, which irritated one patient (Table 6). This reflected that at times the overall will to ‘do different’ at Maggie’s and disrupt the norms of hospital-based care went too far for some patients. This reflects that Maggie’s was an ‘extreme’ ‘response’ to the nearby Hospital, to its arresting cognitive, physical and emotional effects (Table 4); put another way, it closed-down the latitude for patient agency. It was drawn on in the information gathering phase as the embodiment of the ‘problem’ to solve; it was an input to the design of the new PSS. Another input was the Brief which expressed some of the ‘design agency’ that was realised in the final facility, i.e. the will to transform cancer care. The Brief activated the designers who in turn came up with ways to activate the patient and their positive emotions, particularly through the design of agentic stimuli and interpretative schemes.

Having presented our analysis, we now reflect on the literatures we have invoked in this paper and offer implications for theory and practice of PSS design.

6 Discussion and Implications

Our analysis reveals that the emotionally empathic co-design team did not just design a product. Nor did they just design add-on services to it (Aurich et al. 2006). Rather, they paid particular attention to the interpretative processes and conditions that were bound-up with the products/artifacts and services, in order to initiate positive ‘emotional chain reactions’. Designing PSS that are emotion-centred has been put forward as an important step for PSS (Bitner et al, 2008; Steiner & Harmor, 2009; Bertoni, 2013). However, current PSS design focuses on the rationalistic modeling of flows of services and their appropriated products (Baines et al, 2007; Baxter et al, 2009; Bitner et al, 2008; Morelli, 2003). Further, tools like CAD help integrate representations of functions, service activities, and product behaviors (Hara et al., 2009; Isaksson et al., 2009; Bertoni, 2013), but not emotion considerations. For the purposes of designing ‘positive’ PSS, we suggest that PSS designers additionally pay attention to interpretative schemes in the research phase. This is usually an ‘implicit’ phenomenon, reflecting mutually taken-for-granted knowledge. Through the qualitative techniques we have employed here, these may be uncovered - through an empathic research process that goes beyond the usual technical Brief. This involves researching a ‘problem space’ – an artifact or service that provides almost a polar opposite to the desired solution in the Brief – i.e. by highlighting and articulating a rationalistic, functionalistic exemplar, such as a Hospital. The extended appraisal model of emotion (Figure 2) can be employed as a technique of organising and analysing this preparatory material, as we have demonstrated (Tables 3, 4). This helps the designer to reflect on and structure the interpretative dynamics at play in a problem setting, which will provide the clues for an emotion-centric PSS solution. It is expected that there will be little in the way of latitude for user agency in a PSS where emotional bonds with customers are not forthcoming (Bitner et al, 2008:p.67), or, emotion is just not of prime concern there. Conversely, where the PSS users are being given ‘agentic latitude’ there may already be a satisfying and uplifting relationship between provider and customer; we methodically traced a relationship

between creating stimuli that afforded agency coupled with interpretative schemes that encouraged agency, that yielded an active, emotionally positive user (with only a very few exceptions). This could be adopted as a goal when designing an emotion-centred PSS – not to lock-down but to open-up opportunities for users to exert their agency over small or large aspects of their PSS consumption. However, we cannot and do not assume that PSS users can be deterministically made to feel a certain way by design choices. Rather, the devised interpretative schemes and stimuli that are made available to them are potential enablers of positive emotion. Further research in a variety of PSS settings could ‘prove’ or add further insight here. Also, a more detailed theoretical account of human agency (e.g. Giddens, 1993) could help unpack this further, but is beyond the remit of this paper. Agentic stimuli and interpretative schemes could be the key to helping companies create stronger emotional bonds with their customers (Bitner et al, 2008:p.67). Another key design stimuli is an emotionally articulate Brief - empathic, moving user stories need to be sourced that also ‘move’ the designer, making for a compelling and emotional primary generator (Lawson, 2005).

Given that current PSS design tools perhaps lack some capacity to consider the dynamics of emotion, it is incumbent on us to suggest how one in particular – service blueprinting – could be adapted in order to take user emotion into account.

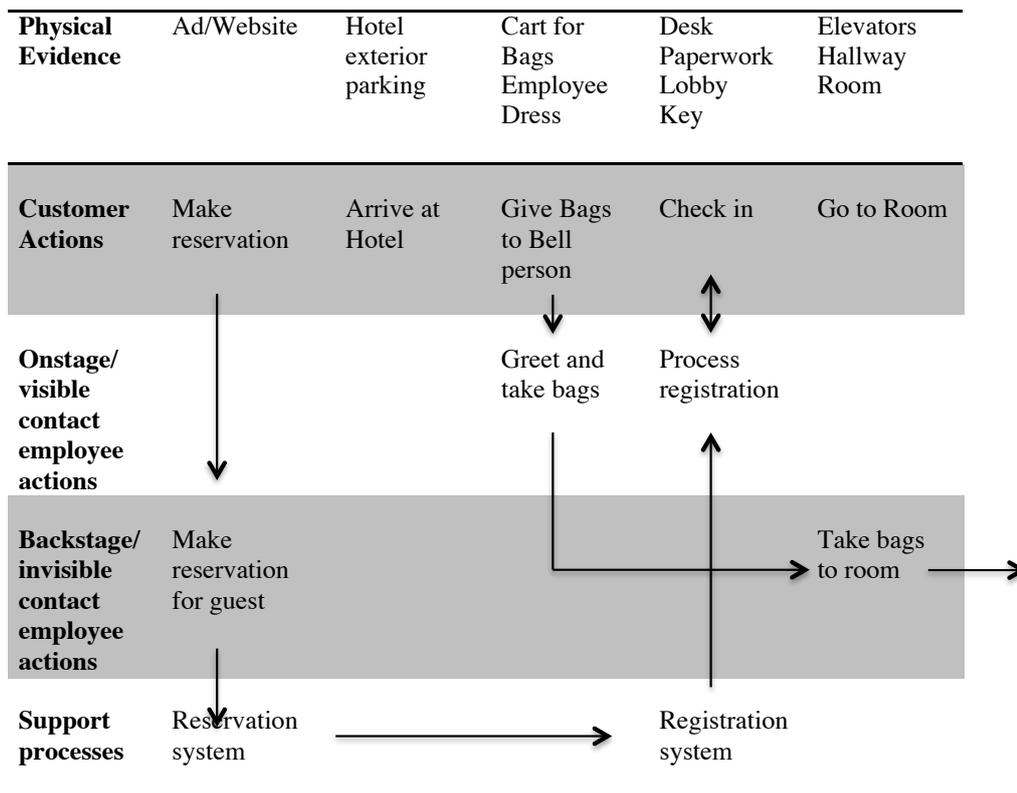


Figure 4: After Bitner et al (2008), Service Blueprint for Booking a Hotel Room

Figure 4 is a reproduction of Bitner et al (2008) who present the canonical dimensions of service blueprinting - customer's actions, onstage visible contact, backstage invisible contact, support processes and physical evidence. Four further dimensions could be added here with the possibility of positive emotional chain reactions: (i) agentic affordances in the evidence? (ii) sensemaking axiom, (iii) agency encouraged?, and, (iv) agentic appraisals. We created a simple blueprint based on a simple example from the data to illustrate our suggestion – please refer to Figure 5.

Physical Evidence	Domestic kitchen artifacts, e.g. tea-making facilities
- <i>Agentic affordances in the evidence?</i>	<i>Yes - a variety of teas, sugar types, milk, cups, mugs that can be combined in various ways</i>
Sensemaking axiom	'make yourself at home – don't wait for tea'
- <i>Agency encouraged?</i>	<i>Yes – activating, domesticating</i>
Customer Actions	Make a cup of tea
- <i>Agentic appraisals</i>	<i>'I'm in control', active, making decisions</i>
Onstage/ visible contact employee actions	-
Backstage/ invisible contact employee actions	Ensure there is adequate tea-making resources
Support processes	If a new user/visitor, shows them where all the tea-making resources are



Figure 5: Simple blueprint of the tea-making activity at Maggie's

In Figure 5, underneath Physical Evidence we place 'agentic affordances in the evidence?', which takes both a Yes/No input as well as unstructured text. It prompts the designer to consider whether there are adequate affordances and flexibilities in the evidence. This is followed by Sensemaking Axiom, which is intended to be a less theoretical term than 'interpretative scheme', although that is what it is. This should feature intended common understandings by which the user will interpret and use the Physical Evidence. Underneath that is another 'check' – is 'agency encouraged?' Again, a Yes/No input option here, as well as some unstructured text on how agency is actually to be encouraged – does it activate the user, any domestic sensibilities as well (as per the cancer care context)? Finally, what 'agentic appraisals' are expected following Customer Actions? Does it evoke any of those in Table 7? These additional blueprinting considerations could empathically prompt the designer into considering the interpretative conditions of users that are being created, along with the physical aspects/evidence/stimuli. After all, according to extended appraisal theory, the dynamics of interpretation are key to understanding emotion.

7 Conclusion

This paper makes seven contributions to PSS theory and practice:

- (i) We have addressed a knowledge gap that has been expressed in the field – the lack of research regarding emotion in PSS, specifically how it may be ‘designed’.
- (ii) We have introduced mainstream emotion theory into the PSS field.
- (iii) We have extended appraisal theory (Figure 2) with the theory of interpretative schemes (Giddens, 1993) to take account of the interpretive conditions of PSS users.
- (iv) We have presented an analytical approach for PSS designers to research and conceptualise ‘emotional chain reactions’ using the extended model of appraisal theory (Tables 3-6).
- (v) We provided a novel case study of an emotion-centred PSS.
- (vi) A conceptualisation of how the designers created an emotionally empathic PSS (Figure 3), which placed a premium on activating human agency through design stimuli and interpretative schemes.
- (vii) We suggested ways of adapting service blueprinting in order to take account of user emotion (Figure 5).

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References

- Arnold, M. B. (1960). *Emotion and personality*. New York: Columbia University Press.
- Aurich, J., Fuchs, C., and Wagenknecht, C. (2006) Life cycle oriented design of technical product-service systems. *Journal of Cleaner Production*, 14 (17), 1480– 1494.
- Baxter, D., Roy, R., Doultsinou A., Gao, J., Kalta, M. (2009). A knowledge management framework to support product-service systems Design. *International Journal of Computer Integrated Manufacturing*, Vol. 22, No. 12, 1073–1088

- Baines, T. S., Lightfoot, H. W., Evans, S., Neely, A., Greenough, R., Peppard, J., et al. (2007). State-of-the-art in product-service systems. *Journal of Engineering Manufacture*, 221(B), 1543e1552.
- Bartunek, J.M. Changing interpretive schemes and organizational restructuring: The example of a religious order. *Administrative Science Quarterly*, 1984, 29(3), 355–72.
- Bate, P. and G. Robert (2006), “Experience-based design: from redesigning the system around the patient to co-designing services with the patient,” *Quality and Safety in Health Care* 15(5).
- Bertoni, A. (2013). Analyzing Product-Service Systems conceptual design: The effect of color-coded 3D representation. *Design Studies* 34 (2013) 763-793
- Bijker, W., (1995) *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*. Cambridge, MA: MIT Press.
- Bitner, M.J., A.L. Ostrom, and F.N. Morgan, *Service Blueprinting - A practical technique for service innovation*. *California Management Review*, 2008. 50(3).
- Brown, A. D., Stacey, P. & Nandhakumar, J. (2008) Making sense of sensemaking narratives. *Human Relations*, Vol. 61, No. 8 1035-1062
- Callahan, J.L. and McCollum, E.E. (2002), “Conceptualizations of Emotion Research in Organizational Contexts,” *Advances in Developing Human Resources*, 4(1) 4-21.
- Chesbrough, H. and J. Spohrer, A research manifesto for services science. *Communications of the ACM*, 2006. 49(7).
- Comaroff, J., and Comaroff, J. (2003) *Ethnography on an Awkward Scale: Postcolonial Anthropology and the Violence of Abstraction*, *Ethnography*, 4: 147
- Cooper, R., Boyko, C. & Codinhoto, R. (2008) *Mental capital and wellbeing and the physical environment*. *Foresight Science Review*.
- Cross, N. (1982) *Designerly ways of knowing*, *Design Studies*, Vol 3(4) pp. 221-227
- Crilly, N., Moultrie, J., and Clarkson, P.J. (2004) *Seeing things: consumer response to the visual domain in product design*, *Design Studies* 25, 547–577
- Demirbilek, O. and Sener, B. (2003) *Product design, semantics and emotional response*, *Ergonomics*, Vol 46, No13/14, 1346–1360
- Desmet, P. (2003) *A multilayered model of product emotions*, *The Design Journal*, Vol6, No2, 4–13
- Easterby-Smith, M., R. Thorpe, and A. Lowe, (2002) *Management Research*. Sage Series in Management Research, ed. R. Thorpe and M. Easterby-Smith. London: Sage Publications Ltd.
- Geertz, C. (1973). *The interpretation of cultures: selected essays*. New York, Basic Books.
- Giddens, A., (1984) *The Constitution of Society: Outline of the Theory of Structure*. Berkeley, CA: University of California Press.

- Giddens, A. (1993). *The Giddens Reader*. Cassell, P. (Ed) London, Macmillan.
- Goedkoop, M.J., van Halen, J.G., te Rielea, H.R. M., and Rommen, P.J.M. (1999) *Product Service-Systems, ecological and economic basics*. Report for Dutch Ministries of Environment (VROM) and Economic Affairs (EZ)
- Golden-Biddle, K., and Locke, K. 1993. *Appealing Work: An Investigation of How Ethnographic Texts Convince*, *Organization Science* (4:4), pp. 595-616.
- Gouldner, A.W. (1971) *The Coming Crisis of Western Sociology*. London: Heinemann
- Gregor, S. (2006) *The Nature of Theory in Information System*, *MIS Quarterly*, Vol. 30 No. 3, pp. 611-642.
- Hara, T., Arai, T., & Shimomura, Y. (2009). *A CAD system for service innovation: integrated representation of function, service activity, and product behavior*. *Journal of Engineering Design*, 20(4), 367e388.
- Hume, D. (1738) *A Treatise of Human Nature: Being an Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects*. London.
- IfM and IBM, *Succeeding through Service Innovation: A Discussion Paper*. 2007: Cambridge, United Kingdom: University of Cambridge Institute for Manufacturing.
- Isaksson, O., Larsson, T., & Ronnback, A.O. (2009). *Development of product-service systems: challenges and opportunities for the manufacturing firm*. *Journal of Engineering Design*, 20(4), 329e348.
- Jacobson, I. 1993. *Object-oriented Software Engineering: A Use Case Driven Approach*. ACM Press, New York.
- Jencks, M., (1995) *A View From the Front Line*. London
- Jensen, R. (1999) *The Dream Society: How the coming shift from information to imagination will transform your business*. New York: McGraw-Hill.
- Kowalkowski, C., & Kindstrom, D. (2009). *Value visualization strategies for PSS development*. In T. Sakao, & M. Lindahl (Eds.), *Introduction to product/service-system design* (pp. 159e181). London: Springer London.
- Lawson, B. 2005. *How Designers Think*. 4th ed. London: Elsevier
- Lazarus, R.S. (1968) *Emotions and Adaptation: Conceptual and Empirical Relations*, in W.J. Arnold (ed.) *Nebraska Symposium on Motivation* Vol. 16 175– 270. Lincoln, NE: University of Nebraska Press.
- Lazarus, R.S. (1991) *Emotion and Adaptation*. New York: Oxford University Press.
- Lusch, R.F., V. S.L., and G. Wessels, *Toward a conceptual foundation for service science: Contributions from service-dominant logic*. *IBM Systems Journal: Service Science, Management, and Engineering*, 2008. 47(1): p. 5-14.

- Manzini, E. and C. Vezzoli (2003). A strategic design approach to develop sustainable product service systems: examples taken from the environmentally friendly innovation Italian prize. *Journal of Cleaner Production*, 11(8):p.851-57
- Mesquita, B., Frijda, N.H., (1992) "Cultural variations in emotions: A review." *Psychological Bulletin*, 112 (2)
- Miles, M.B. and Huberman, M.A. (1984). *Qualitative Data Analysis*. Thousand Oaks: Sage Publications.
- Mills, W.C. *The sociological imagination*. Harmondsworth: Penguin, 1970.
- Morelli, N. (2003) Product-service systems, a perspective shift for designers: A case study: the design of a telecentre, *Design Studies*, 24 (2003) 73–99
- Moors, A. (2009) Theories of emotion causation: A review, *Cognition & Emotion*, 23: 4, 625 — 662
- Ngwenyama, O. and Lee, A. S. (1997). Communication Richness in Electronic Mail: Critical Social Theory and the Contextuality of Meaning. *MIS Quarterly*, 21(2): p. 145-167.
- Niedenthal, P. M., Barsalou, L. W., Winkielman, P., Krauth-Gruber, S., & Ric, F. (2005), "Embodiment in attitudes, social perception, and emotion.", *Personality and Social Psychology Bulletin*. 9(3) 184-211
- Norman, D.A. (2002) Emotion and Design. *Interactions*, 36-42.
- Park, H. and Cutkosky, M.R., (1999) Framework for modeling dependencies in collaborative engineering processes. *Research in Engineering Design*, 11 (2), 84–102.
- Parkinson, B., A. H. Fischer, et al. (2005). *Emotions and social relations: Cultural, Group, and Interpersonal Processes*. New York, Psychology Press.
- Ranson, S., B. Hinings, et al. (1980). The structuring of organizational structures. *Administrative Science Quarterly* 25: 1-14.
- Rubin, H. J. and S. I. Rubin (1995). *Qualitative Interviewing: the art of hearing data*. Thousand Oaks, Sage Publications Inc.
- Scherer, K.R. (1982) Emotion as a Process: Function, Origin, and Regulation, *Social Science Information* 21: 555–70.
- Scherer, K.R. (1987) Toward a Dynamic Theory of Emotion: The Component Process Model of Affective States, *Geneva Studies in Emotion and Communication* 1:1–98
- Scherer, K. R. (2005) What are emotions? And how can they be measured? *Social Science Information-Sur Les Sciences Sociales*, 44: 695–729.
- Schön, D. (1983) *The Reflective Practitioner*. London: Temple-Smith.

- Schutz, A. (1967). *Phenomenology of the Social World*. Evanston, IL, Northwestern University Press.
- Shostack, G. L. (1984) *Designing Services that Deliver*, *Harvard Business Review*, 62.1, pp. 133-139.
- Spohrer, J., Maglio, P. P., Bailey, J., & Gruhl, D. (2007). Steps toward a science of service systems. *Computer*, 40, 71–77.
- Steiner, F. and Harmon, R. (2009). *The Impact of Intangible Value on the Design and Marketing of New Products and Services: An Exploratory Approach*. PICMET 2009 Proceedings, August 2-6, Portland, Oregon USA 2066-2079
- Shweder, R. A., & Haidt, J. (2000). The cultural psychology of the emotions: Ancient and new, In M. Lewis & J. Haviland (Ed.), *Handbook of emotions 2nd edition*, (pp. 397-414). New York: Guilford
- Strauss, A. L. and J. Corbin (1998). *Basics of Qualitative Research - techniques and procedures for developing grounded theory*. Thousand Oaks, Sage Publications, Inc.
- Swann, C. (2002) *Action Research and the Practice of Design*. *Design Issues: Volume 18, Number 2 Winter 2002*.
- Tien, J.M. and D. Berg, *A case for service systems engineering*. *Journal of Systems Science and Systems Engineering*, 2003. 12: p. 13 – 38.
- Vargo, S. L. and R. F. Lusch, "The Four Service Marketing Myths: Remnants of a Goods-Based, Manufacturing Model," *Journal of Service Research*, vol. 6, pp. 324-335, 2004.
- Walsham, G., (1995). *Interpretive Case Studies In IS Research: Nature and Method*, *European Journal of Information Systems* 4(74)
- Walsham, G. (1998). *IT and Changing Professional Identity: Micro Studies and Macro Theory*. *Journal of American Society For Information Science*, 49 (12), 1081–1089.
- Wells-Thorpe, J., *Healing by Design*. 2003, Royal College of Physicians of London
- Wernick, J. (2008) *Building Happiness: Architecture to Make You Smile*. Black Dog Publishing.