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A Design Framework to Build Sustainable Societies: Using Happiness as Leverage

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ABSTRACT   Increasingly, design is being forced to re-examine the role it plays in the happiness of people and the sustainability of society. This paper proposes the 'Design for Happiness' Framework as an approach to address this and it is illustrated through a design study. The design methods, process and characteristics of products and services capable of contributing in a positive and holistic way to these issues are discussed. The findings demonstrate that the framework encourages the reinterpretation of the relationship between products, services, and users; approaching design from a new perspective where the characteristics of what is meaningful for people sits at its core. The results are innovative systemic designs with high potential to contribute to happier sustainable societies.

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Introduction

Highlights

- 'Design for Happiness Framework' (DfH): new design approach
  which bridges the social gap in design, and results in innovative
  designs which contribute to happiness and sustainable lifestyles
  through systemic level changes.
- Challenges traditional design process and methodologies, and
  their subsequent theoretical development.
- Reinterprets the traditional relationship between artefacts and
  users to a people centric approach which shapes our material
  culture towards happiness and sustainable lifestyles.
- Distinctively, the design process and tool-kit enable integration of
  'Design for Happiness' into practice.

What is progress?

Research on the subject is raising awareness about the ever increasing evidence that current economic growth and material consumption does not necessarily correlate with development, sustainability, or a happier world (Abdallah *et al,* 2009: Jackson and McBride, 2005).

Driven by new policy, legislation, education and public demand, different areas of society, and the corresponding disciplines, are being called to consider the abovementioned within their own realms and are beginning to shift towards more sustainable ways (ISHES, 2012). In the case of Design, Sustainable Design has been introduced as an approach to help towards this shift (Richardson *et al,* 2005). Different theories and tools are now available as guidance for designers in their quest to achieve *sustainability* within its discipline and practice. Regrettably, taking into account the holistic picture of *sustainability*, design examples still often lack a systemic approach and mainly tackle the environmental and economic impacts of sustainability (Thorpe, 2012). Some have begun to offer 'integrated' sustainable solution capacities though. However, their social dimension considerations are not clearly defined compared to the environmental and economic ones; they do not really address happiness or well-being considerations, for example (Escobar-Tello, 2011).

In this paper it is argued that in order to really design for *sustainability* a radical approach is needed; a transition that fits our ever more complex and interconnected world has to occur at a broad system level. This means that ultimately, it requires getting the big picture clear: building sustainable societies. The indications are that

Table 1. Happiness Definition in detail (Escobar-Tello, M. C. and Bhamra, T. A., 2013)

Feeling Positive	Life Satisfaction	Genetics
Affective variable – feeling good; having good and bad moods, emotions, but feeling positive in the overall judgement.	Cognitive variable – feeling satisfied with one's life; being able to look back and also to the future and judge that life has been/is/will be good. Being optimistic. This also includes being and doing well, not just feeling well.	Neurochemistry variable – physical characteristics of a happy brain have come to see that those traits have a powerful influence on the rest of the body.

changes need to occur at the production and consumption level (UNEP, 2002). The focus needs to be on not only the mix of products and services, but also the way in which they promote 'better' – happier and healthier lifestyles; how people's values, needs and wants are defined and satisfied (Walker, 2012).

The following sections of this paper review 'happiness' as a concept, and establish its relationship with sustainable societies. Subsequently, its role in sustainable design is discussed, and is translated into 'design language'. The outcome is the proposal of the Design for Happiness (DfH) framework, whose approach highlights the implications for the design discipline, and calls for happiness to be used as a seed to shape and promote society towards sustainable lifestyles. This theory is explored in detail by discussing the results and findings of a comprehensive design research study.

Let's talk about happiness

Happiness matters because it seems to be the ultimate aim for people; this is what we all constantly strive for (Veenhoven, 2004). Despite its close relationship with each and every one of us, complete agreement on what happiness is does not exist in the literature. Based on an extensive literature review (Brülde, 2007; Diener *et al, 2003*; Layard, 2005; Lemonick, 2005; Sheldon and Lyubomirsky, 2004; Veenhoven, 2001), the following definition was established for the purpose of this research: 'Happiness is a state of deep contentment (serenity and fulfilment) with one's life which results from the combination of three variables: feeling positive (1), life satisfaction (2) and genetics (3)' (Escobar-Tello, 2011: 17). Table 1. describes this in detail:

The key characteristics of 'what brings happiness' have been identified but they do not guarantee that everybody will feel the same level of happiness when under their influence. Sheldon and Lyubomirsky (2004) indicate that there are three primary happiness

factors: Context, Demographic and Geographic variables; discussed in detail elsewhere (Escobar-Tello and Bhamra, 2013). In synthesis, happiness is deep contentment, not to be mistaken with fleeting 'emotion'. Happiness is triggered by, and to be found in, activities that individuals can engage with (immerse in), that correspond to personal interests and internal values. Being creative about them will assure pleasure as this will provide flexibility and constant renewal. It is also very important to interact with others and share, with family and friends perhaps, these new activities or set goals. Finally, it is recommended to reflect on one's life, be kind to others and be grateful for all that one may have (Diener and Scollon, 2003; Sheldon and Lyubomirsky, 2004).

Happiness and our surroundings

Being happy is a serious matter. It goes beyond individual satisfaction; it includes collective and societal aims too. Everything we do, interact with, consume, discard – regardless of its scale – has an effect on our happiness. 'Education', 'Youth', and 'Money', characteristics that have been culturally accepted as strong influencers on happiness levels, are controversial. Although they might supply the 'tools' and spectrum to develop in a 'better way', research has not identified them as pivotal factors on their own to pave the way to happiness (Layard, 2005; Wallis, 2005).

Material culture is a key influencer. It determines our contexts of action and interaction with others. Furthermore, it has become the main bridge between ourselves (our wants, thoughts, and feelings), and our actual life because it is the frequent vehicle through which we carry out our activities and express ourselves to the world; our 'lifestyle' and 'well-being' (Jackson, 2008). In fact, it offers insights into how we live, how we consume, how we move between spaces, and even perhaps the values and meanings that we have (Shove *et al,* 2007).

The present 'material centred culture' has been sold to us as a paradigm whose 'promise' is that products deliver a better, infinite growing, easy-living lifestyle where people can have more time (freedom) to do pleasurable things, and make their own choices (Manzini, 2006). This fallacy has an important impact on our individual and collective happiness level; among others, it has led us to often place too much value on 'externalities' (i.e. consumerism and desire of products), consume and discard at high rates (waste), become 'personalized silos' (alienated individuals), and erode any form of community (Jackson, 2008). It has led us to 'confuse' the satisfaction provided by material acquisition with the idea that it equals happiness. Increased consumption might be good for the economy, but evidence shows it does not contribute to healthy societies, peoples' lifestyles, well-being and happiness (Papanek, 1985; Whiteley, 1993), or to a sustainable environment

(Hinte, 1997; Weizsäcker *et al,* 1998). Our current consumption behaviour is an excellent example to illustrate the unsustainable society we live in.

Sustainable design: a path to go forward?

The 'ill-defined' nature of the term does not facilitate this debate. *Sustainability* can be understood in many different ways, and by people with radically different perspectives of what should be sustained. This ambiguity can carry positive or negative values and 'mask central issues under the false pretence of a shared understanding, set of values and common vision of the future' (Wals and Jickling, 2002). Therefore, in order for sustainability to serve as a 'path to go forward', we need to unpick the concept and locate the overarching goals to be achieved.

The perspective of this research holds the strong understanding that the term *sustainability* is not unidirectional. It involves addressing all the three dimensions (*social, economic and environmental*) in a balanced interlocking way where people are a piece of a symbiotic wider system and by no means at the centre of it (co-sustainment); it is a 'moving target' that is continuously updated as a result of the dynamic conditions of its dimensions (Gaziulusoy *et al,* 2013). It is about co-sustaining life in all its forms, in 'rhythm' between all, with the core underlying value and vision of a 'better sustainable planet' (Stegall, 2006), 'appealing to a time-scale that is neither immortalizing, neither market driven' (Wood, 2002: 297).

On this basis then, sustainable design approaches and designers need to re-orient their creative initiatives into *holistic sustainability* directions. In order to enable the aforementioned systemic level transition, not only environmental and technological requirements, but social requirements are needed.

Designing for happier sustainable societies

The aim of the DfH is to achieve the above mentioned by 'doing' design differently. It aims to aid the design of products, services or systems that contribute to holistic sustainability; a theory or tool that addresses all three dimensions in a systemic way and hence effecting happiness, and sustainable societies.

When analysing the characteristics of a 'sustainable society', it is fascinating how they correlate with the 'triggers' of happiness. This is a complex phenomenon that goes beyond the focus of this paper; however previous research allowed the identification of specific characteristics that contribute to both of them (Escobar-Tello and Bhamra, 2009). Hence, by approaching the problem in a systemic way, and using happiness as a driver for change, this framework addresses urgent needs of the world today, while uncovering opportunities for innovation and enabling the design of sustainable

Figure 1
Design for Happiness Framework. (Escobar-Tello, 2015)
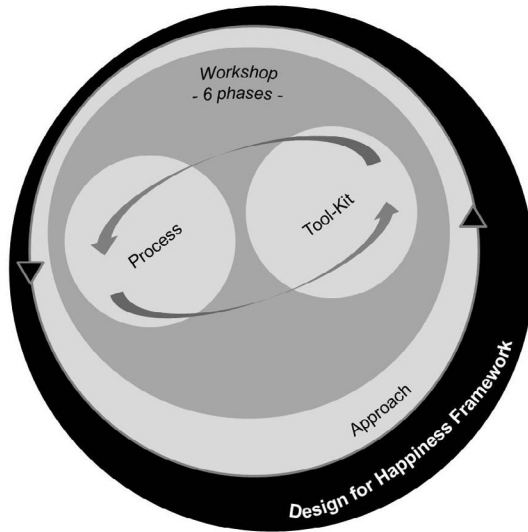
products, services and systems that engage individuals in 'bigger-than-self' problems; bringing people closer to ways of living in line with these concerns (Crompton, 2010). Through a holistic design process this framework invites people to join a multidisciplinary group to explore complex values in society and design (such as happiness characteristics and sustainable lifestyles), make them tangible through accessible collaborative tools, and embed them in their design solutions. At the same time, this process allows us to measure holistic sustainability (co-sustainment) and happiness values.

The *formation* of the DfH framework evolved through a series of design studies which permitted its iterative trial and development. For the purposes of explaining it in a simple and clear way, its development has been summarized and split into three separate foundations: Design Approach; Design Process; and the Tool-Kit. In practice, these have been combined, hence assembling a framework to design for happiness (*method*), and they are delivered in an integrated manner (*workshop*) (illustrated in Figure 1).

The DfH framework is effectively a design method (*process and tool-kit)* delivered through a workshop scenario to design sustainable products, services or systems that contribute to more sustainable lifestyles and happier societies. Designers act as 'facilitators' of such workshops, generating collaborations among a multidisciplinary group of participants, and encouraging participation in the construction of shared and integrated design solutions. It is open to all members of society and can be applied to any challenge – such is the nature of the systemic lens of holistic sustainable design. In practical terms though, participants of each DfH workshop session would be ideally working on a particular challenge in manageable groups of six to eight people. Finally, in terms of its context of use, the framework's

overarching theory embraces the initial conception of design through to implementation in practice, however this paper only covers the approach, tools and process foundations that are necessary to develop the design conception ready for implementation.

Design approach – first foundation

It was clear that in order to start bridging the social gap within sustainable design, and to successfully encourage systemic shifts in the way society operates, the DfH framework should contribute to peoples' happiness and wellbeing *through* design, as well as being a *lever* for building sustainable societies in which individuals can lead sustainable lifestyles. In this way then, its success does not rest only in its design process and tool-kit, but also in its capacity to challenge the evolution of the design discipline and its subsequent theoretical development.

Accordingly, the *design approach* of the design process and tool-kit aimed to be radical about the need for the designers' role to undergo a metamorphosis in order to evolve to be a facilitator, or an agent of transformation (Manzini, 2009). Thus, the development of the DfH has tested whether designers can engage with a multidisciplinary group of stakeholders to encourage new thinking through co-design – requiring creative initiative from all participants (Sanders and Stappers, 2008) – and social innovation, that leads to solutions that consider the individual and the community (Mulgan, 2007). The aim is solutions that deliver a collection of experiences that contribute to the proliferation of happiness not only because of themselves (i.e. happiness and sustainable societies values embedded at the core of the *design* and the *design process* of products, services or systems) but also because of the way in which they require people to behave and live in general (i.e. happiness and sustainable societies values embedded at the core of the *delivery* of products, services or systems).

The resulting DfH framework is delivered through a workshop scenario which follows and reflects this approach. It is an environment for design and co-creation that permits the observation of the 'natural context' ('what is going on'), the situation itself, the use and effectiveness of the framework interventions (process and tool-kit), and the participants' behaviours and interactions. The designer becomes the process facilitator of this workshop, who acts and shares design tools with the aim of generating collaborations among a multidisciplinary group, and of encouraging participation in the construction of shared and integrated products, services and systems, visions and scenarios. Creative Design Methods, Happiness, and Holistic Sustainability are of course the pillars of the framework and subsequently of its context of delivery (workshop scenario). This is discussed in detail in the *design process* and *the tool-kit* sections below.

Design process – second foundation

The framework's 'design process' combines 'traditional' design methods (Baxter, 1995; Cross, 2000; Pugh, 1990), with a wider scope of concerns which are influencing the current transition of the discipline beyond strict industrial and economic boundaries (Jones, 1992; Levitt and Richards, 2010). This includes sustainability and transdisciplinary collaborations; including human-centred, environmental, behavioural, artistic, psychology, and systemic methods (Manzini, 2007; Mulgan, 2007; Scharmer, 2007; Surowiecki, 2004; Wahl and Baxter, 2008; Walker, 2007).

Creative Design Methods were identified as particularly appropriate since these are designed to stimulate radical and creative thinking, and to widen the area in which a search for solutions is made. Collaboration, intuition, innovation and exploration are at their core, as well as emphasis on designing with people, and creating ideal experiences.

With the above mentioned in mind, throughout the framework's development the following elements of the 'design process' called for particular considerations (discussed in the following sections):

- Design Brief – to be used during the design session.
- Design Scenario – within the Sustainable framework – to set the context for the workshop participants to design.
- Conceptual Design Generation.
- Design Evaluation.

Design brief

The opportunities for design to contribute to the shaping of sustainable societies using happiness as leverage rely on the experience provided by the product, service or system, and the nature of the starting point to be used as a 'problem to be solved'. Bearing this in mind, Brezet's (1997) design for type 3 and type 4 were chosen as the starting point of the 'Design for Happiness Brief'. These levels allow a function or need to become the starting point from which to design; in this way a window of opportunity is opened to generate innovative processes that may result in intervention at the product service system level (PSS) as opposed to the restrictive product improvement level (see Figure 2).

Design scenario

Setting a suitable design scenario to design is the key to any design activity; the DfH framework enabled this through the 'workshop' format. However, one of its key components, which differentiate it from other frameworks' design scenarios, is its *guiding narrative*. The requirements of Design at present are different to those when the discipline emerged (technological and industrial boom period);
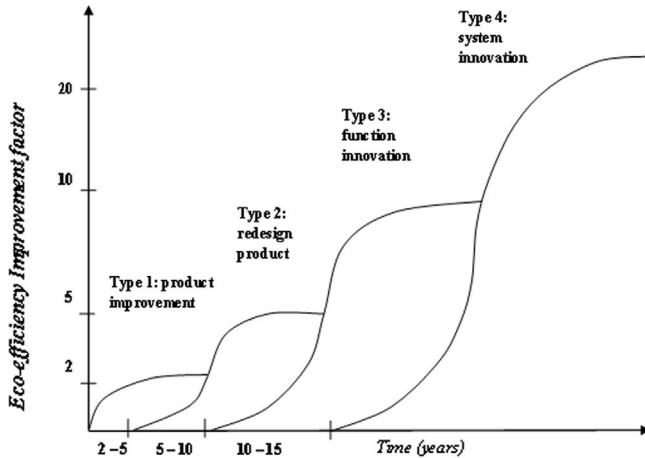
the need for a *transformative innovation period* within society implies a disjunction between the structures and businesses designed in a previous era and the requirements of the new (Murray *et al,* 2009). Combining 'Social Innovation Design Methods', 'Service Design Methods', as well as 'Principles of Creativity', and 'Sustainability', the workshop's *guiding narrative* reflects this transformation through a deep exploratory state, where participants interact with each other to understand the 'world' as a co-sustained system, and in this way trigger new thinking and creativity that show 'problems' in a different light that seeks happiness and innovation with a common goal in mind: holistic sustainable societies.

The tool-kit – third foundation

The 'Conceptual Design Generation' and the 'Design Evaluation' (the third and fourth elements stated under the 'Design Process' section), were central in the development of the tool-kit.

Conceptual design generation

The main objective of the DfH tool-kit was to *inspire* and *enable* creative dialogues with multidisciplinary stakeholders gathered to co-design, explore the concept of sustainable societies and happiness, and its applications in practice within Sustainable Design. Four techniques were identified – and appropriated – as the core design requirements of the tool-kit. Subsequently, five new collaborative tools were specifically developed with these design requirements engrained at their core (Escobar-Tello, 2011). Table 2 summarizes these.

The design evaluation

The aim of the DfH framework evaluation stage is to enable unbiased measurement of the suitability of the design alternatives in regard to their contribution to happiness and sustainable lifestyles. The 'DfH Range-Scale tool' (illustrated in Figure 3) was designed for this purpose. Based on a 'matrix' (Miles and Huberman, 1994), a Yes/No answer rating system gives an overall evaluation result. This is given in terms of a 'scale-range' score where more 'yes' answers indicate a higher score along the scale. The product, service or system's contribution to happiness and holistic sustainability ultimately depends on the user's use, therefore the final evaluation score is kept as a range scale rating methodology. This range shows the potential contribution to happiness of a design solution; indicated through a spider-diagram generated as an output of the happiness range-scale.

The framework in action

Putting the DfH framework into action allowed the testing of its potential, the measurement of its design outputs effectiveness, and the gaining of in-depth insight on the implications of such a framework for the Design discipline. This was achieved through two extensive design studies. The following sub-sections focus and report on one of these.

Setting the scene

The workshop session (illustrated in Figure 4) followed the final version of the DfH framework illustrated in Figure 1. Drawing from specialists' experience in the field of Social Innovation and adapting the recognized U-process method (Hassan and Kahane, 2005; Scharmer, 2007), Figure 4 describes the DfH workshop's phases and its guiding narrative in detail.

The *design brief* was defined by taking into consideration the time and resource constraints of the research project. 'Burning issues' impacting on UK universities was chosen as the context for the design brief. This defined the location at which to carry out the 'ideal workshop' study and the focus of the work during the session. 'Energy' was selected as the function of the design brief; energy efficiency is an urgent challenge for all countries, and the UK and its different organizations and enterprises share this aim (DECC, 2009).

The *participants sample group* followed the stipulated guidelines of the DfH framework. It was a multidisciplinary group composed of six professionals from a range of disciplines (i.e. designers, economists, engineers, social scientists, artists, university students) ranging in age from 24 to 50. The Methodology used for data collection and analysis consisted of the following:

Table 2. DfH Tool-Kit core design requirements

Design Techniques	Goal	Tool outcome	Workshop intervention phase
Theoretical Context	To aid the understanding of the Design for Happiness background.	1st tool: DfH Intro-duction Presentation	Phase 1
Brainwriting & Brainstorming (Cross, 2000; Baxter, 1995)	**a.** To kick-off, stir, and prompt creative thinking among the workshop's participants; **b.** To guide the workshop's participants through deeper and more complex stages of their creative thinking process; **c.** To provide a format to record the workshop's outputs and participants' ideas.	2nd tool: DfHRecord-ingTemplates	Phase 2, 3 and 4
Synectics (Jones, 1992; Cross, 2000)	To serve as inspiration to the work-shop participants, to broaden their scope, and to further their creative thinking effectively; particularly for embedding Happiness and Sus-tainable Lifestyles values within the resulting design alternatives.	3rd tool: DfH Images Set Tool4th tool: DfH Catalysing Tool	Phase 3 and 5
Concept Evaluation	To assess the suitability of the de-sign alternatives in regards to their contribution to happiness	5th tool: DfH Range-Scale tool	Phase 6

Collecting the data

The 'participant observation' approach and the 'participant-as-ob-server' role (Miles and Huberman, 1994; Robson, 2002) were used as a data collection technique. The designer, acting as the work-shop facilitator of the session, swapped between being a partici-pant aiding in understanding and being just an observer when the interactions in the activity would not be influenced by the presence of the researcher. In addition, the tool-kit itself offered data collec-tion opportunities. Digital voice and video recordings, photographs, and field notes comprised the remainder of the data collection tech-niques. All of these sources captured the workshop experiences and gave detailed insight into the participants thinking, discussions and outcomes.

Analysing the data

Video recordings, voice recordings and visual format templates were used as analysis techniques. The data was displayed by the use of 'theme matrices' (aka clustered matrices), and 'network maps' (Miles and Huberman, 1994; Robson, 2002). Two analytic coding approaches were used as illustrated in Table 3.

Sustainable Society Characteristics	Criteria		Y/N	Happiness Triggers					
				Self-esteem	Extraversion (be active)	Goals (pursuing meaningful learning)	Gratitude Journal (relaxation, awareness)	Acts of Altruism and Kindness (give)	Interacting with People (connect)
Low Material Consumption (measure what really matters)	Does your design require/demand low material consumption?	At purchase phase							
		At use phase							
	Does your design encourage the 3Rs?	Re-use							
		Repair							
		Recycle							
	Is your design multifunctional?								
High Social Interaction (support strong active social	Does your design require interaction with other people?	Off phase							
		Use phase							
		3Rs phase							

Total Range-scale Score	0	0	0	0	0	0

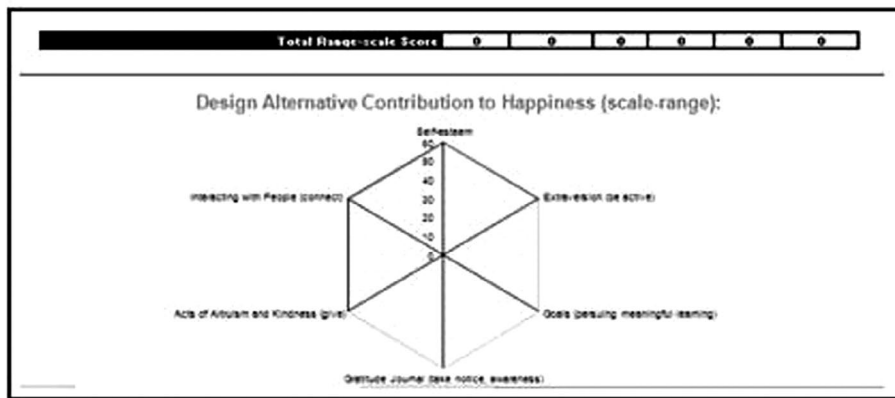Design Alternative Contribution to Happiness (scale-range):

Figure 3
Happiness Range Scale Tool – Checklist Matrix and Spider-diagram Selected Sample. (Escobar-Tello, 2015)

Results and findings

The participants gathered for a day at a UK university. The workshop session followed the established framework satisfactorily.

The following results combine into a narrative style the observations, analysis and reflections based on the evidence collated during the workshop. Details of the practical use of the tool-kit are beyond the scope of this paper but they can be found in Escobar-Tello and Bhamra (2013).

Workshop phases and guiding narrative

Phase 1. First insight – download

Following the explanation of the workshop's aim, objectives, vision and scenario, Phase 1 focused on the delivery of the 'happiness
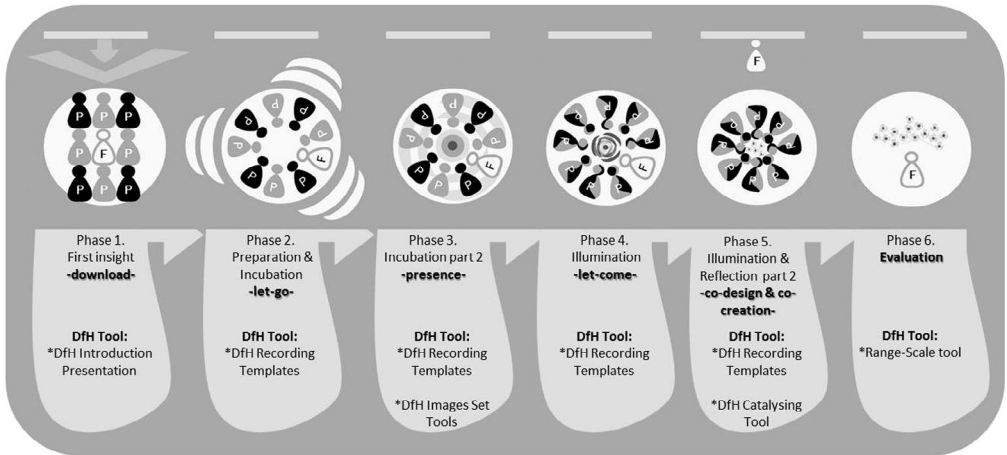
Figure 4
Design for Happiness Framework – Phases & Guiding Narrative. (Escobar-Tello, 2015)

theory' and 'sustainable society characteristics' (presentation described in Table 1). This introduction was key at this stage as it kept participants interested in the topic, and led to strong engagement between the participants and the facilitator.

Phase 2. Preparation & incubation – let-go

Throughout the first task of the workshop, aided by brainwriting and brainstorming tools (described in Table 1), the participants took a closer step towards 'design for happiness' and immersed themselves into the '"let-go" narrative' (as illustrated in Figure 3). In other words, they opened their senses and creativity to new ideas, and in this way 'let-go'. They gave way to new thinking such as the value of the 'happiness theory' and its relationship with Design. During the brainwriting task the participants exhibited a reflective state in which, as an individual task, they were highlighting their own experiences, and picking upon some of the un-sustainable and 'un-happiness' characteristics of current ways to satisfy the function under study. The participants mainly focused on the environmental impacts caused by present energy consumption behaviours; their new ideas focused primarily on 'end of pipe' design solutions. During the brainstorming group activity, however, the participants' interaction moved the centre of attention onto the relationship of these design solutions with happiness. Consequently, as more participants shared their thoughts, a deeper and wider analysis of the 'root of the problem' was reached. Prominent themes related to happiness and the sustainable society characteristics began to shape the discussion; for example, Slow Change, High Social Interaction, Holistic Health and Education, Sharing Products and Services, Pro-active Citizenship,

Table 3. Analytic coding approaches

Formal systematic approach	'Template approaches' and 'editing approaches' were interchanged as the analysis circumstances demanded it. The 'template approach' (Crabtree and Miller, 1999) was particularly appropriate when testing the effectiveness of the DfH process and tool-kit. The 'editing approach' (Robson, 2002) was particularly suitable as a means to understand and collate the design concept. This involved noting patterns and themes, identifying contrast, making a comparison of these and the recurrent variables in the discussions; in this way identifying, interpreting and generating meaning.
Informal systematic approach	This approach follows a less structured and more creative technique based on 'deep reflections' ('immersion' or 'reflection approach') (Robson, 2002). Here, the researcher's previous knowledge on the research's subject allowed the identification of key text data; characteristics in language that were highly connected with the researcher's insight knowledge of the research itself were pulled out and put into a software application (www.wordle.net) which enabled the generation of 'word clouds'. These 'word clouds' give greater prominence to the words that appear more frequently in the text data provided.

Communities, and Low Material Consumption. The fact that many of the individual accounts began overlapping with others created a sense of cohesion and mutual understanding. At the same time, each individual added their own perspective; therefore, enriching the debate and widening the scope of the problem. There were deep fundamental proposals voiced and discussed. It was already clear at this stage that no single, standalone product, would be the solution to satisfy the function effectively while successfully contributing to happiness and holistic sustainability.

> … I think is actually quite revolutionary to achieve this idea of citizenship …. And then if the aim of this project is not just to save energy, and help UK to meet its targets, but actually shaping citizens that care about the planet, other people …. I would like to have people, the students having meetings that engage them in these issues that would take it beyond this mechanistic design of having a product. In a way it's a service for life rather than just a product. (WP- 4, Study 1)

Phase 3. Incubation part 2 – presence

As the Design Generation activity began, the participants took a further step back from the current ways in which the 'function' was satisfied, and nascent ideas began shaping into new solutions that pointed at breaking current paradigms – transitioning towards more sustainable futures. The evidence suggested that the synectic tools

used at this stage (summarized in Table 1) helped them to *visualize* and create *narratives* that made this 'future pathways' more tangible. The tools were effective in engaging, inspiring and connecting the participants with the underlying principles of happiness and the sustainable society characteristics; participants came up with many innovative design ideas and 'requirements' that reflected these characteristics. Furthermore, through the participants' in-depth reflections, it became evident how the *value* of each participant's personal experience and expertise was key in the provision of innovative, diversified, and grounded solutions informed by each of the participants' own discipline and knowledge. For example, designers and artists played a key role in the innovation aspects of the solutions, engineers provided technology expertise, economists led the business and economic feasibility discussions, and students' experiences were crucial in providing first-hand accounts of the reality of the problem at hand.

Phase 4. Illumination & reflection – let-come

The value of each participant's personal experience became even more significant during the 'Let come' stage (as illustrated in Figure 3). At this point, it was revealing to the design process that the function had transformed and evolved into a much bigger design scope, clearly influenced by the participants' expertise. The issues were no longer limited to reducing energy consumption from products as such (i.e. energy efficient products), but rather looked out from a wider *systemic* perspective that included people's behaviours, and people's use-experience with objects and their associated contexts of use and routines (i.e. laundry, cooking); the design concept proposals tended to be service driven and result in participative experiences in communities that by their design nature would trigger happiness. It also acquired a more accountable and pro-active attitude from the user. Participants were thinking of ideas and concepts that went beyond the *individual* object paradigm; all of them gave more importance to systems that would deliver *communal* services (i.e. launderettes, sharing cooking facilities, digital-media entertainment spaces). In contrast to the 'warm-up' brainstorming, the focus migrated from eco-solutions, addressing environmental concerns, towards social innovation ones, addressing social issues in particular. It must be mentioned though, that this did not exclude the possibility of affecting the environmental dimension, the designs tackled environmental issues *through* the satisfaction of the social issues. The evidence showed in a clear way that participants reached a deeper level of understanding about how the happiness triggers and the characteristics of sustainability are not exclusive elements but overlap and are interconnected. Participants were clearly connected with each other and working towards a common goal (co-sustainment).

*Phase 5. Illumination & reflection part 2 –co-design &
co-creation*

The 'co-design' and 'co-creation' stage (illustrated in Figure 3)
brought the Design Generation activity to an end. Many ideas were
discussed at this stage; the main issues and topics that came up
were closely related with 'happiness' and 'sustainable societies'.
Participants were then asked to collate their 'incubating ideas' and
finalize one or two of the concepts fully.

The way that participants worked together was repeated in the
other studies in this research programme. Participants continued
to reinterpret the relationship between 'things' and users; increas-
ingly approaching design with a radically different perspective and
methodology – systemic thinking. Sustainability was clearly under-
stood as an interactive system that results in innovative conceptual
designs that go far beyond 'end of pipe' solutions, and have a high
potential to contribute positively towards happiness and sustainable
lifestyles. Nevertheless, it was only when the participants 'played'
with the second synectics tool designed to aid this stage (DfH Cat-
alysing Tool described in Table 1), that distinct design alternatives
took a definite shape. The participants' reflective capacity picked up
speed and enabled them to interweave their ideas with more confi-
dence. The tool mediated discussions that articulated the underlying
issues (i.e. goals and aspirations) of the problem the participants
were dealing with, eliciting the holistic values of sustainability, their
interlocking nature, and highlighting the triggers of happiness with
deep understanding. The multi-disciplinarity of the group continued
to enrich their ideas too. This characteristic was particularly use-
ful when pinpointing the design problem and defining the potential
design concepts; a wide array of perspectives and previous dis-
cipline related experiences were considered and conflicting views
negotiated (i.e. costs, infrastructure, and feasibility). The designers'
role was predominantly important in driving and giving shape to the
creativity processes and alternatives, while other disciplines were
pivotal in providing grounding for them.

The evidence showed that individual thinking was not imposed;
instead collective thinking and the final outcome came as a result
of the team's joint work. Subsequently, this was translated into a
detailed sketch and concept outline that closely narrated the design
attributes of the design alternative. This also supplied a robust
recording format that described the design alternative with enough
detail, enabling the assessment of the design's contribution to happi-
ness with the use of the 'Happiness Range-scale Tool' (see Figure 2).

Conceptual design outcome

Although the fundamental aim was to reduce energy consumption,
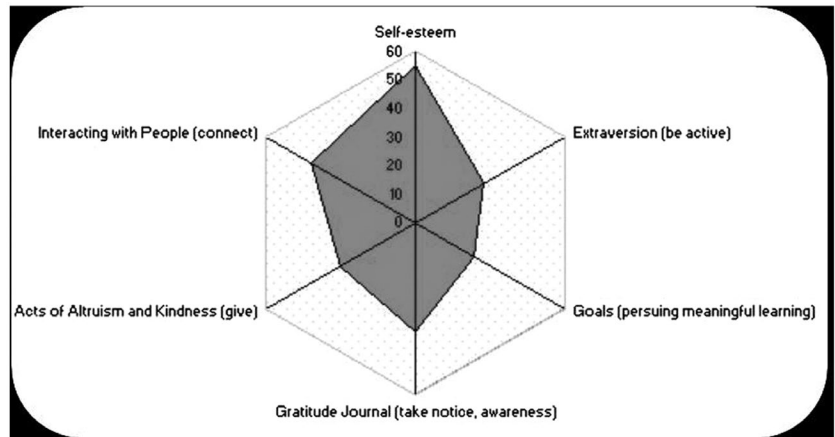the design outcome aimed to do it through building and benefiting

Figure 5
Design Study 1 Conceptual Design – Contribution to Happiness. (Escobar-Tello, 2015)

the local community within and surrounding the university. Its design values and requirements proposed a holistic approach; its strategy aimed to tackle unsustainable consumption behaviours and encourage instead sustainable lifestyles through the use of events and activities such as volunteering schemes, skills workshops, learning exchanges, sharing products and services, etc. In a nutshell, the design consisted of a 'credit volunteering energy saving system' that aimed to reduce the energy consumption at the university, specifically within halls of residence. This was achieved through a holistic perspective that engaged students in a competition beyond a mechanistic design of having a product, and instead embraced two main areas for design: a reward system and a history/storytelling narrative (Escobar-Tello and Bhamra, 2013). From a *design concept perspective* then, the evidence suggested that its concept included '*systemic*' characteristics (a combination of a product-service-system) at its core. It reached in an ideal way an intervention at the 'system innovation level' (illustrated in Figure 1).

In regards to the design's *contribution to happiness and sustainability*, the evidence suggested that the ideas, and design characteristics that led to the conceptual design's development, followed different patterns and revolved around different themes closely related to the 'happiness theory' and 'sustainable lifestyles'. The assessment of the conceptual design against the happiness range-scale tool allowed confirmation of this (illustrated in Figure 3, Phase 6). The design concept ranked very well against the happiness range-scale; out of the 'potential contribution', its contribution to happiness score was 198 out of 220. This result fitted well with the design process observed during the workshop too. As discussed, throughout the workshop, the participants embraced a wider outlook on

the problem and looked beyond just reducing energy consumption at the point of use, including the embedded energy in each activity and behaviour of an individual. In addition to low-material consumption, they gave priority to sustainable society characteristics such as pro-active citizenship, high-social interaction, sharing products and services, and communities. These are characteristics that ranked particularly well when assessing them against happiness. All in all, its evaluation positively suggested that the design brings forth a new reality of a sustainable product service system (Sustainable PSS) that would contribute to happiness and consequently to sustainable lifestyles. Figure 5 illustrates this result through the spider-diagram generated as an output of the happiness range-scale excel tool.

Conclusion

The DfH Framework has been shown to be a design approach that considers and embodies the key fundamentals needed to bridge the social gap in design. This in turn can contribute towards happiness and shift, shape and promote society towards sustainable lifestyles from the core. The results and analysis of the data gathered through the various studies confirmed that the design process and tool-kit are effective in translating these complex values into tangible sustainable design values, and hence bringing designers, as well as multidisciplinary agents, into an innovative 'Design for Happiness' mind-set.

The framework's interdisciplinary and collaborative activities call on cross-disciplinary teams, creativity, and co-design. By combining, for the first time, elements of holistic sustainable design, sustainable society and happiness into one framework which inspires deep reflection and activates systemic design experiences in a radical way, it brings teams, designers, and the design discipline towards meaningful and successful 'innovation experiences'. The DfH framework shows promise in encouraging multidisciplinary agents and designers to approach design from a different perspective, resulting in systemic conceptual designs with high potential to contribute positively towards happiness and sustainable lifestyles of its users. In effect, this research has confirmed that the access to multidisciplinary thinking aids this systemic thinking and the co-design process; it enriches dialogues and the array of solutions. This framework therefore challenges traditional design process and methodologies, and their subsequent theoretical development (i.e. inclusion of issues and values of the social dimension of sustainability, understanding better the symbiotic nature of holistic sustainability).

Although this approach needs more testing and development, the DfH framework does begin to show evidence of its potential to generate collaborative design dialogues that support sustainable design innovation processes resulting in systemic level changes – Sustainable PSS as opposed to the restrictive product improvement

level. Distinctively, it has offered a successful design process and tool-kit to contribute to peoples' (users') happiness through design, and perhaps more significantly, to also be a catalyst for shaping a sustainable society where individuals lead sustainable lifestyles. Essentially, it serves to trigger the proliferation of happiness through the design of Sustainable PSS, to achieve deep cultural systemic shifts, and to enable a transition at a broad societal system level. The success of this development has been anchored, not on the collaborative tools themselves, but rather on their capacity to be a seed for radical change (including the designers, framework participants, and ultimate users), and to deliver a collection of experiences that contribute to happiness through the way in which they require people to behave and live in general. DfH has been tested with a limited sector of society so far. One way forward would be to try it with different groupings; this will serve to test more fully its process and tool-kit, and the new challenges to the role of the designer (i.e. transitioning from stand-alone solutions to systemic solutions).

Finally, DfH can be used as a method to bring from a bottom up approach the characteristics and values of what are important and meaningful for people. It has demonstrated that sustainable products, services and systems can enable material changes to take place without having to leave behind social networks which feed our happiness and well-being. In this way DfH will assist new development of the process of designing and enable great potential for driving sustainable change in business, organizations and society.

Disclosure statement

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