

Care practice and product-service system: design thinking towards user detachment from hibernating or accumulated clothing at end of use

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Abstract

The Carative Factors Inspirational Toolkit has been designed to provide a better understanding of the user's relationship with hibernating or accumulated objects at end of use, and their responsible and decisive disposal, for designers, in order to create products, services and an environment that will influence users' possession and sustainable disposal behaviour.

This paper explores the potential feasibility of adapting and applying the Toolkit to the clothing design process and its implication for a product-service system (PSS). Through exploratory online workshops, in which participants used the Toolkit to generate concepts, and in the subsequent PSS design process, several concepts were developed to inform different users' decision-making process. This paper concludes that Toolkit has the potential to be applied to the brainstorming process in the clothing design sector to influence their design thinking towards enabling user detachment from hibernation or accumulated knitwear at end of use, and contributed to a PSS model by providing an opportunity to generate business and economic opportunities.

Introduction

Consumers hoarding clothes that they do not wear results in a substantial amount of waste (Harris et al., 2015). Replacing behaviour is one of the main factors generating hibernating or accumulated clothing at end of use and increasing the environmental impact of people's wasteful attitudes and throw-away behaviour (WRAP, 2012). The old clothing becomes obsolete and challenges users' decision-making process for the after-use phase.

Since the notion of planned obsolescence became popular (Packard, 1963), interest in the lifespans of manufactured objects has become a central component of contemporary design discourse (Cooper, 2002); however, clothing and systems are not currently designed to help users to facilitate obsolescence and the hibernation period for end-of-use objects. Most of the current design solutions for changing behaviour in a sustainable way for the end-of-use cycle of clothing are added at a later stage of the design process (e.g. providing a recycling bin), with no proper consideration or understanding of environmental problems or human behaviour change factors at an earlier design stage, which results in much difficulty in changing users' behaviour.

PSS has been considered as potentially a more sustainable approach, as a relationship that is based on the premise of services creating value by addressing function has the potential to influence user behaviour towards consuming fewer resources and products; as a result, the system has a beneficial effect on the environment. One design approach for sustainable behaviour within PSS in relation to product obsolescence and the hibernation period through care practice is to increase the durability of

the relationship between user and product through an emotional bond (e.g. maintenance service). Care practices have been explored by focusing on creating a relationship between users and objects, proposing ways to handle the product with care and suggesting various repair methods or upcycling methods to extend product lifetimes and postpone their replacement, thus prompting less consumption (e.g. Chapman, 2005; Walker, 2006; Schifferstein and Zwartkruis-Pelgrim, 2008; Mugge et al., 2010; Niinimäki and Koskinen, 2011).

There is a pragmatic approach within care practice, involving responses that are less emotional around responsibility or a commitment to objects' end of use, which allows users to recognise the value of the object and identify an appropriate place for it to be taken care of (Choi, 2018). This approach involves decoupling the ownership and attachment between users and products by exploring ways to possess less (e.g. Botsman and Rogers), including reuse and sharing by multiple users or returning them to the manufacturer (e.g. Mud jeans). Van Nes (2010) pointed out the risk of applying product attachment strategies to every occasion: "it is unrealistic to seek to increase attachment to all products". In response to this statement, the pragmatic approach aims to maximise the resources' value when the object is in use; also, by recovering and regenerating them when they are no longer in use, the input of natural resources is minimised. Such an approach has been established based on nursing practice. In nursing practice, care-giving behaviour is as much about maintaining or mending subjects (that is, patients) as it is about ways to "let things go peacefully" (Watson, 1985, p7) and about "projecting hope in a shared future" (Jones, 2013, p16). The process aims to sustain a subject's condition, or, where this is not possible, to reduce the pain and distress of the inevitable to enable them to "let go peacefully" (Watson 1985, p.7). For this approach to be viable and sustainable, the bond of ownership between users and hibernating or accumulated objects at end of use needs to be loosened, facilitating their "letting go" and reuse, their return to the manufacturer, or sorting them to enable recycling behaviour (Choi, 2018). Those behaviours are environmentally significant and move towards sustainable behaviour that is based on its impact and users' interaction with products and services, particularly in relation to the disposal phase.

Research Methodology

Denscombe (2010, p.6) writes that an Action Research strategy's purpose is "to solve a particular problem and to produce guidelines for effective practices". In an Action Research methodology, the researchers take action by setting themselves within the practice and involving themselves by creating or promoting change (Lewin, 1946). In this study, the designer-researcher was both the creator of the tools and the observer of their use, thus acting in and on the context being investigated, in keeping with an Action Research methodology (Lewin, 1946).

5 Motive-Caring Themes

In order to explore the dimensions of caring for one's possessions, this study uses Blustein's four forms of care (Blustein 1991, 121–130; Shaw, McMaster, and Newholm 2016), namely *affection*, *responsibility*, *commitment* and *benevolence*, and Tronto's caring factor (Tronto, 2003), *empathy*, and applies them to care-giving behaviour from a user-object relationship perspective. Figure 1 illustrates Five Motive-Caring Themes. The theme of *affection* is located in the centre of the framework, as all four emotions are driven by affection (Blustein, 1991). The framework is then organised into four themes of inspirational factors that might apply to the generation of concepts.

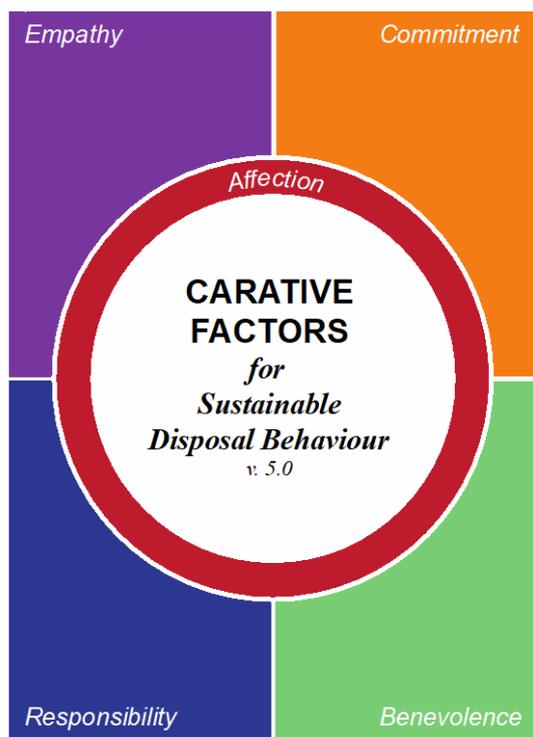


Figure 1. Five Motive-Caring Themes

Carative Inspirational Factors and the Toolkit

The word 'carative' in caring science defines it as "love and charity" and the motive for all caring. The caring process aims to sustain and maintain (or enhance) a subject's condition, or, where this is not possible, to reduce the pain and distress of the inevitable to enable them to let go peacefully.

Metaphorically, care practice is viewed as a process that understands the quality and value of objects, accepting their condition to respect their current state and sending them to a place where there is the opportunity to recapture and re-recognize their value (Purtilo and Doherty, 2010). Such a caring process could influence a user's view on an object's value at the end-of-use stage, and aims to encourage users' commitment to, and responsibility for, preserving the value of the current product condition for other positive opportunities. Carative factors are seen as interactions between care-giver and care-receiver that can be employed to enhance this experience.

Thirty-seven influential factors that were found during the research had a direct impact on creating original carative factors for influencing behaviour. The underlying motivational factors for each theme were extracted from the process of translating caring factors from nursing practice to design by using metaphor, and translated to a user-object context with phrases more applicable to the process of design (Choi, 2018). A collection of inspirational factors was categorised within the four themes in a card format to inform designers. Each factor contains a relevant quote related to the factor, an inspirational question, and examples of the carative factors as applied in design (Figure 2). The aim of the Toolkit is to allow designers to explore ideas through provocative and inspirational questions, to enable different ways to approach design challenges and to drive creative solutions.

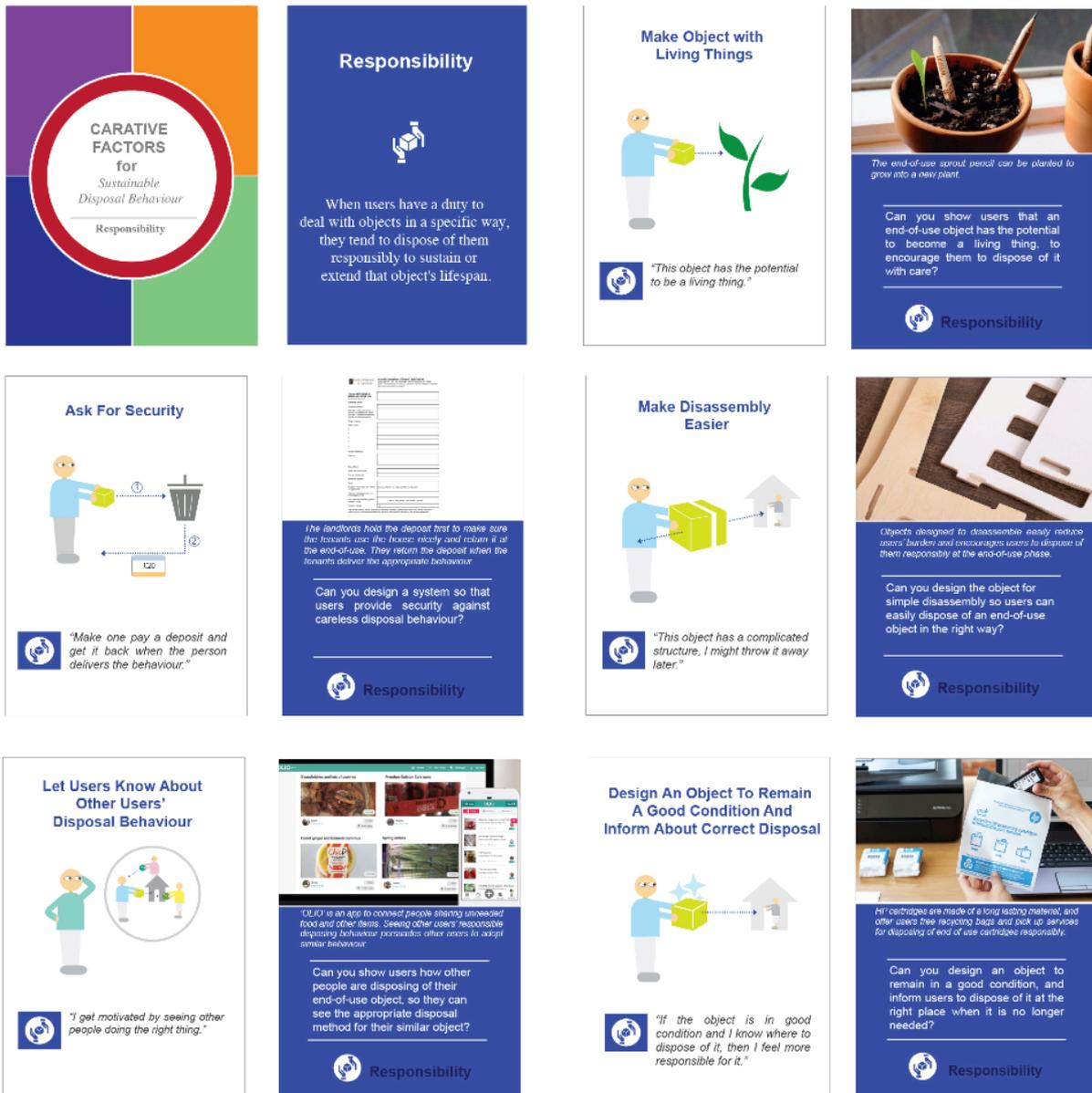


Figure 2. Examples of the carative factors and the front and back of each card.

User Types

Three different kinds of user types are included in the Toolkit in order to help participants visualise users with different behaviours and attitudes. These are "Attentive users", "Cautious participants" and "Careless consumers". Figure 3 shows three different user types and their characteristics.

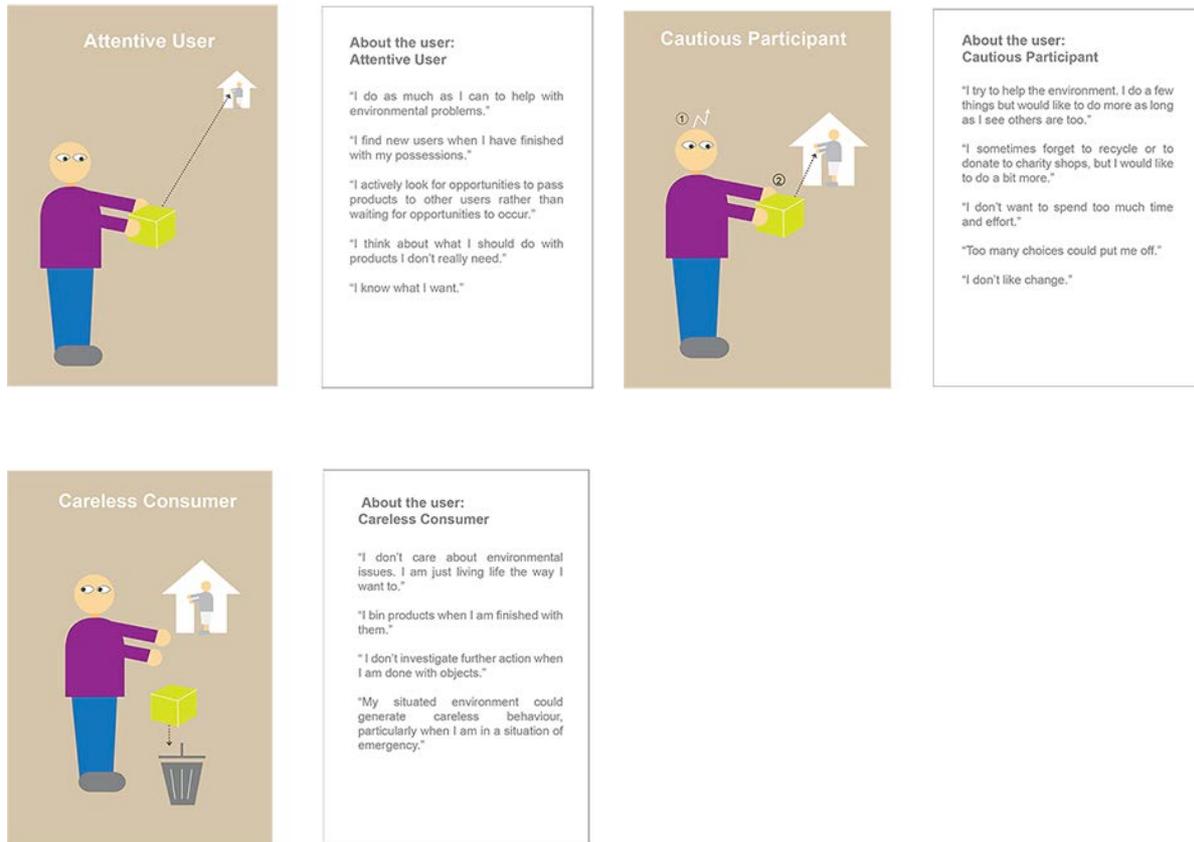


Figure 3. Three user types

Online workshop: Knitwear

The online workshop was conducted in collaboration with the knitwear department at Hyundai's Handsome Corporation. It involved eight knitwear designers and two product and service designers. At the first session, participants were asked to reflect on their current design process in relation to the design challenge of enabling a user to detach from accumulated or hibernating knitwear. Figure 4 illustrates the current knitwear design process. Selecting sustainable yarn was the most common method they had already considered to tackle the hibernation period for end-of-use knitwear. It was observed that it was challenging for participants to extend their ideas beyond the utilisation of sustainable materials. All participants stated that the end-of-use phase was not sufficiently considered during the early stages of the design process, which could have an impact on the hibernation period of the garments. Understanding the design opportunities through reflection on the current design process helped the designers to envisage appropriate interventions through the use of the Toolkit. The underlying aim of this workshop was to apply the Carative Factors Inspirational Toolkit to the knitwear design process to influence designers' system-level design thinking toward enabling the user's detachment from hibernating or accumulated objects at end of use and to develop ideas, to provide a critical research environment to enable the examination of the carative factors and for the original design to be produced. In the following session, the Toolkit was distributed to designers to be discussed and tested in the context of knitwear design through an interdisciplinary creative workshop.

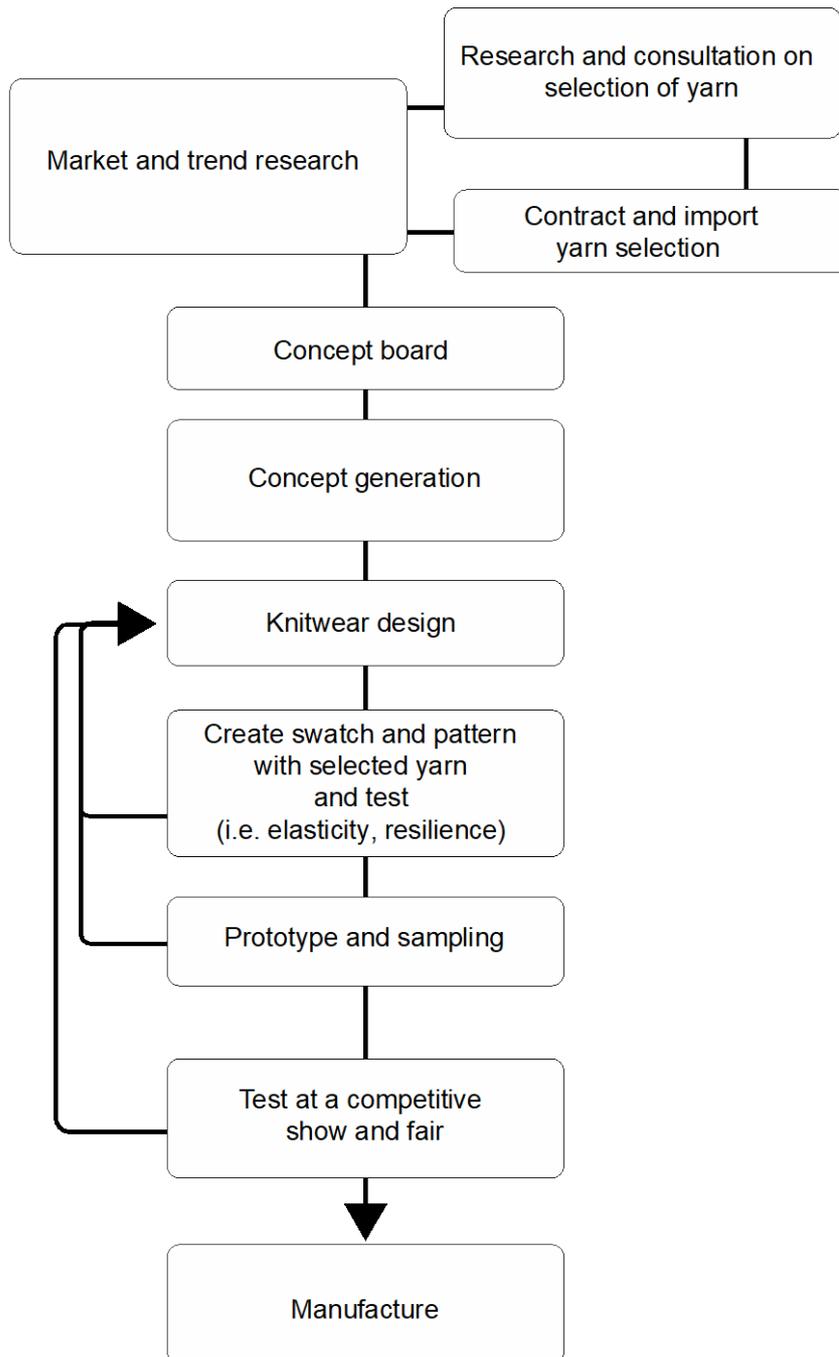


Figure 4. Knitwear design process

The participants were divided into two groups to generate design concepts using an online version of the Toolkit's curative factors inspirational cards, exploring how design could help and enable users to let go of hibernating or accumulated knitwear at end of use responsibly and decisively. This also enabled them to review the feasibility of the toolkit. The Toolkit was emailed to the designers prior to the workshop, and the designers were allowed to select the factor most suitable for their idea exploration. They were allowed to freely discuss, explore, draw and write down ideas, whichever came to mind first to fit an appropriate user type. Drawing ideas during the online workshop was challenging for certain participants, so both groups sent their written or drawn ideas by email after the session. Thirty-four design concepts were explored using this toolkit and the concepts were summarised according to user types and caring themes (Table 1).

		<i>Attentive users</i>	<i>Cautious participants</i>	<i>Careless consumers</i>
Group 1	Empathy	<p>Create and share an empathic story about the design and manufacturing process with users.</p> <p>Create a small garment – a hat or scarf - with the by-product yarn from the manufacturing process. Sell these products at a charity event. Inform users the profit will be donated to charity.</p>	<p>Inform user that end of use knitwear is going to a good cause/ Inform user that collected knitwear will be recycled for new garments. Create accessories if the recycled material quality is too low to produce a new garment.</p>	
Group 1	Responsibility	<p>Inform users that the knitwear is made of renewable and recyclable materials.</p> <p>Provide a positive image of the knitwear through using recyclable materials. Inform users about the positive environmental impact.</p>	<p>Inform users that the knitwear is made of renewable and recyclable materials.</p> <p>Use other good examples of responsible and decisive disposal behaviour by well-known people to encourage other users to follow their lead.</p> <p>Apply activism-related graphic design to the knitwear label. Users thus feel proud of themselves and build a positive self-image.</p>	<p>Apply a penalty for not returning the knitwear at the end of use.</p>
Group 1	Commitment	<p>Inform users that their returned knitwear will be recycled to produce quality yarn. Create a video to share the process of recycling.</p> <p>Use recyclable materials. Inform users about the knitwear material and the positive impact when it is returned to the manufacturer.</p>	<p>Collect unwanted knitwear from users and turn it into recycled yarn. Create and sell a DIY repair kit, including recycled yarn. Teach users about upcycling methods using the DIY kit that they can apply to their unwanted clothing.</p>	<p>Reward system where users get points or coupons when they return the knitwear to the shop.</p>

		Inform users about the impact and result of reuse and return behaviour.		
Group 1	Benevolence			<p>Eliminate the choice of toxic material-based knitwear.</p> <p>Eliminate the choice of low-quality knitwear.</p>
Group 2	Empathy	<p>Create an engaging story about the design, manufacturing and recycling process and inform users about it.</p> <p>Produce a quality yarn from collected knitwear – This requires a different manufacturing process and is expensive. Inform users about this process on the garment label. This could be an opportunity to create a new brand line.</p> <p>Create an online platform or a physical store which collects unwanted knitwear and repurposes it. Skilled designers deconstruct the knitted fabric and pattern and create new knitwear.</p> <p>Design and create a small bag, apron or hat with surplus yarn and donate these to a developing country.</p>	<p>Inform users about the negative impact and result of their throw-away behaviour.</p> <p>Design a logo related to the recyclability of knitwear. Inform users about the impact and result of reuse, return, recycle and throw-away behaviour. Apply and share the logo between multiple knitwear brands.</p>	<p>Inform users that the 1% of the payment goes to save environment once users return the end-of-use knitwear to the manufacturer.</p> <p>Create an online game in which users design their own character. A virtual character grows and become healthy when users reuse, return or recycle the knitwear. If it is not returned or recycled then the character becomes unhealthy.</p>
Group 2	Responsibility	Educate and inform users about the reasons why sharing, returning and recycling behaviour are relevant.	Provide brand membership points when users donate the knitwear. The company selects from the donated items those which were previously fashionable, based on fashion history.	Users pay a deposit and get it back when they return the knitwear.

		<p>Make knitwear with recycled and (or) recyclable yarn. Inform users about the material by applying it to a label.</p>	<p>Then create an exhibition with the collected knitwear and resell it.</p>	
Group 2	Commitment	<p>Create a service for users to rent knitwear. Reward the user if the item is returned in a good condition.</p> <p>A collection service in which users are rewarded.</p>	<p>Provide information about sustainable ways to dispose of end-of-use knitwear, and what other brands or companies are doing to achieve this. Inform users about the result of each kind of behaviour.</p>	<p>Create a service to provide an update on how other people in the community are disposing of their end-of-use knitwear.</p> <p>Reward users when they reuse, return or recycle their unwanted knitwear.</p> <p>Inform users that the collected knitwear is going to good causes and provide an update on the disposed-of knitwear. For example, inform users when the collected knitwear is washed and turned into a new garment.</p>
Group 2	Benevolence		<p>Design a standardised but friendly graphic logo for a place that collects unwanted knitwear – the logo will help users with ease of recognition and accessibility.</p> <p>Create an eye-catching logo for a sustainable disposal place. This logo is also marked on the garment label, to help users to find the right place to return and recycle their knitwear.</p> <p>Reduce the choice of disposal methods – offer no option for knitwear to be buried as landfill, but create more places that will accept unwanted knitwear for recycling.</p>	

Table 1. Ideas generated through the workshop

The final session was to share the experience of using the Toolkit. The questions focused on the designers' experience of using of the Toolkit, how useful the Toolkit was, whether they understood the best way to use the Toolkit and whether they had acquired new knowledge.

Reflection

The Toolkit enabled openness to new design ideas, according to all four of the knitwear designers. The metaphorically translated caring factors and the examples of the carative factors being applied in other design sectors provided an opportunity to learn from other design fields, and helped participants to generate ideas considering the end-of-use phase of knitwear. It provided an opportunity to link the problems and the solution within the idea generation process and further develop the designers' primary ideas. The participants emphasised that the Toolkit encouraged them to explore ideas from a different perspective, which indicates that the Toolkit informed the designers' idea-generation process and acted as an inspirational instrument and material to enable designers to devise creative design solutions. According to the participants, the Toolkit was occasionally used as a reference or a checklist when reviewing whether the generated ideas fitted into any of the themes or factors. The designers also tended to produce one solid idea by using a range of factors, mixing them together as they built upon the ideas. There were ideas to improve services or systems to encourage responsible and decisive disposal by users. This indicates that the Toolkit encourages designers to generate a broad range of approaches when it is used at early stage of the design process, and has the potential to act as an inspirational tool by stimulating designers' creative thinking process. Other ideas included designing a small knitted product with surplus yarn, which could improve the manufacturing process. This shows that the Toolkit provided an opportunity to rethink the current manufacturing process. For people in the "attentive users" group, providing relevant information and education was the most applicable. For "careless consumers", eliminating choices or providing benefits was seen as a very important aspect of changing users' behaviour. *Empathy* was also occasionally explored when creating services to encourage empathic emotional responses to other potential users, which enables users to pass the items on to other specific users. This indicates that all the Five Motives of Caring themes have the potential to be applied to the brainstorming process in the clothing design sector to influence their design thinking towards enabling user detachment from hibernation or accumulated knitwear at end of use and to promote users' care-giving behaviour in relation to peaceful letting go.

Discussion

Tietze and Hansen (2013) have claimed that the PSS approach could enhance innovation in companies' behaviour towards generating less product manufacturing, utilization, and disposal (e.g. Baines et al., 2007; McDonough and Braungart, 2009), therefore contributing to a reduction in the impact of external environmental factors and a sustainable economy without government intervention (Tietze and Hansen 2013). Exploring ideas through the application of carative factors provides an opportunity for designers to consider a new development in products and services which aims to shift companies' approach from designing physical products only to designing a system of products and services, facilitating "product-oriented services" and "user-oriented services" (Tukker; 2004; Behrend et al., 2003; Zaring et al., 2001). In particular, the Toolkit prompts designers to generate ideas around transformation from consumer ownership to usership, enabling the return of products for reuse and remanufacturing and upcycling, as well as the collection of waste for recycling. The concepts that were designed in the workshop tended to promote users' determination towards responsible, decisive and appropriate user-product detachment to loosen the remaining emotional ties and ownership, enabling a closed loop system for materials. Group 1 generated ideas around a sustainable material-based knitwear, but also a contract-based selling scheme that would let users return knitwear to the manufacturer, utilizing users' responsibility and commitment to objects at end of use to encourage decisive and responsible recycling behaviour. The online reward scheme idea generated by Group 2 is another good example of facilitating a product-oriented service. This idea involves the user receiving points once they have returned unwanted knitwear; the user then redeems the points when purchasing another garment from the same brand. This idea would be commercially beneficial to companies as a way of increasing their market share, and offers the chance to increase the size of their loyal customer base. Considering the efficiency of resources that is required in PSS, there is a benefit in terms of a reduction in material cost when a company takes back used products. Additionally, Group 2 generated an idea for a new business opportunity for a third party, which collects used knitwear and provides an upcycling service. This idea involves creating an eye-catching logo for a sustainable disposal place, the same logo being printed on the knitwear label, to help users

identify the right place to return and recycle their garments. Most of the ideas evoked by the application of the Toolkit imply an increasing awareness of resource scarcity and a positive effect along the material chain through behaviour change in users.

Group 2 generated the idea of a rental scheme service for users to subscribe to a knitwear and recycling service: when the knitwear is no longer wanted they can return it to the recycling platform. This business model might provide an opportunity to increase benefits for the company, as it retains the ownership of products, and consumers only pay for services which facilitate a user-oriented service for a PSS model. This implies that carative factors have the potential to contribute to a PSS model by providing an opportunity to generate business and economic opportunities, but also environmental benefits.

However, the ideas generated and developed using the Toolkit face a number of challenges. For example, the quality of unwanted items will become lower during the collection process, and there is less demand for reused or remanufactured knitwear. Endlessly recycling material is costly (Andersen, 2007) and difficult to achieve: many companies will still focus on product-related services unless the technological system changes. Furthermore, the market involving the PSS model is probably of relatively low value compared to the product sales business model (Tukker, 2004).

Conclusion

Through exploratory study, the potential benefits of using the Toolkit for idea development process by designers were established and the positive effects on an object's lifespan were demonstrated. It should be noted, however, the study was based on a limited sample. Despite this limitation, this study has demonstrated that applying caring themes in the design process influences design thinking towards detachment from hibernating or accumulated objects at end of use, enabling the user to return products for reuse or remanufacturing, as well as facilitating the collection of objects as waste for recycling in a zero-waste, circular system. This study will contribute to the growing field of design for sustainable behaviour and equip design approaches for PSS with new knowledge about design for sustainability.

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