

Seeding sustainability through social innovation in fashion design

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Abstract

Sustainability is one of the key challenges facing the fashion industry due to the complexity of the environmental and social issues associated with whole product life cycle, complex supply chain systems, as well as human consumption and consumer behaviour. Although awareness of the issue has grown significantly in the last decade, the question of how to integrate the concept of sustainability into design practice still remains. It has been argued that complex design problems and the transition towards sustainable design require radical social innovation, enabling a system that engages with diverse social actors facilitating discussion as a process of social learning. This concept of co-design represents a new paradigm for fashion and textile design, involving participatory activity and consumption encouraging action towards social change. However, the adoption of co-design for sustainable fashion is still in its early stages and there has been limited study into a systemic level of co-design processes for sustainable fashion.

This paper will explore how the co-design process can act as an agent for environmental and social change in the early fashion design development phase. The main purpose of this study is to investigate the challenges and barriers to sustainable fashion and to define and develop a co-design system that assists in addressing sustainable issues in fashion design process. Utilising the meta-design mechanism, an online-platform has been developed as a social e-learning process, which allows the user to discover new insights in sustainability and synergistically contribute to a sustainable solution at the early phase of the fashion design development process. This paper will discuss the potential opportunities and barriers for an ideation co-design system and its educational interpretation.

KEYWORDS: Sustainable fashion, Social innovation, co-design, idea generation

Introduction

The clothing and textile sector is one of the most complicated industrial chains involving different actors including agricultural, chemical fibre, textile and apparel industries, retail and service sectors, and waste management (Defra, 2011). While design activities are associated with environmental compatibility and complex industrial chains, there are a number of criticisms that fashion has increased its environmental and social 'footprint' at every stage of the apparel product life cycle. These include cultivation and processing of the textiles (manufacturing yarn, fabric, dyeing and finishing), clothing production, distribution, maintaining the product during use or reuse and final disposal. Within the production process there is excessive use of resources and energy and pesticides in growing natural fibres, particularly cotton production. Yarn and fabric production involve various chemical inputs throughout the manufacturing and production processes including bleaching, dyeing, printing, finishing processes. Apparel production involves the labour-intensive garment making process from unethical labour sourcing in overseas clothing suppliers and manufacturers (cited in Saicheua et al, 2012). Furthermore, current clothing consumption patterns are unsustainable. In clothing and textile consumption alone, it has been estimated that 2 million tonnes of clothing waste (a value of £38 billion) is produced per annum in the UK and, of this, 63% (1.2 million tonnes) end up in landfills (Defra, 2007). Although a growing awareness of environmental issues in the production of fashion has led to some improvement, the current fashion business model is facilitated by the 'fast fashion' trend which accounts for one-fifth of the total clothing market in the UK (Defra, 2010) and this paradigm continuously encourages consumers to even greater levels of consumption and ultimately generates more waste.

Addressing the sustainability issues in the fashion industry is extremely challenging and now it has been faced with a critically complex dilemma between sustainable production and consumption. Particularly, sustainable consumption in the fashion design field has not been actively investigated, only recently has attention been focused on the various social issues of lifestyle change. The research by the United Nations Environment Programme/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production (UNEP CSCP) shows that *"80% of data currently collected focuses on impacts from manufacturing; however 80% of the impacts themselves occur during end use"* (cited in WBCSD, 2008). Although there a need for further research and empirical data on consumption behaviour there can be no doubt that consumer behaviour has a significant influence on the environmental and social impact of clothing.

The design activities influence on the not only the production process (choice of materials, energy, process, distribution and manufacturing) but also the consumption process, including the ways of buying, ways of use (mending, laundry etc), as well as disposal of products. These are associated with lifestyle and behaviour as well as our consumption patterns. If sustainability is considered as a design aspiration, how could this goal be possibly achieved through fashion design?

Sustainability calls for fundamental changes and thinking in relation to the design process and a consideration of how design affects production and consumption. It has been acknowledged that design has the ability to influence the environmental and social aspect of goods, service and system transition towards more sustainable production and consumption. Furthermore, design is considered as one of the most powerful tools for transforming the new roles, patterns of behaviour and opportunities to lead a cultural and systematic change (Fletcher and Grose, 2012). The transition towards more sustainable fashion design practices requires a new generation of product and service systems that move away from the traditional concept of a product orientated approach to a new way of social innovation. In order to achieve this, Manzini (2008) suggests that sustainable design should focus not only on promoting sustainable solutions, but also on how to conceive the possibility of seeding new design solutions. Manzini argued that this could be achieved by creating social innovation that moves beyond existing techniques and provides the ability to generate new ideas. This can be motivated by behaviour change rather than by technology or the market through an emphasis on the scope of economy rather than economy of scale, with a bottom-up approach rather than the traditional top-down one (Manzini, 2008). However, this process requires the education of designers and consumers, as well as offering actual alternative solutions. According to the Allen et al (2002), a component of behaviour change requires the learning and doing environment that provides information, guidance and an enabling-platform to create imperative solutions.

In this paper, two potential ways of contributing to social innovation are described and explored. The first method discussed employs participatory action research, and presents a case study where 52 design students participate in the process of co-design as social innovation. This paper outlines how the workshop provided a co-designing process model in which users are encouraged to explore sustainability as a way of thinking and embedding education in the design process. Secondly, the authors propose a co-designing web platform, which represents a more global level of interaction with people sharing their ideas and learning with each other. The implications of social innovation with co-design practices are discussed alongside the designer's role in the new design system for sustainable design practice.

Drivers of social innovation and co-design

As noted above, the value of social innovation has drawn attention in recent years. Manzini (2008) identified three drivers of social innovation; techno-economic, socio-cultural and political drivers. First, a techno-economic driver requires the alternative approach of flexible, effective, robustness and a secure manufacturing and production system. This phenomenon has recognised that a new technical platform allows an advanced degree of connectivity and the possibility to manage very complex systems. Secondly, the socio-cultural driver calls for creativity, self-direction, and responsibility and empowers human needs and inclinations among a growing group of people and communities, especially as developed a modern society. The implication of a

distributed socio-economy plays a pivotal role in a large part of value creation of a design process at the local level of economic wealth, facilitating interaction and the optimisation of resource. The implication of a socio-cultural driver towards a more sustainable design approach allows the reduction of the individual components in a system that promotes symbiosis through the facilitation of a closed loop system with local resource and the end user. Third, the political implications provide the empowerment of users in design decisions, as well as increasing the visibility of a system of transparency, democratic discussion and choices. Especially, people can compare the problem-related choices and advantages for individuals and communities in taking responsible decisions (Manzini, 2008). While, Sanders and Stappers (2008) observed that the nature of ‘consumers’ has evolved as they are no longer satisfied with a passive role in consumption but they want to be ‘co-creator’. The role of the individual is not only just as consumer or user but rather they act as a continuum of diversified characteristics as consumers, active participants, co-designer and co-producers dependant on the situation. Fisher (2003) proposed the classification of the various levels of considering people as consumers and designers ranging from passive consumer, to active consumer, to end-user, to user, to power users, to domain designer, all the way to meta-designer. The spectrum of consumer and designer in the co-designing process is illustrated in figure1.

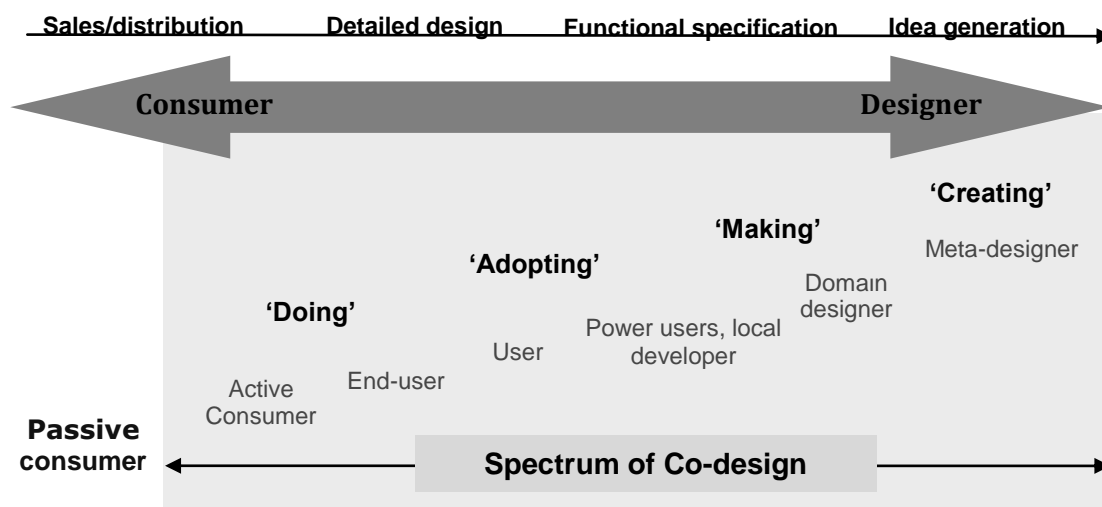


Figure 1: The consumer/designer spectrum in way of co-designing (adopted from Fisher (2003); Sanders (2006))

Sanders (2006) also suggested a similar spectrum in the consuming and designing process including the ‘doing’, ‘adopting’, ‘making’ and ‘creating’ level in the degree of engagement and motivations depending on their level of expertise, passion and individual creativity. The basic engagement is the ‘doing’ level that is to get something done productively. It needs minimal interest and knowledge in product and service. The second level of creativity and user engagement is the ‘adopting’ level that involves customising an existing design. The ‘making’ level requires a genuine interest and experience in the making process. It is commonly motivated by the true desire to create a new product. The highest level of creativity and user engagement process is the ‘creating’ level in which the individual is guided by a high level of experience and knowledge. Sanders (2006) argues that all individuals have the ability to reach the ‘creating’ level,

provided they have the desire to do so; however, traditional design approaches in which the designers and production team have control of the process do not provide support for the creative consumer.

When we reflect the adoption of co-designing in fashion, the design practices have been largely explored through the 'doing' and 'adopting' level. This activity commonly takes place at the latter stages in design development through design component customization such as colour, fabric, size, pattern design. For example, a number of T-shirt and shoe companies offer various customized products for consumers; for example the NiKEID online tool lets users personalize their own style and design components. The product configurations involve consumers in the design process so that there is no leftover inventory on the shelves for markdown and eventual disposal. However, the major disadvantage of user engagement in online design is that ordinary people cannot try real products and there is a restriction in tactility (Loker, 2008, p107).

The spectrum of the 'making' level of activity is beginning to emerge, there are a number of DIY (do yourself) product and fashion micro-producers who are embracing co-design practices at the making level of users. This category of consumers can be considered as 'power users', or 'domain designers' as termed by Fisher (2002). An example of the making level can be seen at a local level of community engagement which is utilized a combination of collaborative design, personalized fit and hands-on tailoring. One important activist designer in this field is Otto von Busch, a researcher and fashion designer. Von Busch has explored a method for questioning the forces at play between the global fashion system and small-scale local production using collaborative design practices. This co-design method was an open approach to fashion design, rethinking the roles of designer and producer and linear or sequential modes of assembly in industrial production. This would mean co-design and co-authorship throughout the design process and creating a multiplicity of interfaces for design interventions during the production (Von Busch, 2006). He explores various collaborative projects with local companies or designers and suggests reform projects from old garments. His project emphasized the distribution of "chef power" in the current high street fashion system and reinforces the opinion that system level innovation is required to make a real change. Van Busch contests that perhaps we are used to undertaking passive consumption through formulized global fashion brands.

Another 'making' and 'creating' tool is the 'modular design tool' which can be a considered potentially important platform at the making level of design. Modular fashion provides the opportunity to engage the user through the user's ability to create personalised design and experience. Hur (2009) explored active user engagement practice in the design process through modular design. Each set of textile pieces can be rearranged to transform one item into various other hybrid designs including hats, dresses, bags, scarves and interior accessories. Figure 2 illustrates modular fashion and refashioning to other products. This example can be not only a 'learning by doing' process enhancing the user's inner creativity, but also a flexible approach to transform various products with a multifunctional purpose. Furthermore, she explored the community level of collaborative design practices which enable groups of people to share their experiences and knowledge more actively in a social context.

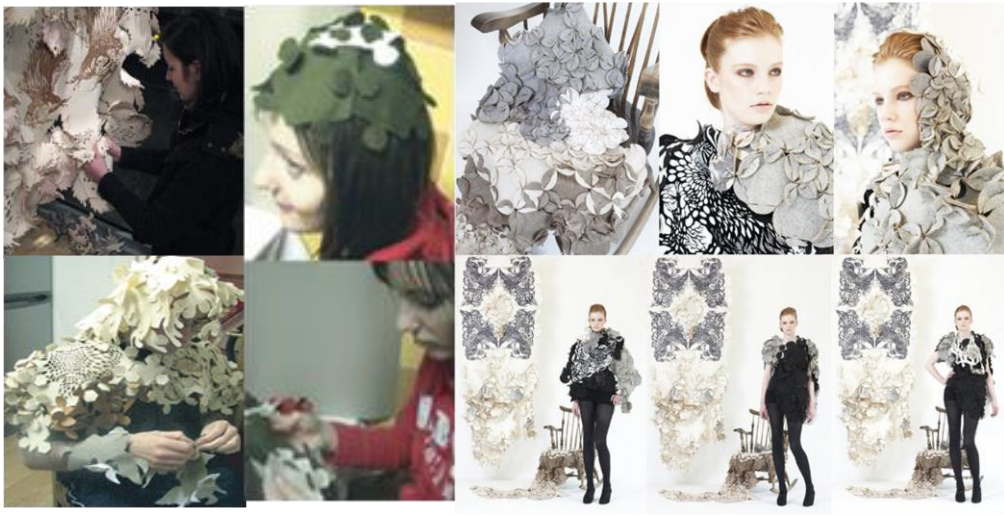


Figure 2: Transformative modular fashion and user engagement practices (Hur, 2009)

Later on, Hur and Thomas (2011) explored interdisciplinary hybrid design that is intended to suggest more systematic modular fashion through exploring the boundaries between mathematics and modular system of fashion based on geometric shapes. The mathematics of the modular system allows modular material shapes to be transformed into sophisticated textile designs for fashion or interior decoration. Unlike traditional textile designs there is no sewing as the textile and the garment are created simultaneously and the modular structure allows infinite design possibilities based on variations in the underlying tessellation. Modular systems of textiles enable the creation of products with a second “life” through the system’s capacity for reinvention. Individual modules can be rearranged in order to create different patterns or colorways to reconfigure the product’s structure. Although it is not a commercialised tool for fashion and textile design but is the potential for contributing co- design for sustainable fashion as well as facilitating a user’s inner creativity.

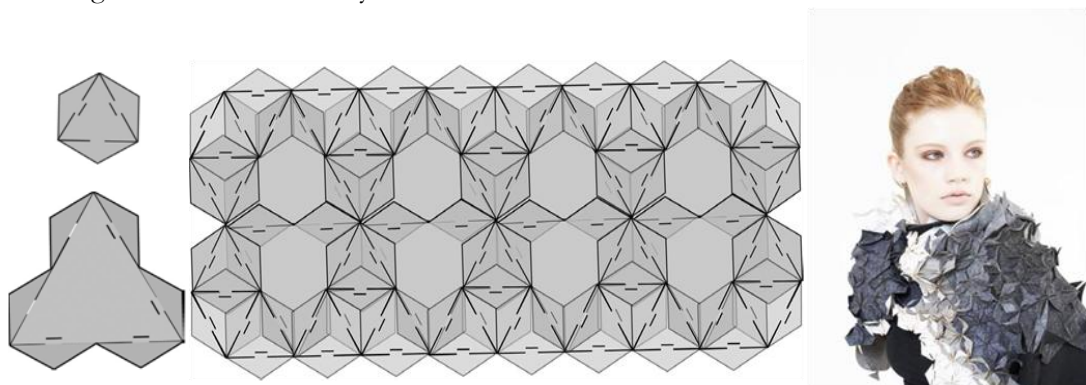


Figure 3: Development of modular series and clothing (Hur and Thomas, 2011)

Whilst there are a number of excellent tools for developing craft skills and detailed design production through utilisation of distributed production tools, there are still very few tools available to encourage employing the context of a deeper understanding of sustainability for fashion and textiles. We argue that rather than simply being engaged with the end user participation with customization, users need to be provided with appropriate tools for creating and acting themselves for the highest level of creation in order to facilitate the seeding of new design solutions. More importantly, the tools require setting common goals (for example, sustainable fashion).

As we discussed above, the adoption of co-design in fashion design is commonly through mass-customization which focuses on the monetary and user-experience value (empathy or emotional value). This allows a unique product in a crowded marketplace, but the question is that it does not directly deal with the fundamental problems associated in sustainability issues in fashion and textiles. Although the economic and experience values are important and must develop further, Sanders and Simons (2009) suggest that when the co-design process and its mindset have embedded social value, the co-design process can provide user experience values as well as financial rewards. Due to the objectives of design and value of co-design are inextricably linked. A further identification of Sanders and Simons (2009)'s study is that, the social value of co-design is motivated by aspirations for social learning, behaviour change, happiness and more sustainable ways of living. It is most likely to take place at the idea generation of the very early stage of the design process through providing the largest benefit involving with people to solve their own problems. It seems reasonable to suggest that a number of researchers have also emphasized the decisions made in the idea generation stage. It is considered that the stage is the most influential in the design development process in addressing sustainability and the total design strategy at the systems level of innovation (Sherwin and Bhamra, 2001, Vezzoli and Manzini,2008; Jones et al, 2008). Figure 4 illustrates the relationship between the design development stage and co-design tool availability for sustainability. Unfortunately, there are not many tools available for sustainable fashion and there are almost absent for the specific support of sustainable fashion design practices at the idea generation phase.

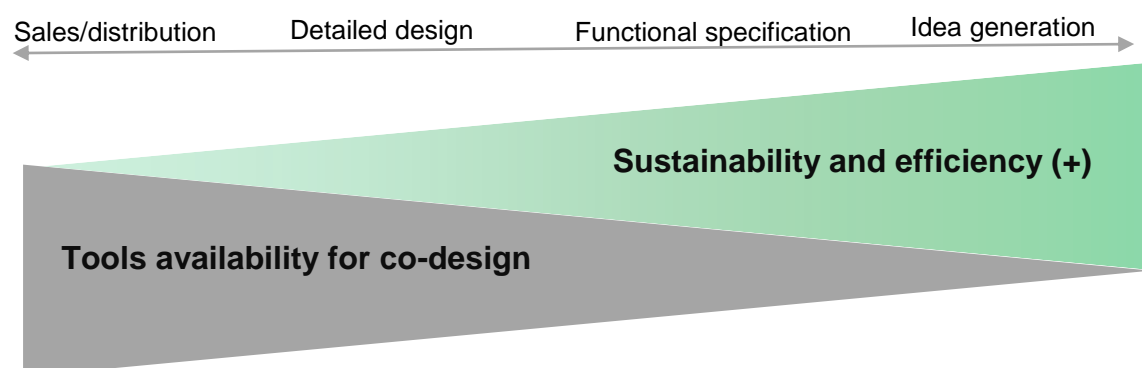


Figure 4: The relationship between the design development stages and co-design tools for sustainable design

Indeed, the early integration of sustainability is critical in supporting decisions for designers as well as potential co-designers. User engagement in the idea generation phase should facilitate

consumers' understanding of the context for sustainable fashion and facilitate their various levels of creativity in tackling its challenges. However, without an appropriate tool and platform for sustainable fashion, it is difficult to achieve designer and consumer engagement in the design process. The new approach requires a new tool, process and platform.

Research methodology for seeding social innovation and co-design

The ideation (idea generation) toolkit and workshop process have been developed through a series of workshops. The methodology is loosely adopted from participatory action research (PAR). PAR is commonly aim at transforming and searching for understanding situations and improving desired action. It is a collective, self-reflective investigation that researchers and participants conduct together, so participants can understand the process better and find alternative solutions. This reflective process is directly involved with action, influenced by understanding of information and social relationships (Baum et al, 2006). This process allows designers and various users to work collaboratively and explore their creativity together. The role of this process inevitably transforms the role of designers, researchers and users throughout the participatory experiences. According to Sanders (2002), the traditional design process is where the user is a passive object of study, and the researcher brings knowledge from theories and develops more knowledge. The designer then passively receives this knowledge in the form of a report. On the other hand, in co-design as a participatory process, the roles get mixed up and the user becomes as a partner. This can be play a pivotal role in concept development when the researcher supports the user by providing tools for ideation and design expression. "Users" can play co-creating roles throughout the design process. Therefore, the role of the designer and researcher blurs and the user becomes a critical role in the design process. Utilizing the process of PAR (Plan-Act-Observe-Reflect), the toolkit information, performance and co-design platform have been developed. The first pilot workshop took place in 2011 aimed at creating more sustainable fashion involving designers (N=2) and non-designers (N=6) and a large-scale study achieved with final year undergraduate fashion design students (N=35) and design masters' students (N=17) at the University of Leeds. The methodological model is shown in figure 5.

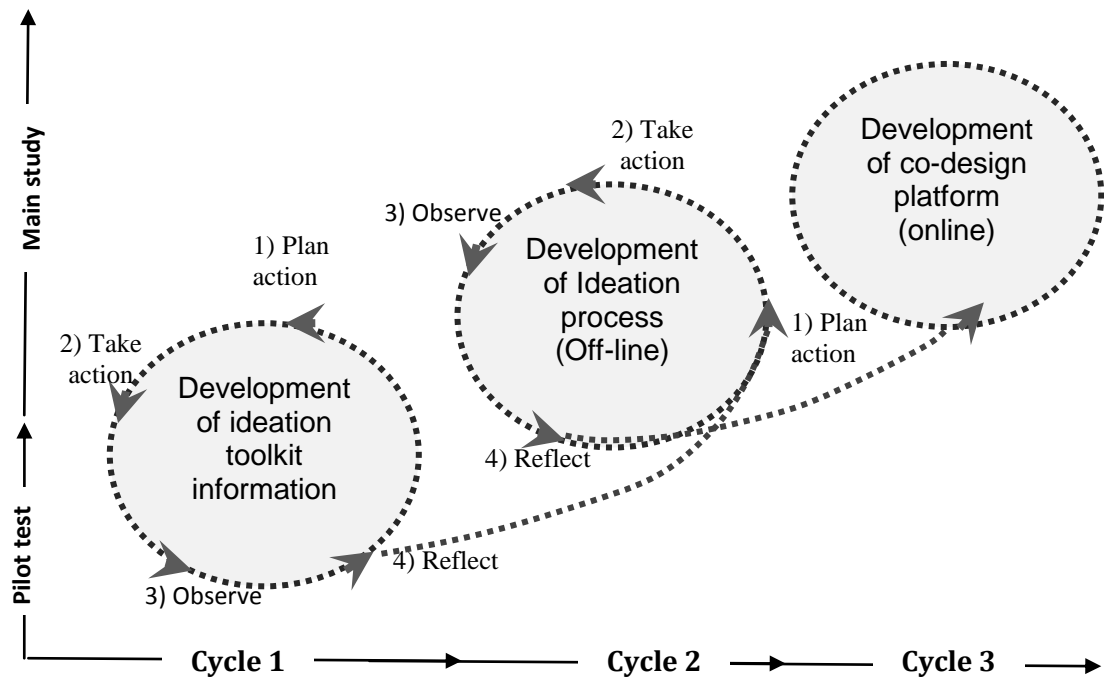
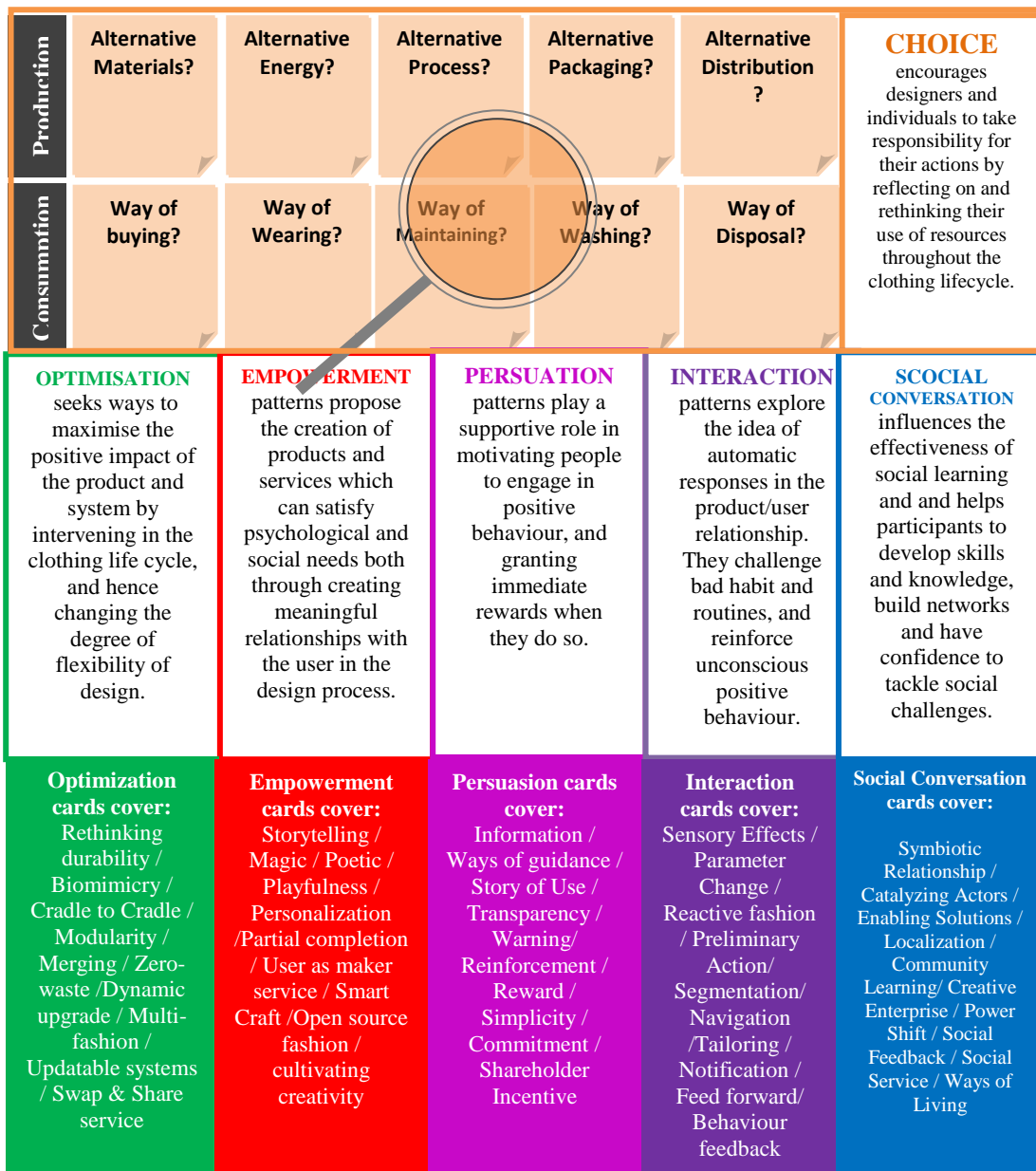


Figure 5: research methodology for participatory action research process

The participatory action research (PAR) is a systematic enquiry through a continuous cycle of plan, action, observe and reflect the process of transformation. This reflective process is directly involved with action, influenced by understanding of information and social relationships. It is considered as a powerful strategy for human centred design in both social science and design practices (Baum et al, 2006).

The first main study was focused on the contents of the information in the ideation toolkit that was intended to encourage various users in the design process to consider sustainability from the very beginning. The aim of toolkit was to provide useful guidance, boost inspiration and provoke ideas regarding a sustainable production and consumption approach in order to help designers and potential co-designers to incorporate more sustainable behaviour as well as sustainable production. The information was designed as cards which was especially inspired by the form of 'IDEO method cards (IDEO, 2003) and 'Design with Intent' (Lockton et al, 2008). The toolkit uses provocative questions that tackle the sustainability issues at every stage of the clothing lifecycle as well as focusing on 'human-centred' approach in order to deal with the behaviour of people. The ideation toolkit and brief description of various themes is shown in Figure 6.



Structure of card

Design brief & open-ended question: Utilising provocative questions which address sustainability concerns at every stage of the fashion design lifecycle.

Example & scenario: Using the examples with a short explanation can be one way to inspire users to generate their own future solution to the design brief.



Figure 6: Ideation cards structure and layout

The ideation toolkit consists of 60 ideation cards divided into six distinct groupings of 'design patterns', with each of the six design patterns containing 10 sub-categories. The idea of 'design pattern' is generally utilised in order to clarify a design problem for solutions in the area of architecture and computer science. Christopher Alexander introduced this idea which is called a 'pattern language' (Alexander et al, 1977). The strength of categorising the patterns is to have a common terminology for discussing the situations and recognition of the problems. It explains why a particular situation causes problems, and proposes solutions which can be considered for the design solutions. 'Design with Intent toolkit' (Lockton et al, 2008) has also adopted the 'idea of pattern language' and it is considered effective and appropriate for identifying design problems and generating new solutions during the idea generation stage. The toolkit is called the Sustainable Fashion Bridges (SFB) which aims to facilitate co-design at the early design stage. The open-ended questions are used to define and provoke the recognition of the design problem in fashion and textiles and propose solutions which can be considered by users. Each suggestion is not a definitive solution, rather a proposal of more applicable and alternative solutions. The questions have been categorised into six key themes: Choice; Optimisation; Empowerment; Persuasion; Interaction; and Social Conversation.

Using the Sustainable Fashion Bridges ideation toolkit

Following from the initial development of the toolkit, the second main study explored the focused on the toolkit performance and idea generation process as a co-design process. Taking account of participants' feedback and observation of participants' actions in pilot study, the process of ideation toolkit developed and improved further. During the process, participants have an opportunity to understand more about sustainable fashion and share their knowledge and experience with other participants in an active way. The workshop lasted approximately two hours. Pilot workshop sessions provided a brief introduction to the toolkit, workshop process, and discussion of previous understanding of participants' sustainability, and final discussion followed by the sharing of their feeling and experiences during the workshop event.

Throughout the pilot study, we observed that participants responded that the toolkit information was useful and the majority of participants wished to use again. Many participants mentioned that it was a good opportunity to think in a holistic view of the clothing life cycle as well as the importance of consideration of sustainable consumption in their daily life. Another indication is that this toolkit makes a process of generating new ideas easier to come up with sustainable design solution. It helps to save time, as most of the aspects of sustainability are covered and summarized. It also expands the perception of sustainability, which means that they could be able to generate more conceptual and integrated ideas. However, we also identified several weaknesses of the toolkit. Participants replied that although the toolkit provides useful information regarding sustainable design issues and increase awareness of sustainability, it does not make clear where to

start and how to effectively use toolkit. Another major finding was recognised that depending on the participants' levels of previous experiences and understanding of sustainable design knowledge, the process should be conducted in a different way. Therefore, we developed descriptive instructions and scenarios in which the ideation toolkit can be used on various levels by users.

User at the beginner level: users employ the ideation cards to make more informed decisions and have the opportunity to be aware of sustainable design issues and increase their knowledge. They can follow the practices set by step as suggested on the ideation cards.

User at the intermediate level: Combination of at least two or three different ideation cards, users can personalise their own thinking and develop design concepts which better fit their interests and situations. The intermediate level of users requires more interest and understanding of sustainable design and fashion than the beginner level. We identified that this is useful for undergraduate fashion and textile design students and they develop sustainable design skills and concepts towards the advanced and expert level.

User at the advanced level: Using the questions on the ideation cards as a stimulus, the advanced level of users can investigate more closely the synthesis of social, environmental and economic issues and create new design solutions. Through co-design workshops, users can share and expand their knowledge with their peer group (in the case of community-level workshops) but the guidance of professional designers (or facilitators) is essential.

User at the expert level: expert level of users can practice sustainable fashion and textile design in more innovative ways. Utilising the ideation cards, they can continuously reflect on their actions and consider short, medium and long-term impacts, based on their broader knowledge of sustainable design issues. Users can express their creativity supported by professional designers at the 'expert level' where users have the deepest engagement and greatest understanding of sustainable design. The expert level of users can support others at the beginners, intermediate and advanced levels. They can act as facilitators in the co-design process and they can become actors for transform action in the sustainable design movement.

Although the toolkit was intended to be used by fashion and textile designers and highly engaged users (co-designers), the next main study was conducted with target group considered as intermediate level of users. We selected sample audiences from the design students for the main study. We considered that these are the future of the fashion and textile industries and bridge the fashion academic and business sectors. It is crucial to educate students to integrate sustainability for their future design practices. Furthermore, it is important to emphasise that they can be the future of the 'facilitator' for sustainable fashion acting as a catalyst for the users' own creativity. Sanders and Stappers (2008) suggested that the professional designer can be the new role as a 'facilitator' for various levels of co-designers in the co-design process. Therefore, professional designers can still be a pivotal role in co-design process, but they can also act as a catalyst for user research, facilitation, visualizing structures and systems for product development, and invent a shared language for problem solving with involving with user acting (Thorpe, 2010). The large

scale study achieved through a co-design approach with final year undergraduate fashion design students (N=35) and design masters' students (N=17) at the University of Leeds. We developed and provided the more specific tasks and descriptions of workshop process. Table 1 shows workshop process and specific participants' tasks.

	Task Description	Objective	Time
Step 1	Welcoming	Explanation of the purpose of the workshop, process of activities, tasks and timescale.	20min
Step 2	Assessment of the toolkit information	Participants have an opportunity to look at a holistic view of sustainability issues and assess the ideation toolkit.	20 min
		The ideation toolkit serves to help the user understand the context for sustainable fashion and encourages them to create new solutions.	
Step 3	Problem identification	Personalize their own thinking and ideas to develop concepts; combination of two or three different ideation cards.	
		Defining the problem and decide the scope of what issues can be tackled, which issues require to be tackled.	
Step 4	Future scenario building	Synthesis of their ideas and creation of future scenarios to tackle specific design problem and design briefs.	30min
Step 5	Idea visualization	Refine their ideas and demonstrate your results by visualized format which can be planning for a fashion product design, service design or business strategy.	
Step 6	Group discussion and presentation	Discuss their concept with other people whether your idea can be feasible and useful for environmental and social sustainability.	7 min per group

Table 1: SFB tool cards used workshop process and participant's tasks

During the initial stages of the workshop, participants were invited to take part in the workshop process and a brief background of the research was presented. Following this, in phases two and three each participant accessed the ideation toolkit and was given a 20 minute timeframe to explore and identify specific problems. Participants then selected two or three ideation cards and defined the scope (age group, life style, target markets) in order to articulate the specific problem. Participants were encouraged to construct a holistic view of sustainability issues through assessment of the ideation toolkit and conceptual brain mapping of design ideas. During these stages, the toolkit serves to help understand the context for sustainable fashion and encourages the creation of new solutions. Checkland (1999) suggested that utilizing visual models and making drawings of many elements in any human situation offers insight into aspects of the whole as well as illuminating the complexity of multiple interacting relationships. This visualized thinking and pictures can help to encourage a holistic relationship rather than reductionist thinking about a situation. This offers a mechanism for learning about wicked problems or complex situations through drawing detailed ("rich") representations of them. Utilizing the rich picture of their thinking, participants communicated their ideas with others, synthesizing these in

a visual format through successful combination of the group's design skills, encouraging the maximization of potential creative skills through the workshop process. During the final discussion presentation stage, each team presented their design concepts and discussed their ideas with other groups to explore whether their ideas were considered feasible and beneficial for environmental and social sustainability. The group discussions encourage the identification of alternative perspectives and shared understanding among the groups. Figure 7 shows the ideation toolkit in use at a workshop.



Figure 7: Ideation toolkit in use at workshop

Development of co-design platform for sustainable fashion

The final main study followed the development of an online co-design platform (environment) which provides a more global level of interaction with people sharing their ideas and learning from each other. The Sustainable Fashion Bridge (SFB) is a co-design platform which has been developed to facilitate sustainable fashion design practices and social innovation through providing an ideation toolkit to seed a sustainability driven approach. This website utilizes design thinking to provide a sustainable design toolkit for the fashion designer to learn and share in the environment, encouraging co-design activities which allow enterprises to develop ideas internally or through communication with the consumer. It aims to provide appropriate resource information and design processes for designers and a potential number of other users who are interested in sustainability.

Fisher and Giaccardi (2006) argued that complex design problems and uses cannot be completely anticipated at the design stage when a system is developed. Rapidly changing user needs will realise mismatches between the aspiration and the support that an existing system can provide. They argued that a new platform requires designing from a meta-design perspective, by creating environments where users can act as co-designers, rather than passive consumers. In order to achieve this goal, facilitating social creativity through co-designing allows owners of a problem to contribute to framing and solving the problem. The integrated design platform provides a technical infrastructure for a co-evolutionary system for the design of learning environments, which allow users to become empowered as active contributors, and for the design of relational settings. The fundamental part of co-design associated with the meta-design process concept was proposed by Fischer et al (2002), who developed the Seeding, Evolutionary Growth, Re-seeding

Model (SER) process in order to bring co-creation alive. The traditional system model was a closed system with a small number of people whilst, the SER model builds seeds that evolve over time through the small contribution of a large number of people. According to Fischer et al (2002), during the seeding phase, the knowledge-based design environment evolves over time allowing users to access information. During the evolutionary growth phase, this knowledge is extended to create more work or explore a problem with various users. In this phase, the researcher or developer is not directly involved with the problem; as an alternative, the users have a direct involvement in the problem and personalise their own solution. During this time, an online platform plays a pivotal role in the design process providing resources for work by information accumulated from prior use and each project contributes new information to the seed (e.g. SFB Ideation toolkit). Throughout the reseeded phase, the researcher or system developer does not need to provide solutions but rather reseeded information gradually extended by a number of users and providing inspiration or solutions. Through the extension and adoption of SER Model, the SFB (Sustainable Fashion Bridges) co-design model has been developed, as shown in figure 8.

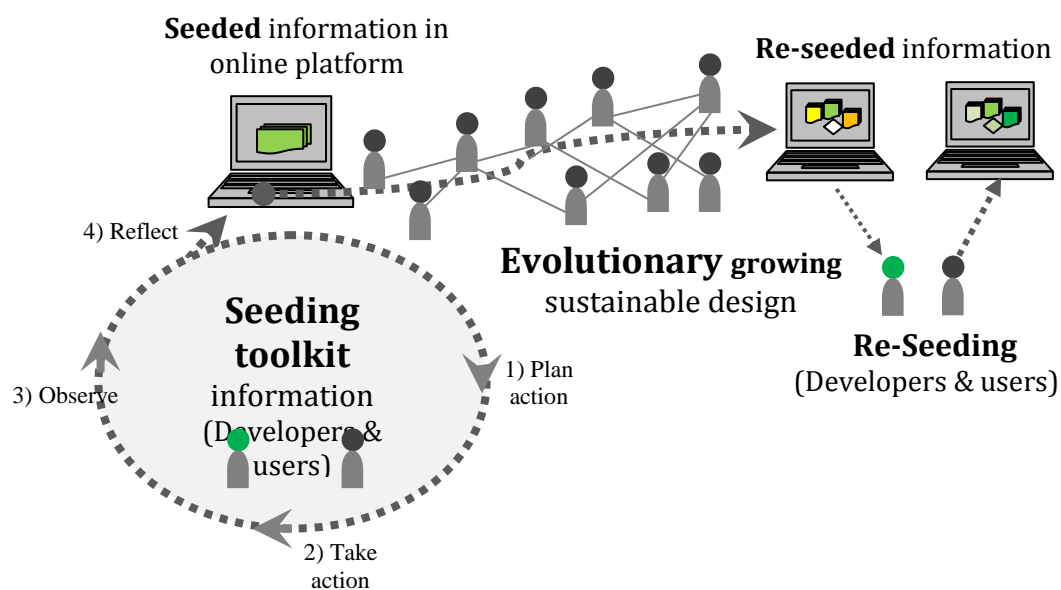


Figure 8: The sustainable fashion bridge (SFB) model for co-design sustainable fashion (adapted from Fischer et al, 2001)

The SFB toolkit has been developed with a researcher and a number of users using participatory action research. The sustainability driven design concepts can be stored to the Sustainable Fashion Bridges (SFB) website. Although the SFB online platform, the evolutionary growth and the reseeded phases have not yet been fully explored, there are a number of technical infrastructures that could support these through user-innovation by utilising the distributed networking. Through the creation of social innovation, the traditional idea generation process can be extended beyond the initial toolkit information and evolutionally grow sustainable design

thinking and address environmental and social issues. Users will have the opportunity to provide feedback and this will also form part of the 'feedback loop' which will influence the toolkit, the website, and ultimately the community engagement projects. Indeed, offline and online activities can interact with each other, with proposed online problems forming the basis for workshops, and offline visualizations being uploaded to the gallery and share and promote sustainable thinking for a more global level of interaction. The social design environment will provide a space for interested participants to network and share ideas, concepts and outcomes, and a network of diverse skills and understanding. The web platform has a range of resources which expand on sustainable design thinking and practice, including examples of facilitating the ideation toolkit for encouraging sustainability at the advanced level and standard tools for encouraging creativity which may be used online and offline (e.g. scenario building). Utilising a dynamic meta-process of web-platform, the sustainable Fashion Bridge can offers the potential to bridge the gap between theory and practice in the area of sustainable fashion and textile design.

Discussion and conclusion

This paper has discussed the potential for fashion designers and various levels of co-designers to facilitate sustainable fashion solutions through social innovation and a co-design process, highlighting engagement of the user at the idea generation stages of the design process. The Sustainable Fashion Bridges (SFB) ideation toolkit can be used in a number of ways to facilitate this, depending on the engagement of both designers and various levels of users. The authors have found that absorbing information knowledge alone is not enough to encourage the long-term perspective of sustainable fashion and it requires social innovation through active engagement of sustainable fashion. It is proposed that the co-design process, ideation toolkit and a model of online platform potentially have a critical role in facilitating social innovation and design for sustainable fashion and textile. Potential users can understand sustainability from the ideation toolkit and incorporate it with their existing knowledge before and refining or modifying needs to be given to it depending on their situation and desired aims. Furthermore, we need to consider the role of designers in such a system in order to seed new design solutions and improve the production and consumption process by providing bridges between consumers and producers.

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