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Personalisation from a design practice perspective

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Abstract
The Internet is facilitating new ways of designing, manufacturing and distributing products. This has led to a more democratic, open-design approach and has resulted in users having more involvement in the design process than ever before. In particular, designers are shifting away from designing a finished product, to either designing components, a template or a set of tools which the user interacts with to finalise and/or personalise the product. This way of approaching design is still in its infancy. The authors' have termed this design framework, as it applies within product design, 'user-completion'.
The authors' propose that the user-completion framework operates at the intersection between mass-customisation and craft. The skills and knowledge sets associated with mass-customisation and craft, presents challenges and opportunities for both the designer and user. The user-completion framework enables users to personalise the end product and therefore requires designers to shift their conceptual approach, by handing-over more design control to the users. It is hoped that by doing so, and by engaging the user in the product's completion, a stronger emotional bond will be generated between the user and the final product. This design process also anticipates an added value and a longer life cycle for the product.
The 'user-completion' framework proposed by the authors will be outlined, and supported with the three case study examples of work. Through these case studies the value of users being involved in the design process is explored, as is their engagement with craft and their perceived emotional value of the resulting products.

Introduction

Today there are numerous ways in which the end-user can become part of the design process, and many of these methods are well established and documented. In this paper two established approaches will be discussed; co-design and mass customisation, as well as an approach developed by the authors through practice called 'user-completion.' In both of the established approaches the end-user is involved in the early stages of the design process in order to customise or individualise their needs. The user-completion approach as will be outlined through three product case studies, allows for the user to be part of the design process in the final stages of assembly and finishing of the product, enabling personalisation of the visual appeal of the product, and to some extent its form and function.

In the course of applying the user-completion approach to the established design practice of one of the author's, a deeper insight was developed into how user-completion could become a tool used more widely by designers in practice. The basis for developing this approach was to enhance the emotional bond between user and product with the aim to create a higher value and longer lifespan for the final product.

Co-design and mass customisation

The recognition of individual creativity and the value of involving the end-user in the design process has resulted in a number of user design approaches. Two models that enable personalisation and engagement in the design process are co-design and mass customisation.

The term co-design has been described as having "gained currency as a general term" (Binder et al., 2008, p. 82). Although it might be used in various applications and across multiple fields of design, it will be considered here in relation to product design. Co-design, as the authors understand it, is often utilised early in the design process. Leading practitioners in the field Elizabeth Sanders and Pieter Jan Stappers (2008, p. 6) to state that co-design does not simply refer to the collaboration between trained designers, but importantly also encompasses designers collaborating with non-designers during the design process. According to this definition, co-design is unlikely to take place during or after the manufacture phase, as the co-design approach relies on facilitating collaboration between the involved parties (Bernabei and Power, 2013).

Mass customisation is the process in which "the end user gets to choose certain features such as colour and apply

Figure 1. Stitch Light, Pop Light, and Hybrid 3D- printed woven vessels. Images Dieu Tan and Rina Bernabei.

them to a pre-designed product" (Szita, 2009, p. 109). The website *MINI* [https://www.mini.com.au/configurator/] provides an example of mass customisation in relation to the automotive industry. Frank Piller (2008, p. 631) explains the economic efficiency of mass customised personalisation, explaining that it "meets the demands of each individual customer, but that can still be produced with mass production efficiency." In a mass customisation model, the final finished product is provided to the end-user. As a result, the emotional connection between the end-user and the product is likely to be minimal. Ruth Mugge believes that in order for an emotional bond with the product to emerge, effort is required during the personalisation process. Mugge et al. (2009, p. 473) feel that often in relation to mass customisation this effort, both mental and physical, is low (and physical is generally absent altogether). With such thinking in mind, the authors propose an alternative approach – *user-completion.*

User-completion model: an overview[1]

The user-completion approach is one that the authors have proposed after developing it to design a new interior lighting solution for the Australian market. To best understand the user-completion approach, we must look at the design process and where to best apply it. The user-completion approach focuses on a specific point in the product design process - assembly and completion (although it will be shown that it may also be applied to the manufacture stage). It is important to note that while the authors believe that the user-completion approach has the potential to be applied to various fields of design, it is considered here specifically in relation to product design.

In the design process the final stages are usually product assembly and finishing, or sometimes occurring in reverse order. 'Finishing', in product design usually refers to a paint or surface finish, or it may be a hand applied process, such as upholstering, or other decoration. In assembly the product, which is usually made up of separate components, is assembled to designer specifications. As in the mass customisation approach, the different components may be configured in different combinations to offer different functions, size, or visual appearance to the end-user or retail business requirements. The user-completion approach is no different to this, in that the end-user decides how the final product will look, how it will function and its visual appeal. The difference is that in mass customisation, the manufacturer will assemble to end-user requirements, whilst in the user- completion approach, the end-user assembles, and hence they can 'try out' different combinations, functions, visual appearance – thus they have creative control over this part of the design process. This also applies to the finishing of the product in which end-users are given creative control and become part of the creation process. Allowing users to have this control and involvement, to customise and personalise the product to their wants and desires can have, as previously mentioned, a positive effect on their relationship with the end product.

The user-completion approach is best suited to product design, particularly where a hands on approach to assembly and finish is embraced. For these reasons it draws similarities to the 'hand of the maker' in hand crafted objects. One of the authors (and her design partner) of the award winning design practice bernabeifreeman recently applied this approach when designing a series of products – the *Stitch Light, Pop Light, and Hybrid 3D-printed woven vessels* (Figure 1). These products were developed sequentially and as such, the learning from each product informed the refinement of the user-completion model and the possibility of user attachment and personalisation for the next product.

From the initial stages of the design process, it was decided that the product would be designed in such a way to allow the end-user to assemble and finish the products, allowing the objects, in some cases to take on different forms and aesthetics. To do this, the designers believed that the product would be presented as a 'design kit', or a series of specifically designed components, that could then be fitted together in various combinations that the end-user would assemble to their individual needs and tastes. In the final iteration using the 3D-prined hybrid vessels, the kit was not only physical but digital. This will be discussed further through the case studies. The user-completion approach relies on the specialised skills of the designers to provide the components and understand

[1] *Adapted from (Bernabei and Power, 2013).*

the manufacturing options, whilst leaving some details of the finished product to the end-user to decide upon. It should be noted that the skill of the designer is in no way diminished by embracing the involvement of the end-user – instead, the designer is required to understand the product in new ways and forecast its potentialities.

Case Studies

Stitch Light series

The *Stitch Light kit* is made up of a variety of different lighting pendant forms, made from aluminium spinnings (Figure 2). These spinnings are carefully designed to be joined in different combinations. The 'design kit' also includes a selection of different perforated aluminuim diffusers that can work with the spinnings in numerous combinations. It also comprises a lamp holder, electrical wiring, and nylon cord that can be embroidered to customise the light. It was envisioned that the end-user could customise their kit on purchase, either online or in a retail environment. This decision would be aided by looking at examples of different light combinations that are achievable.

The designers spent time conceptualising how an element or technique could be designed into the product to allow the end-user to personalise the product during its making, without any assumption that the end-user had any prior skills.

Craft practice results in one-off unique pieces. The user-completion model has parallels with craft, in that the end-user ends up with a one-off-design to some extent. Yet it is important to note that all components of the *Stitch Light* kit were mass produced. The designers felt that the *Stitch Light* would appeal to the end-user who wanted to engage in "doing". By combing craft and mass manufacture in the user-completion approach, the end-user is allowed to personalise mass manufactured elements in a craft-like manner, which allows for all the appeal of craft to be transferred to a mass consumer product.

One important consideration when designing a product using this method is the amount of effort required by the user, if the product is too difficult to assemble and finish the end-user may give up and not finish the product due to frustration with the process. For a truly successful final product, the kit of components should allow people with differing level of skills, both low skilled and highly skilled, to be challenged and obtain a satisfying result.

It was found that the Stitch Light required a higher level of skill than most users were prepared or able to achieve. This lead the designers to re-think the level of skill involved in the user-completion model. This informed the next iteration of the user-completion in the *Pop Light*.

Pop Light

The *Pop light* is a cardboard pendant light kit comprised of six semi-perforated cardboard panels, a polycarbonate crossbar, and an electrical kit. Like the *Stitch light*, each of these core design kit elements can be mass-manufactured. Following the instructions, the user assembles the card panels to create a predetermined pendant light form. Users are then invited to 'pop' out any of the 300 semi-perforated holes on each panel, into any pattern they wish (Figure 3). Several patterns are illustrated in the instructions, as examples, with encouragement for users to design their own patterns. Popping out the cardboard holes is a much simpler and quicker method of personalisation, than the embroidery of the previous *Stitch light*.

Through the simplification of the personalisation in the *Pop light*, the product may have lost its ability to be personalised to the same level as the *Stitch light*. In addition, for someone with a higher skill set, the product would not hold the same challenge. This highlights that there is a fine line that needs careful design and user testing to understand these gradations of user interaction and satisfaction. As Mugge et al (2009, p. 469) explains:

> *"[the] personalization process requires the investment of a great deal of effort, the person is occupied with the product for an extended period of time, which may positively influence the strength of the emotional bond with the product".*

After designing the Pop light, the author's co-ordinated a workshop to understand if there was value in the user-completion model from a user's perspective. Results from the user questionnaire illustrated that everyone felt generally positive towards the light. Most users said they were 'very satisfied' and 'happy' about the light as it gave them a sense of accomplishment. Two users even regarded the light to now having a sentimental value to them, seeing their own designed pattern on the product. According to one user, despite the complexity in designing a pattern, the end result definitely creates excitement and achievement. Everyone stated that due to their own pattern being on the light, they are less likely to dispose of the product. The Pop Light according to most of the participants, not only acts a physical product but transformed into a memory due to the fun experience, effort and time they gave to it.

Figure 2. Stitch Light embroidery detail, Stitch Light in various configurations, Stitch light components of the 'design kit'. Images Dieu Tan

Figure 3. Pop Light with diverse hole patterning, Pop Light - 'unpopped' and 'popped'. Images Dieu Tan.

Fourteen out of fifteen users felt the light to be personally valuable.

Vessels

From the experience gained through the development of the Stitch and Pop lights using the user-completion approach, the authors wanted to apply this method to a product that gave the user involvement in the manufacturing process as well. They turned to 3D digital printing with an incorporated hand-finished component (Figure 4). The 'hybrid' vessels are made of a 3D-printed body that the user selects from a pre-designed web-based suite of options. The user prints their chosen vessel at home or through a printing agency. The vessel design allows for a handwoven, in this case "basketry", element to be added for functional and/or visual appeal. The development of the hybrid vessels differs from those previously discussed in that the designer does not provide a kit of components but rather a selection of digital files that the users can print, and in doing so users can determine; scale, resolution, materiality and colour. This gives the user more control over the manufacture of the product. This is quite different to mass-customisation, in that the user manufactures the entire product, including the components. The authors believe that the incorporation of the user-design approach and personalisation, in the design and development of new hybridized digital/craft products, will allow the user to fully engage in the adoption of this new emerging materiality and language. Also through engaging users in the digital fabrication and basketry it allows them to become more fully part of the creative process and therefore strengthens the user/product bond, as well as attach a high value through engaging the hand of the maker.

Through the design of the 3D printed component, the designers were very aware of the skill level of the users, and designed the vessels in such a way that the incorporation of hand-weaving was pre-determined. The design of the vessels, allows for different flexible materials to be slotted into the 'tubes' of the vessel wall. The user could use organic and/or synthetic filaments or other materials such as metal to vary colour, texture and visual language. To facilitate the basketry and weaving, users would have access to weaving diagrams (through a web source) to mimic or they could weave their own design. The role of the designer remains integral to the output of a successful product and integrating the technologies and providing the skill-set supported with examples.

In the design of the vessel, we extended the user-completion approach to be more fully integrated into the whole process. Designing the vessels using the user-completion approach differs from the Stitch and Pop light because the approach encapsulates the full manufacture of the product in the design process, where previously it was only applied to the assembly and finishing

Figure 4. Hybrid Vessels - Details and various configurations. Images Rina Bernabei.

Conclusions

As academic designers, having developed a participatory-based framework and applying it to the practice of product design, we have been able perform, refine and test our theories. Over the past years we have been able to apply the user-completion framework and adjust it to a variety of products and feedback from workshops have confirmed the value and shortcomings of the framework. We have found that the design of the kit, either physical or digital, is crucial to the success of the product. Pre-determining the level of skill needed by the user is important; if the skill set is too high the users will fail, as seen in the Stitch light, and if the skill is too low, the value of the final product is diminished. While most people like to be involved in the design process, they are not designers and need to see examples and options, either through digital or printed support. Most users will mimic an option provided. Very few users are unlikely to take the designs to a highly personalised level. Digital literacy is also needed when using a digital took kit to be able to manipulate the product successfully.

Through the feedback received from the Pop light workshop, most users said that the light had more value and that they would not dispose of it readily but this needs to be examined in more detail. The next step is to understand how users may undertake more iterations of the design or update their product overtime through re-printing, re-weaving and re-stitching. There is an opportunity for the digital toolkit to be constantly updated with technological advancements in materials and technology. This model may provide a new way for users to live with their products for longer, building memories, value and ecological benefits.

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