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# Wordpress of Objects: Addressing Layman Participation in a Post-Industrial Society

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**Abstract**

In this paper a perspective on layman participation in the design of everyday products is presented. The development of digital fabrication technologies such as 3D printing enables an increasing involvement of the layman in appropriating the performance of objects to their own needs and desires. The question is how professional designers as well as laymen deal with openness in product design. An analogy is made with the content management system *Wordpress* to discuss how could be dealt with openness in a toolkit that addresses multiple skill levels of its users.

**Author Keywords**

3D printing; Computational design; Mass customization; Performance-based design; Layman participation

**ACM Classification Keywords**

H.5.2 User interfaces: User-centered design

**General Terms**

Design

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## Introduction

In this position paper a perspective is presented on layman participation in the design of everyday products. The increasing involvement of the consumer is apparent in the many customization offerings [1] which allow people to customize, adapt and modify a product to one's preferences. Besides these often aesthetic adaptations, the accessibility of digital fabrication technologies such as 3D printing allows people to produce complete products from a digital 3D file. A post-industrial society that goes beyond the constraints of mass production would produce unique products that fit each individual in his or her own needs and desires. In this future scenario where "*the physical world is as malleable as the digital world*" [4], laymen could manipulate products in a similar way as they do today with digital media. Related work is *Codeable Objects* [5] that also investigates the opportunities of the combination of digital fabrication and computational design mainly focusing the skill of programming for novices. In this paper, an analogy is made with *Wordpress* [15], the content management system, to show that this is not only accessible to the novice, but also suitable for the expert.

How will the role of the professional industrial designer change in a post-industrial society where highly individualized products are produced by 3D printing and where the consumer is an active participant in the design process? Besides a shift in manufacturing technology, this mass individualization paradigm requires a shift in the way products are designed, distributed and purchased. It will require a new way of working for designers and especially interesting is how *designing* these new products might take place. The issue raised in this position paper is how to address the

trade-off between the freedom of the consumer and the control by the designer, in other words the openness of design.

This paper is structured in the following way. First the three relevant areas of layman participation, computational design and 3D printing are discussed. Hereafter, openness will be discussed by making an analogy with the content management system *Wordpress*. This paper ends by discussing openness and its implications.

## Layman Participation in Design

Design can be interpreted "as an activity undertaken by all humans, not just professional designers" [11]. Rittel argued in a similar way, stating "design is not the monopoly of those who call themselves designers" [9]. If design is not solely the domain of the professional designer, the question raises who is a designer, or what makes someone a designer. Is there a way that the layman could be involved in the design of everyday products? The layman who is often portrayed as passive opposite to the designer, does not possess the knowledge, skills, sensitivity and experience a professional designer has, when it comes to product design. Therefore we are looking at a way the consumer can be involved in the design process without trying to turn every one into a professional designer. Rather than using the terms *designer* and *consumer*, we will use *meta-designer* [3] and *layman-designer* to depict both roles and acknowledge that the distinction between these two roles is fading. The meta-designer concerns the professional designer who is working on a more abstract level whereas the term layman-designer refers to the non-expert who is entering the design arena.

An approach that is of particular interest is mass customization. The term was first coined in the book *Future Perfect* by Stan Davis [2] and is an aggregation of *mass production* and *customization*. The aim of mass customization is to produce products that meet individual's needs in an efficient way [12]. Industrialization and mass production have distanced the consumer from the designer and manufacturer of products. To produce products that meet the consumers' needs designers typically try to identify a need in the beginning of a design project. This so-called *sticky information* [14] is difficult to extract from the consumer, therefore mass customization lets the consumers configure a product themselves. This form of customization is called collaborative customization [8] since a dialogue with the individual customer is established. Mass customization relies on three capabilities, that is elicitation, process flexibility and logistics [16] or solution space development, robust process design and choice navigation according to Walcher and Piller [13]. Consumers that are more involved in the creation of a product also have a stronger emotional bonding with the product, which might be one step towards a more sustainable way of consumption.

### 3D Printing

The design of mass produced consumer products is to an extent constrained by the manufacturing technologies. Mass production dictates homogeneous offerings and is based on the concept of economies of scale where the production of one product is very expensive and the more products are made the more affordable they become. The initial investment in the mold that will be used for injection molding thousands of products is high, but once in place the production not

only becomes affordable but also fast. However, changing a design requires adapting the mold or even remaking the mold, in turn making the system rigid.

The adoption of digital fabrication technologies such as 3D printing requires rethinking what is designed, for whom it is designed and how things are designed. To accommodate for the flexibility, computational design is a method that could serve the opportunities of digital fabrication.

### Computational Design

The digitalization of fabrication with 3D printing on the forefront shifts the focus from mass manufacturing to the production of potentially unique products. In order to accommodate this opportunity to produce one-offs, the way products are designed is likely to change as well. Products will be represented as data which is easy to manipulate as well as easy to transfer. The digitization of physical objects leads to the discussion of the role of the computer in design. This goes beyond using the computer to automate processes ('computerization') or the using the computer as a way to represent objects (Computer-Aided Design) which has been widely established in design practice. We refer to computation as a design approach for form finding processes, which consists of "*elemental properties and generative rules*" [7].

The role of the layman becomes to appropriate an object to his or her own *context*. The notion of performance [6] is introduced to depict the relation between form, function and the context and it is concerned with the desirability of the behavior of a design. The use of computational design constitutes a shift in the *material* product designers work with. In

contrast to the conventional way of designing prevalent in today's product design, algorithms and code become a material to design with. The computational approach opens up a whole new array of possibilities for designing products that are adaptable by the individual to the individual's context.

In industrial production the designer is concerned with giving form to products and due to the mass manufacturing technologies the designer is forced to fully determine a design. This is in contrast to the craftsman who is concerned with form finding. A craftsman often refers to finding the form within the material, suggesting that the form is already there and the craftsman merely exposes it. In a post-industrial era, the notion of form finding returns to the stage. Computational design allows the designer to design a system that consists of rules where the layman can find his or her own solution that is appropriate to their own context and use. This approach characterizes a certain amount of indeterminacy and therefore evokes the question of openness.

### **Openness**

By opening up fabrication and consequently design of everyday products to the laymen, professional designers gain a new role and responsibility. One of the main points of discussion focuses on the trade-off between the autonomy of the consumer versus the authority of the designer over a design accompanied by issues such as ownership, liability and intellectual property.

#### *Wordpress: Openness in Various Ways*

In order to discuss openness, we will make an analogy to digital media and toolkits that allow the user to

adapt and create digital media. In the recent decade, digital media became widespread and it has become increasingly accessible for the laymen to actively create it. We will look at *Wordpress*, an open-source content management system which has opened up web design to a broad audience. The aim of this analogy is to show how this system deals with openness.

Wordpress is an online application for setting up and managing web content, it enables its users to design both the aesthetics as well as functionality of a website or blog. The Wordpress toolkit is used by people with different skill levels from complete novices to professional web designers and each level comes with a certain amount of autonomy and responsibility. Several different levels can be distinguished in the Wordpress toolkit, from simply choosing a ready-made theme, configuring it, writing simple code, to designing a complete theme with aesthetics and functionality from scratch. The amount of autonomy the layman gains depends on his own knowledge, skills and motivation. Wordpress allows for an increasing freedom when the layman is willing and able to learn the consequent steps.

From examining *Wordpress*, we noticed that this toolkit addresses different skill levels. The Wordpress toolkit addresses the tool set as well as the skill, knowledge and mind set. The first level of the CMS toolkit is choosing a ready-made theme and can be seen as an activity of *adapting*. By increasing imagination and gaining responsibility as well as freedom, the layman ends up at the highest skill level which is designing your own theme from scratch, or *creating*. This activity requires substantial amount of skills and knowledge in order to succeed. In this way the *Wordpress* toolkit

deals with openness by having an easy-to-access system that, depending on the user and his motivation and ability to learn new skills and obtain new knowledge, opens up for advanced design actions.

The CMS deals with different levels of creativity. According to Sanders and Stappers there are four levels of creativity, namely *adapting*, *making*, *doing* and *creating* [10] where *adapting* is the most restricted form and *creating* is the most open form of creativity. The layman can participate in design in a number of ways; a layman can design a website through a content management system, ranging from a novice to expert level.

#### *Continuum of Layman-Designers*

The content management system *Wordpress* addresses multiple skill levels which makes the toolkit suitable for different layman-designers to use. Fisher has discussed the emergence of adaptive design [3] and argues for a scaling involvement of the consumer in the design process. The notion of a continuum is adopted and appropriate since the layman-designer is neither a passive consumer nor a professional designer. The level of participation from adapting, making, exploring and finally creating depends on the layman's intention, motivation, knowledge and skills. Each increasing step of involvement requires more imagination and comes with more responsibility. The essential difference between a professional designer and a layman-designer is that the latter is a personal designer who designs for his or her own context, whereas the professional designer first and foremost serves others.

#### **Discussion**

This paper raises the issue of openness when laymen are participating in the design of everyday products. When meta-designer and layman-designer develop a product together, to what extent is the layman autonomous and to what extent does the professional designer have control over the outcome? An analogy is made with *Wordpress* that seems to successfully address different levels of openness and thereby allowing people with different skill levels to use the content management system. If this model would be applied to toolkits aimed at creating physical products, how would laymen relate to this activity and what issues would emerge? Moving from a digital environment where people can create websites to toolkits that enable them to design physical products is likely to bring along many issues that cannot all be foreseen. Computational design is an approach that will provide flexibility in the designs, making it possible to have people adapt a design on different levels, from simply aesthetic changes through parameter configuration to complex adaptation by coding. 3D printing is suitable to manufacture the unique outcomes that are developed by laymen.

The laymen's role in the design of everyday products is often limited to customization of mass produced products. In order for the layman to become a *layman-designer* and be able to appropriate the performance of objects to their own needs and desires, the way products are designed will have to change. The professional designer becomes a *meta-designer* who is designing unfinished or incomplete objects that will be finished by the *layman-designer*.

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