Slow Design for Meaningful Interactions

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ABSTRACT
In this paper we report on an exploration of how to apply the theory of Slow Design to mass produced products to establish more mindful usage of products; the intention behind this is to promote product attachment and the associated sustainable benefits of long term use. Slow Design is a design philosophy that focuses on promoting well-being for individuals, society, and the natural environment. It encourages people to do things at the right time and at the right speed which helps them to understand and reflect on their actions. Several authors have proposed Slow Design principles and cases have been reported in which these principles were applied in cultural design projects. These applications indicated that Slow Design can indeed have a positive impact on wellbeing. Although promising, this philosophy has not yet been used in the design of mass consumer products. In this paper we present a design case study in which we explored how the Slow Design principles can be applied in the design of an electric fruit juicer. Two studies are reported on where the conditions for implementing Slow Design are explored. The results led to a revision of the principles for use by product designers. The main finding from the case study is that the Slow Design principles can be used to create more ‘mindful’ interactions that stimulate positive user involvement. This is not from designing interactions that require more time per se, but by stimulating the user to use more time for those parts of the interaction that are meaningful and less for those that are not meaningful.

Author Keywords
Slow design; Product Attachment; Sustainability.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Human Factors; Design; Measurement.

INTRODUCTION
A topic of increasing interest in the HCI community has been ‘user behavior change’ towards being more environmentally conscious and sustainable. One area within this topic is to promote product attachment via the application of emotionally durable design theories [2]. A positive change in the users’ behavior can be achieved by creating a stronger bond between users and their products. “When a person becomes attached to an object, he or she is more likely to handle the object with care, repair it when it breaks, and postpone its replacement as long as possible.”[18]

For this to occur, people need to be motivated to invest time, money and energy into a product in order to increase their bond with it. Thus far, the numerous theories of product attachment have had their principles applied mostly to unique or artistic orientated objects [2]; only a few examples of applying them to everyday objects can be found [15, 5] and consequently, there is scant knowledge on how to apply such theories to everyday products [9].

With product attachment as a basis for their work, the authors have investigated numerous theories that may contribute and support this area of interest. One of the theories investigated was Slow Design and this paper details how this theory was interpreted and applied to a mass produced product for the purpose of exploring its potential contribution to product attachment.

To date the design principles of Slow Design, as stipulated by Carolyn F. Strauss and Alastair Fuad-Luke are yet to be applied to a mass produced consumer product [4]. The six Slow Design principles are currently quite abstract and use terms such as “Slow Design processes and outcomes become agents of both preservation and transformation.” How to apply this to a kettle or television is not clear and thus requires a translation phase to assist designers when using these principles. This abstraction may also be a reason why the Slow Design principles have not been used greatly in product design circles. This is certainly unfortunate, since the world in which we live is becoming more chaotic and the need to appreciate our products and conserve resources is more important than ever before. Slow Design could provide designers with an insight into how to design products that promote a more meaningful
interaction to promote this reflection and appreciation which may ultimately support product attachment. Meaningful interaction with products shares similarities with Salen’s and Zimmerman’s definition of meaningful play, where the product is the game that users (the players) are interacting with and responding to. Meaningful play occurs when the relationships between the actions and outcomes are discernible and integrated into the greater context of the game. The meaning resides in this relationship between action and outcome.

The paper begins with a brief overview of product attachment and introduces the theory of Slow Design. The principles of Slow Design are then redefined to make them more applicable for product design and finally we present a case study where they have been applied for the redesign of a juicer.

BACKGROUND
Product Attachment
Many objects initially acquired for their functional, aesthetic or psychosocial benefits are eventually discarded and in some cases these products are still fully functional [1, 2, 3, 21, 22]. One possible strategy for lengthening product life cycles is to increase the attachment people experience towards the products they use and own [20]. A general assumption is that “When a person becomes attached to an object, they are more likely to handle the object with care, repair it when it breaks, and postpone its replacement for as long as possible.” [18]. Schifferstein and Zwartkruis-Pelgrim defines consumer-product attachment as the strength of the emotional bond a consumer experiences with a product.

Odom et al. picked up “… the problem of understanding why we preserve some things passionately and discard others without thought [14]. According to them there are three main elements that influence product attachment to digital artifacts: function, symbolism and material qualities. They clustered their research findings from a study ‘why people create a stronger attachment with some artifacts’ in the following categories: engagement, histories, augmentation and perceived durability. Meanwhile, Zimmerman focused on product attachment with physical artifacts. He “…produced six framing constructs, which work as specific perspectives designers can take when applying product attachment theory in an experience design project.” [23]

The discussion on the how to strengthen product attachment has been the work of many researchers [16, 2, 7, 17, 12, 22, 18, 23, 13]. Many of whom differ in opinion with regard to the elements that enable product attachment and their relative importance; however we can identify several common elements that appear in all publications: positive or negative memories [7, 13, 18, 12]; changing over time [16, 18, 17, 13]; self expression [7, 17, 12, 23]; group affiliation and social interaction [17, 12, 22, 23]; regular involvement [2, 7, 18]; and well functioning [17, 22].

It can be inferred, that product attachment is supported by product and interaction characteristics such as change and evolvement over time (memories, time), and understanding, transparency and involvement (self-expression, involvement, well functioning). These values and goals can also be found within the philosophy of Slow Design. Therefore, it was a reasonable assumption that the principles of Slow Design, when applied to a product, could also be used for enhancing product attachment.

Slow Design
Slow Design is part of the Slow Movement which advocates a cultural shift towards slowing down the pace of life [4]. It began with Carlo Petrini’s protest against the opening of a McDonald’s restaurant in Piazza di Spagna, Rome, in 1986, resulting in the Slow Food movement. Other sub-movements of the Slow Movement are Slow Technology [6], Slow Cities and Slow Art.

The Slow Technology movement, as described by Hallnäs and Redström [6], state that it is concerned with taking technology applications beyond the efficient and functional to also include expression and reflection in use. Slow Design is not so dissimilar, however its core focus is on promoting the movement to the broad field of product design, which inevitably includes technology and HCI elements.

Alastair Fuad-Luke defines Slow Design as: “Slow Design focuses on ideas of well-being. Wellbeing needs are indirect impacts on health though their relationship to personal fulfillment, quality of life and psychological health. Failure to meet well-being needs results in psychosocial maladjustment and stress-related illnesses. The guiding philosophical principle of Slow Design is to reposition the focus of design on the trinity of individual, socio-cultural and environmental well-being” [4].

Slower human, economic and resource flow metabolisms are integral to the principle of well-being. This encourages those engaged in design to: take a long view; envisage slower rates of production and consumption; stimulate a renewed joy in design (and its outputs); offer new scenarios for the physical, emotional, mental and spiritual durability of design outputs; celebrate diversity and pluralism; envisage slow as a positive sociocultural value; and, focus on the present rather than trying to design the future. [4].

Slow Design Principles
In 2008 Carolyn F. Strauss and Alastair Fuad-Luke published the paper ‘The Slow Design Principles - A New Interrogative and Reflexive Tool for Design Research and Practice’, [19]. Here they describe the six Slow Design principles with which they wanted to “… posit a new evaluative tool to encourage design practices to orientate towards social, cultural and environmental sustainability.
under the rubric of ‘Slow Design’’. The six principles are [19]:

Reveal: Slow Design reveals spaces and experiences in everyday life that are often missed or forgotten, including the materials and processes that can easily be overlooked in an artifact’s existence or creation.

Expand: Slow Design considers the real and potential “expressions” of artifacts and environments beyond their perceived functionality, physical attributes and lifespans.

Reflect: Slowly-designed artifacts and environments induce contemplation and ‘reflective consumption.’

Engage: Slow Design processes are “open source” and collaborative, relying on sharing, co-operation and transparency of information so that designs may continue to evolve into the future.

Participate: Slow Design encourages people to become active participants in the design process, embracing ideas of conviviality and exchange to foster social accountability and enhance communities.

Evolve: Slow Design recognizes that richer experiences can emerge from the dynamic maturation of artifacts and environments over time. Looking beyond the needs and circumstances of the present day, Slow Design processes and outcomes become agents of both preservation and transformation.

Several artistic and cultural design projects have been inspired by the Slow Design principles (for an overview see www.slowlab.net). An example is the ‘sasa clock’ by Icelandic designer Thorunn Arnadottir (http://www.thorunndesign.com). The clock comprises of a sequence of brightly colored beads strung like a necklace, with each color representing an increment of minutes or hours (Figure 1). The string of beads is positioned on a wall-mounted wheel, which turns with an almost imperceptible slowness, releasing one bead every five minutes. Although the beads themselves do represent units of time when positioned on the wheel, they can also be removed from the wheel altogether, representing freedom from time. In doing so, “the clock creates a more emotional perception of time, measured in relation to events in one's life rather than rigid units by which most of us slice up our day.” (http://www.thorunndesign.com)

From the literature there appeared to be similarities between the values and goals for enhancing product attachment [2] and the six principles of Slow Design. Based on this an assumption was made that a product developed using the Slow Design principles may also support product attachment. Therefore, the purpose of this investigation was to explore how to interpret the Slow Design principles for use when designing mass produced products via a case study. The first steps towards this were to understand further the effects of slowing people down with regard to everyday products: when is ‘slow’ a positive or negative element when interacting with a product? For this purpose an investigation to find out “when is it valuable to slow people down” and “what slows people down positively?” were undertaken.

Figure 1. ‘sasa clock’ (© Thorunn Arnadottir)

VALUE OF SLOWING PEOPLE DOWN

The philosophy behind the Slow Movement originated from the observation that, in the current world, people live lifestyles that are too fast; a behavior that leads to work overload and stress. By slowing down, focusing, and thinking about what they are doing and why, people will be able to take control and begin to relax.

To explore this philosophy from a product interaction perspective a brief home study was conducted to uncover the positive and the negative aspects of using devices that perform a task more slowly than the participants’ conventional means of performing it. This would also identify where the value may be in slowing people down when undertaking the given tasks. Furthermore interviews were conducted to gather more insights into ‘What slows people down?’

Driving research questions for the study were:

• How do people feel if they are forced to spend more time on daily activities, such as making coffee?

• Does slowing down the process relax them or cause more stress and irritation?

• To what degree does the time of the day and the context (people around) influence the result?

The five participants of the study were aged between 25 and 60 years and were a mix of Dutch and German nationalities. The participants received the task of using a more time-consuming kitchen device than they would normally use, for one week at home. Two different cases were applied to generate more insights. Two male and one female joined the ‘coffee machine vs. Mokka pot’ study, while two males participated in the ‘bottled juice vs. citrus press’ study.
Those given the Mokka stove top coffee maker were asked to use this instead of their coffee machine. The other participants were given a half-mechanical citrus press and were requested to use it whenever they would usually drink a glass of bottled juice. At the end of this one week home study a semi-structured interview was conducted to identify how the participants coped with these alternative situations.

We have observed that time and context is highly important when it comes to the question of whether people perceive slowing a process down as positive/relaxing or negative/stressful. If people have more time available, such as during a weekend, they perceive slower processes as being nice rituals and relaxing. “It takes more time to use the Mokka and is just a burden during the week. On the weekend I would not mind to take more time for preparing coffee or espresso.” During the week, or when under time pressure, the opposite applies. The main driver for people to prepare coffee or juice in a more time consuming way is that the quality of the result is often perceived to be better, but even more important, preparing it for someone else (mentioned by 4 participants) - “I prepared the juice for me and my girlfriend. I know that she is happy about getting something ‘special’.”

To understand further when slowing down makes most sense, ten interviews with participants aging from 24 to 35 were conducted. The participants were asked to share their experience on what slows them down in a positive and relaxing way as well as what they would like to slow down.

The results from these interviews revealed that a diverse range of activities have a ‘slowing effect’ on people. Physical movement such as sport, stretching, walking or gardening, was mentioned quite often. On the other hand, physical relaxation such as meditating was mentioned, as often as being active. Furthermore, having a structured daily routine or rituals, such as preparing food, tea/coffee or going shopping, was considered as having a ‘slowing down effect’. Some people mentioned that focusing on details, creating something, playing instruments or reading a book slows them down. Drinking coffee or tea, or listening to music was most often mentioned as ways to relax during work. The sentence ‘...doing something else than what I’m doing right now’ was mentioned frequently. Such remarks might explain the contradiction of the presence and the absence of physical movement as being equally relaxing.

These insights were compared to the six Slow Design principles [19] in order to determine which of the key slowing down elements can be found there:

- **Reveal** is about discovering things that are often missed or forgotten. Discovery can happen during listening or focusing.
- **Expand** communication facts that are not expected play an important role. The same can occur during focusing or listening.
- **Reflect** seeks to trigger ‘reflective consumption’, so the user has time to think about his/her actions. This also occurs during listening, focusing or physical relaxation.
- **Engage** is about the sharing of knowledge and cooperation. It is activated when people learn something, such as during listening, creating or focusing.
- **Participate** encourages people to become active. Following the key slowing down elements ensures the application of principles of physical movement, creating, focusing and ‘doing something else’.
- **Evolve** implies a change or a growth over time. Learning a skill, such as creating something also grows over time.

As can be seen in the above comparison, most of the slowing down elements from the interviews and home study are covered, with the exception of daily routines and rituals.

**Proposed Slow Design Principles**

From the previous study on “the value of slowing people down” it was concluded that ‘rituals’ also appear to be an important element of the slowing down process, thanks to its relaxing and reflection inducing character. Ritual, thus, became the seventh Slow Design principle.

The Slow Design principles are not a design method or tool but a philosophy to inspire designers to stimulate thinking in new ways. Since they are to be used to enhance product attachment it is necessary to understand how designers interpret this philosophy and these principles and ensure there is some consistency so that they can be applied by the wider design community hereafter.

To evaluate the principles a creative session with 4 professional designers and 4 design students was organized. They were asked to use the Slow Design principles to generate ideas for a new juicer. It became apparent that the participants required a demonstration of Slow Design project examples in order to understand and apply the principles. Before these examples were provided, the interpretation of the principles varied greatly from person to person; this confirmed that the SlowLab’s definitions of their principles were abstract even to designers. In response to this a more product design related definition was added to every principle and ‘ritual’ was added as the seventh Slow Design principles. The revised descriptions of the principles are:

- **Reveal**: Creating awareness, uncover the function and essence of a product.
- **Expand**: Give a bigger picture: zoom in (what is it made of) and zoom out (where does it come from).
- **Reflect**: Provide time for the user to think and reflect about his or her actions, visualize processes and create narrative products.
- **Engage**: Create Do-it-yourself concepts; the user becomes a designer; the user is active in the creation of the product.

**Participate** encourages people to become active. Following the key slowing down elements ensures the application of principles of physical movement, creating, focusing and ‘doing something else’.
Participate: Create opportunities, supporting the user to personalize and reconfigure the product; the user is active during the use of the product.

Evolve: Create products that are changing or growing over time.

New principle Ritual: Create rituals for a better user experience, stimulating social interaction and providing security and stability in a hectic society.

In Figure 2, an overview of the authors’ states that the proposed Slow Design principles can inspire designers to create product concepts with an enhanced product attachment, leading to a more sustainable use of products.

CASE STUDY ‘JUICYMO’
As we stated in the beginning of the paper our goal was to explore how to apply the Slow Design Principles to mass produced products - which were so far mostly used for craft or artistic projects – for the purpose of potentially increasing product attachment.

The criteria used to select which product would be the focus of the case study was: close user-product interaction; useful life that is longer than two years; and easy to access and evaluate.

A centrifugal juicer was chosen as being the most suitable. This device has a high potential to become a slow product, thanks to, among other reasons, its healthy lifestyle promoting quality and the close interaction between the user and the product. The product’s useful life is long enough to provide the requirements needed to build a better product attachment between the user and the juicer. However, the juicer exhibits few Slow Design qualities. For example, its blades turn at a high speed, producing a lot of noise. Equally important is the fact that the actual transformation of the ingredients into juice takes seconds, but the cleaning requires substantial time and effort.

Process
As mentioned previously, there are many ways to apply the Slow Design principles. For the case study of the centrifugal juicer, the authors will explain their applied design process.

The process began with a research phase, including user research and an analysis of the ‘process of use’. With these insights the first ideation cycle was performed using mind mapping as well as a creative session and sketching of first concepts. A selection of the concepts was evaluated during a focus group. The feedback was used for a second ideation cycle, leading to the final concept “JuicyMo” and a prototype. The process ended with a usability test and user feedback on the Slow Design principles.

User research ‘centrifugal juicers’
In order to gather information about people’s motivations for preparing fresh juice, as well as regarding the perceived advantages and disadvantages of a centrifugal juicer, user research was performed. The research included a product analysis of a Philips centrifugal juicer and interviews. The semi-structured interviews were conducted with 8 participants, all of whom were owners of centrifugal juicers. The insights of the user research are summarized in the ‘main drivers’ as to why people buy and use such a device, as well as the ‘main problems’ that occur during use.

The results of the user research showed that the two main drivers for buying and using the juicer are preparing juice for someone else (e.g. for the user’s children or a partner). 6/8 participants mentioned this as a reason why they bought and use the juicer – “Kids like smoothies a lot”.

Furthermore, ‘feeling healthy while drinking self-prepared fresh juice’ was mentioned by all participants. “I drink juice every day, because my girlfriend and me are in a Detox diet program.” or “Last summer we had a lot of apples in our own garden, so we could just go outside and then prepare a fresh juice.”

The main problems the participants mentioned were cleaning (some parts are very difficult to clean and the device has too many components), storing the juicer (it is too big for most of the cupboards and too dominant to stay on the kitchen counter), the juicer is too loud, and the pulp is perceived as a waste of ingredients and the amount of pulp in the juice cannot be adjusted to suit their own preferences.

‘Process of use’ analysis
In order to understand the context of use and to identify the necessary steps, the juicing process was analyzed. The process usually starts with shopping for the ingredients and storing them. The next step is the preparation of the fruits and the actual juicing, followed by serving and cleaning or vice versa. At the end of the process the user can decide if the pulp should be further processed or thrown away. The decision on which combination of ingredients will be used can take place before shopping or it can depend on the fruits the user has at home.
The next step in the design process was perceived as being highly important by the authors when designing with the philosophy of Slow Design. Slow Design is not just about optimizing the product in terms of convenience; rather, the ‘right moment’ in the ‘process of use’ should be enriched by increasing the user’s experience, joy and fun. Where and when this moment or period is, has to be defined by the designer, supported by the insights of the user research and the ‘process of use’ analysis. In the case of the juicing process, the ‘right moment’ or ‘focus interaction’ was deemed to be when the ingredients are turned into juice, because that is the reason why users buy and use such a device (Figure 3). If it is necessary for the user to understand and reflect about what they are doing, this interaction can take longer than the time currently needed. Consequently, we can also identify the right moments that need to be speed up. In the case of the juicer the moments to reduce or skip were the cleaning time and the ‘bring’ and ‘store’ in the cupboard.

Figure 3. Analysis and comparison of the current and new juicing processes

Ideation
The ideas generated from the use of mind maps were visualized using scenario sketches. Here are some examples from the first ideation phase:

‘Fruit basket’ (Figure 4), a concept supporting the juicer’s permanent place in a kitchen is a device that doubles as a basket for storing fruits and vegetables. This can also encourage users to prepare a glass of juice from the overripe fruits instead of throwing them away.

‘Kneading juice’ (Figure 5); the user is physically active while feeding the juicer. A soft, pillow like lid contains a small opening where the ingredient can be placed. The next step involves ‘kneading’ the ingredients like dough towards the blade.

‘Combined device’ (Figure 6), which offers three devices in one, where only one motor is necessary. The combined device becomes a universal ‘juice machine’, e.g. for smoothies, clear or pressed orange juice. In addition, the multi-functionality presents the user with three more reasons to keep the device in a visible place in the kitchen.

The concepts were meant to enhance the main drivers and to solve the main problems defined in the user research. The next step after the first ideation cycle was to define strong concepts that incorporated the Slow Design principles.

Many of the developed concepts share in common the physical involvement of the user. Concepts within this category are, for example, ‘spinning juice’, ‘wring like a wet towel’ or ‘physical effort to make the juice’. They have all been inspired by the Slow Design principle participate and all require the user to be physically active in order to produce juice. This concept direction strongly supports the Slow Design philosophy. However, in order to find out to what extent users are willing to be active and still use the device, a creative session about ‘physical involvement’ was held. The motivation for this extra research was the rationale that when people are not willing to use a physical interaction means, for example by using a crank, they may stop using the device. This leads to weaker product attachment and a less sustainable product.

A creative session was carried out to investigate the possible added value for the user when a kitchen appliance is powered manually. Furthermore to find out to what extent people are willing to be physically active, as well as when and why they perceive this activity as a positive or negative one.

The methods applied during the session were firstly an observation of the participants while they were using provided objects that had a crank, followed by a group discussion about the experience with the tested objects and other kitchen appliances. Four males and four females between the ages of 45 and 60 years participated in the session. None of the participants owned a juicer, but all owned a blender.

The main conclusion from the session was that people like to be active and involved while using a kitchen device, but
without exhausting physical effort. Moreover, people wanted to be involved in the process of use and to have the feeling of control over the device, though, at the same time, it should not be too exhausting and time consuming.

With this new input, a second ideation cycle was conducted, resulting in the concept ‘Engagement and control’. This concept actively involves the user in the process by letting them hold, press or turn the feeding tube in order to keep the motor running. In addition to involvement, this interaction provides a feeling of control over the device. At the exact moment the user releases the hand, the device stops working.

**Criteria for the final design**

From the 35 concepts, which were developed during the first and second ideation phases, six were selected. They were inspired by five different Slow Design principles. The chosen concepts were translated into a coherent story: the case study ‘JuicyMo’, with the aim of demonstrating the potential of applying Slow Design principles in one product.

Slow Design can be applied to all aspects of a product, including the mechanical elements, therefore the Single Vertical Auger juicing technique that supports the Slow Design principles was selected. The average rotation speed of this technique is 40 rpm, while the speed of a centrifugal juicer is up to 13,000 rpm. This lower rotation speed will damage the juice less with frictional heat, leading to more nutrients and vitamins in the juice.

**Final design**

The final design JuicyMo was built as a non-functioning appearance model in order to test and discuss the applicability and suitability of the Slow Design principles for the development of a mass produced product with added consumer value for enhancing product attachment (see Figures 7-12). JuicyMo presents a plain and simple form language; therefore, it is perfect for combining with other kitchen appliances.

The six concepts / aspects of JuicyMo and their relevance to Slow Design are described below:

*Kitchen Object (Inspired by the principle REVEAL)*

One of the problems encountered in the user research is that users hide their juicers in a cupboard post use. This concept’s compact size, of 320 mm height and diameter of 160 mm diameter, reduces its footprint on the kitchen counter increasing the chance that the user will keep the product on display. The next step for this concept was to allow the user to understand the process of juicing by revealing the device’s function and internal structure. To use the juicer, one takes off the juice and pulp jar (Figure 7).

Once the device is switched on, its parts slowly become transparent and reveal what is hidden behind the casing: first the auger jar, then the pulp container, and finally the juicing jar. The aesthetic kitchen object becomes a kitchen device, revealing its function and internal structure. After juicing the device transforms slowly back into a kitchen object. E-Skin technology can be used for implementing this feature [10, 11]; for the prototype we used samples that were provided by Hewlett Packard.

*Choose Pulp (Inspired by the principle PARTICIPATE)*

The user research showed that people have different preferences regarding the amount of fiber they want to have in their juice. Some prefer to have more fibers (a ‘smoothie’), while others prefer clear juice. Thanks to the double strainer system this new device offers the possibility to adjust the amount of fiber, as well as combining two devices in one: juicer and blender (Figure 8).

Another advantage of this strainer concept, as compared to the existing one, is the ease of cleaning. The current vertical auger juicers come with two different strainers, one with larger and one with smaller holes. The hole size is so small that the fibers get stuck and a lot of effort and a special brush are required to clean it. This double strainer can simply be separated and the larger perforations should be easier to clean. Fewer separate components simplify storage and preparation of the juicer. This design element facilitated the reduction in cleaning time that was unanimously considered to be unpleasant by the participants of this investigation.

*Second Life for the Pulp (Inspired by the principle EXPAND)*

This concept encourages the use of left over pulp. After finishing the juicing process, the user will disassemble the device for cleaning and, while lifting the pulp container from the motor block (cork), they will discover text and
icons printed on the surface, thus information is presented to the user during the decision moment: dispose in the trash or use further (Figure 9).

![Figure 9. Second Life for Pulp](image)

This concept came from the principle *expand*, which considers the option of ‘giving a bigger picture’, thus showing how all elements of a process can be used, such as the discarded pulp.

*Engagement and Control (Inspired by the principle PARTICIPATE)*

As described in the creative session on physical involvement, this concept focused on one of the key elements of product attachment ‘keep user involved’. The Slow Design principle used was *participate*, supporting that the user should be active while operating the device. The final ‘feeding interaction’ with the juicer was solved by using a hollow ¾ sphere on top of the juicer, which represents a bowl where the fruit is placed prior to juicing (Figure 10).

![Figure 10. Engagement and Control](image)

When this small fruit bowl is full, the user can turn the sphere around its axis and the fruit slides into the juicer, where they are crushed by the auger. To provide the opportunity to understand and observe this process, these elements were made from a transparent material. In addition to being involved, this interaction gives a feeling of control over the device.

*Sharing Stone (Inspired by the principle RITUAL)*

This concept was inspired by the principle *ritual*, which supports positive memories and provides security and stability in a hectic society. A ritual can also create or improve a social bond between people. One of the main drivers for people to use their juicer is preparing juice for someone else, a wife, a husband, a child or a friend. One participant of the user research said: ‘*It is worth the effort if I see my wife is happy with a glass of juice*’. This motivation led to the action of sharing the juice at the moment it leaves the juicer. The ‘turn and share’ concept was translated into ‘add stone and share’, where the juicer has one big spout, through which the juice leaves the juicer like a waterfall. If someone wants to share the juice, a ‘stone’ can be added, which divides the ‘waterfall’ in two streams, one for each glass.

*Carefully Serving (Inspired by the principle REFLECT)*

The reflect principle stands for animating people to think and reflect about their actions. This was translated into a jar, where the user needs both hands to lift and pour the juice into a glass. The juice jar is made of white glass, encouraging the user to handle it very carefully, taking the time and paying attention during serving (Figure 11).

![Figure 11. Carefully Serving](image)

*User Test*

The appearance model was used to determine whether users identified the elements of Slow Design that were designed in. Should the elements be identifiable by the participants then it is a reasonable assumption that the principles of Slow Design were successfully interpreted and realized in a form suitable for a mass produced product. Six participants were invited to the kitchen of Philips’ ExperienceLab and asked to explore the Slow Design case study – the JuicyMo.

The prototype employed is a demonstration mock-up, hence, in order to emulate the technique and sound of the JuicyMo as closely as possible, the participants were asked to prepare a glass of juice with the help of an existing vertical auger juicer (Figure 12). During the second task the participants explored the interaction, shape, size, function, and material of the JuicyMo juicer. Additionally, a semi-structured interview was conducted. As a final task the participants were asked, with the help of ‘Slow Design feedback cards’ (Figure 13), to judge which principles they could see and experience in the new juicer. The testing group consisted of three male participants, who have already joined the user research interviews and three female participants, who have never used a juicer before (gender division of the two groups was not intentional).
One of the research questions of the user test was “can users find the Slow Design qualities / principles in the final design and if so, which one?” The principles reflect, reveal, and participate were ranked highest with the Slow Design feedback cards. Below are a few excerpts from the comments given by the participants regarding the reasoning behind their choice:

**Reflect**: “I would observe the juicing process”, “I like the information about the pulp. A nice suggestion on what you can do with it.”, “Usually I focus on what I do, so I think I will watch the window of the juicer.”. “This transparent thing you showed me in the video... that helps to reflect. Maybe.”, or “Yes, ...in this changing effect, I can see ‘Reflect’ in it.”

**Reveal**: “It reveals everything, because it is transparent”, or “It reveals the technology.”

**Participate**: “...removing the pulp and choosing the filter size”, “This is strong, because of the filter and the sharing stone”, “This I can see, because I have to assemble the juicer, cut the fruits in smaller parts, but overall it is similar to my Philips centrifugal juicer, just with less noise.”

**Discussion**

**Reflection on the Slow Design method**

First of all, some words on the name ‘Slow Design’. In the course of the project it was identified that term ‘Slow’ has a negative connotation in our society. It is connected with ‘being less productive’, laziness, and the opposite of speed and fun. However, the Slow philosophy is not about doing everything at a snail’s pace. It’s about seeking to do everything at the right speed. [8] In order to communicate well the message of Slow Design, the authors consider ‘Design for mindfulness and consciousness’ to be a more descriptive and appropriate term.

From the user study with the appearance model JuicyMo it was found that the principles reflect, reveal and participate were identifiable. From this two outcomes can be deduced. Firstly, it was possible to interpret and design using the refined Slow Design principles, since some were noticeable by the end users. Consequently, and secondly, there is room for improvement since not all were clear to the end users; however, this not rule out the potential that they would not have been appreciated following a longer exposure or even subconsciously enjoyed (or not).

The last task of the user test showed that the explanation of the principles, written on the ‘Slow Design feedback cards’, was, for most of the participants, not easy to understand and they had difficulties to rank them. The researcher had to explain most of them twice. While listening to the participants’ comments, it became clear that, in some cases, the principles were interpreted wrongly and needed correction from the researcher. The creation of a testing and feedback tool is the recommendation for further development of the Slow Design principles.

The principles of Slow Design appear to be an inspiring tool for creating product concepts with surprising user interactions and transparent processes, which keep the user involved and lead to an enhanced relationship between user and product. An important outcome that can be drawn from this project is that in order to slow people down the needs of users and living trends of our society have to be taken into account. Balance has to be found between providing product qualities that involve the user more and, perhaps, take even more time to use, learn, and understand them, and, simultaneously offering the convenience of supporting a modern lifestyle. People with busy lives, for example balancing work and children, are willing to spend a few more minutes on interacting with a product they like. However, once ‘slow’ becomes irritating the product attachment decreases as will the frequency of the product usage. If this happens the goal of creating products that are more sustainable is not achieved. The authors recommend combining the use of the Slow Design principles with the results of a user research and an analysis of the ‘process of use’.

The analysis of the juicing process illustrates that some of its segments have to be, and can be, slowed down, while others need to be sped up to create an easier and ‘faster’ handling, leading to a successful final slow product that supports wellbeing. What the ‘right’ or the ‘important’ moment is to slow a process down must be discovered for every Slow Design project as an essential step.

**Conclusion**

From this work we have demonstrated that Slow Design principles can be interpreted by designers and indeed be applied to a mass produced product. In conjunction with
Design principles were written to provide inspiration and support the product attachment theories. The original Slow Design principles were written to provide inspiration and direction during a design study; to ensure success when applying them it was found from this study that detailed user centered research into how a product is used is required to identify when it is best to slow people down during use.

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