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Vincent van Rheden, Bart Hengeveld
Eindhoven University of Technology, Eindhoven, The Netherlands
v.rheden@tue.nl, b.j.hengeveld@tue.nl

An Exploration In Kitchen Blender Interactions Aimed At Designing For Higher Levels Of Engagement

Abstract
This paper illustrates three novel kitchen blender interactions aimed at bringing about a higher level of engagement with interactive products, as a response to current, seemingly un-engaging interactions. We describe our starting points and approach after which we present the designed blender interactions. Following that, we illustrate the set-up of our first evaluation and present preliminary findings. We wrap up by outlining future work.
The experiment was performed comparing the novel interactions with the original blender interaction using Rozendaal's Richness, Control and Engagement (RC&E) Framework. The outcomes suggest that the designed interactions are indeed more engaging than the original blender interaction.

Keywords
Engagement, Interaction design, Mindfulness, Human skill

1 Introduction

As described by Sloterdijk [13] we increasingly live our lives in the media: instead of having proper attention to a task at hand, we get distracted more and more by the digital realm that over the past years has blended thoroughly into our non-digital one. As designers of interactive artefacts, we feel this trend of being-in-the-media is not good. We prefer being-in-the-world, and do not stand alone here. For example, Hummels [7] analysed kitchen appliances throughout the 19th and 20th century and observed that Human-product interaction has become less physical and less engaging, partly due to uniformity. Also, Frens [4] observed that electronic products are typically operated through small, standardized actions., making that products require us to interact through buttons and menu screens, relying on mainly our cognitive skill, instead of the three skills identified by Overbeeke et al. [9], i.e., cognitive, perceptual-motor, and emotional skills.
The work described in this paper connects to these observations and is specifically aimed at investigating how to design interactive artefacts in such a way that they engage us in the non-digital so that we are less consumed by the digital. We present two contributions: Three compelling examples of interactive artefacts to demonstrate the just mentioned direction and an evaluation of these artefacts. What follows is a short introduction to the designed blender interactions and a pilot study that provides initial indications that addressing all human skills might lead to higher levels of engagement.
In order to engage people we can learn from what has already been said about engagement. For example, Chapman [2] states that *"something that 'engages' us is something that draws us in, that attracts and holds our attention"*. Also, engagement can go as far as being in a flow, which is when someone is fully engaged in an

Fig. 1. Three Novel Blender Interactions: Rotary, Push and Pull

activity, having intense focus and concentration on present moment, the merging of action and awareness, loss of reflective self-consciousness [3]. In the context of product design, Quesenbery [11] defined engagement as: *"the degree to which the tone and style of the interface makes the product pleasant or satisfying to use."* where 'tone' and 'style' can be seen as hedonic qualities relating to the intrinsic stimulation of a product in order to use it, rather than pragmatic functional attributes of a product [5].

2 Designing Kitchen Blender Interactions Aimed At Higher Levels Of Engagement

2.1 Design process

To explore how to design for more engaging interactions through addressing multiple human skills, we developed a set of three interactions with a kitchen blender, following a Research-through-Design process, which can be described as a process in which scientific knowledge is generated through, and fed back in consequent cycles of designing, building and experimentally testing [6, 8]. In our design process we allowed ourselves to be inspired by activities from our daily lives with a special focus on bodily engagement, ranging from careful and controlled, to energized and large. We describe these below when we address the designed interactions. We translated the inspirations into meaningful and natural mappings between user input and functional output using the Interaction Frogger framework [14]. Below we describe the outcome of this process.

2.2 Designed interactions

Interaction 1: Rotary. This interaction (See Fig. 1, top left) was inspired by the precision we holds a pencil while painting. The speed of the blender is mapped to the degree to which the stick is rotated: the further the stick is rotated counter-clockwise, the faster the motor will spin. Rotating the stick back will decrease the blender speed.

Interaction 2: Push. The second blender interaction (Fig. 1, Interaction 2) resembles a pump that requires continuous repetitive input. The increase in pressure applied to the handle at the top of the blender is mapped to the increase of the blender's speed. Releasing the pressure has no result on the motor speed. This means that the user needs to keep on pushing down in order to keep the blender spinning.

Interaction 3: Pull. The third blender interaction was based on a 'top and whip'; a toy from the past in which the goal was to keep the top spinning. It has a string that can be pulled out of the top of the body, similar to starting a motorboat (Fig. 1, Interaction 3a). The acceleration with which the string is pulled is translated to the acceleration of the blender motor. The string is automatically pulled inwards this has no effect on the blending speed. In order to keep the motor spinning, the user can rotate the handle above the blender body (Fig. 1, Interaction 3b). By rotating faster, the blender speed will increase, by rotating more slowly, the blender will decrease in speed.

A movie of the working prototypes can be found at: http://vimeo.com/118347875

3 Evaluating the Kitchen Blender Interactions

3.1 Goal and setup of the experiment

The goal of the evaluation is to explore to which extent the designed interaction styles - addressing not only cognitive, but also perceptual-motor and emotional skills - lead to higher levels of engagement in comparison to the original push-button blender interaction. We chose for this original interaction style

Fig. 2. The Original, Rotary, Push and Pull interaction during the evaluation

as it is also can be found in a lot of other appliances. Four participants (25-37yrs) who are experts in the field of interaction design were recruited, as they are able to look beyond the flaws of the prototypes and are able to focus on the experience and interaction. All participants had experience with blending prior to the experiment. The experiment held qualitative and quantitative components. The qualitative component was conducted through observations and the think-aloud method [10]. The quantitative component consisted of a questionnaire using attributes based on Rozendaal's RC&E framework [12], which was developed to assess the level of engagement with a product The framework is composed of three elements: Richness, Control and Engagement. Through the levels of Richness and Control the levels of Engagement can be predicted. Richness captures the level of experienced variety and complexity of thoughts, actions, and perceptions that are evoked during the activity and is strongly influenced by the product features. Control captures the experienced effort one needs to invest in order to fulfil a goal. It relates to feelings of competence and confidence during the interaction.

In order to assess the experienced levels of Richness, Control and Engagement we used the attributes assigned to these elements to create a survey assessing the attributes on a seven-point Likert-scale. *Challenge, stimulating, enervating, possibilities, variety and richness* are the items assessing Richness. *Control, self-confidence*, *ease, clarity, freedom* and *personal style* are the items used to assess Control. The elements assessing Engagement were: *engagement, fun, motivation, enjoyment, challenge, excitement, freedom, stimulating, personal style.*

All four blenders were evaluated through the following procedure, consistent of two main parts. In the first part the participant firstly gets time to explore the interaction and to get acquainted with it by blending crisps to pulp. In order to give a clear goal and get the participant focused on actually blending, they are asked to blend crisps down to approximately one-fifth of their original size. Participants were encouraged to think-aloud [10]. In the second part the participant fills a questionnaire and is encouraged to motivate the answers. This way qualitative insights are gained about the experiences regarding the attributes in the questionnaire. For each blender interaction this process was repeated, varying the order in which they were presented in order to prevent influences from this order.

4 Findings

Figure 3 shows the quantitative findings retrieved from the questionnaires. The bars show the medians of the results of the overall levels of Engagement, Richness and Control per blender interaction based on the attributes outlined in section 3.3.

We performed a thematic analysis [1] on the think-a-loud quotes and observations. First we familiarized ourselves with the data by transcribing the recorded data, resulting in 27 quotes and 12 observations. We categorized these quotes and observations to Richness, Control and Engagement per blender interaction.

We realize that a number of four participants is too low to draw solid conclusions, yet the quantitative outcome allows us to easily visualize the results in order to get a general overview our findings that we will explain using the qualitative data.

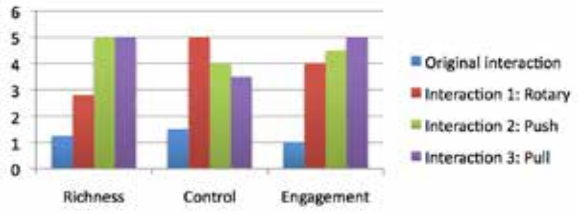

Fig. 3. Levels of Richness, Control & Engagement per Blender Interaction

The three novel blender interactions all show higher levels of Engagement in comparison to the original interaction. The Original Interaction scored in terms of Richness very low. As a participant noted *"there is only one option; pzzzz, look what it is, pzzzz, look what it is...this makes it very easy"*. Also at the level of Control the Original Interaction scores low. As one participant prompted when attempting to blend crisps into little pieces: *"I approached it gently, but the result wasn't really gentle"*.

Overall it seemed that the Rotary Interaction was experienced to be most controllable of all interaction styles: *"it is possible to very subtly search for the right speed, and switch very subtly between slowly and just a bit faster and back to slowly"*. But it was – though more Rich than the original interaction- less challenging, exciting and enervating than the Push and Pull blenders that allowed more freedom in expressivity through their mappings. Therefore the Rotary was also less Engaging: *"Since you have this much control it is also less challenging"*.

Interaction 2 and 3 were experienced to be less easy to control in comparison to the Rotary Interaction but were both experienced to be more Rich and Engaging. Where the Rotary Interaction was relatively not challenging, the Push and Pull Interactions seemed to leave room for growth and were more engaging over time: *"You need to learn to couple your proprioception to the speed of the thing"*. Though, this also resulted in lower experienced *self-confidence* when using the blenders with Pull and Push Interaction.

5 Discussion

The first evaluation showed indications that the taken design approach that not only addresses our cognitive, but also perceptual-motor and emotional skills, led to higher levels of Engagement in a short lab setting evaluation. A more rigid experiment needs to be conducted in order to be able to make actual claims.

It would be interesting to evaluate the novel blender interactions on engagement during long-term experiments. Probably the skill level of the participant would increase leading to higher levels of Control and possibly decreasing the level of Engagement.

As the current exploration focuses on blender interactions, we are currently looking for other kitchen interactions in order to broaden the area of types of interactions to which the design approach would be applicable to design for interactions with higher engagement levels.

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