Meaningful Interaction of Male Users with Product Shapes
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1. Introduction
This paper refers to a study that explores the semantic dimension of products and interactions. It investigates the quality of product shapes in triggering meanings that provoke users’ responses. In the first part, the paper describes Meaningful Interaction (MI)\(^1\) as a framework for analysing the semantics of products and users’ responses. MI is based on the thinking that the features of products and contexts of interactions have semantic properties, and that the meanings triggered during interactions may elicit specific responses in the pragmatic and emotional dimensions. In the second part, the paper summarises the findings from an empirical study with a sample of male users, and outlines initial thoughts about the MI of male users with products.

2. Background of the study
The study of the semantics of products has been researchers’ subject of investigation aiming to unveil the meaningful dimension of products and users’ understanding (Csikszentmihalyi and Rochberg-Halton, 1999; Fleming, 1996; Vihma, 1995; Du Gay, 1997; Pearce, 1986; Krippendorff and Butter, 1984). There is even the belief that semantics might be soon considered as the next paradigm in design (Krippendorff, 2006). Concomitant to the rising of semantics, the study of emotion in design has gained more evidence and academic support (Design and Emotion, 2006; Norman, 2004; McDonagh et al., 2004; Cagan and Vogel, 2002; Jordan, 2000). Also, the study of issues in design interaction is now one of the most debated topics (Bagnara and Smith, 2006). However, the literature about these three current subjects in design (semantics, emotion and interaction), shows that the relation between the meaningful qualities of products and the emotional interactions that people may have with products has not yet been satisfactorily investigated, and certainly in order that designers can benefit. We still need a clear understanding of the qualities of product features which elicit meanings that can trigger specific reactions. Few publications have reported

\(^1\) The acronym MI will be used to avoid successive repetitions of the term Meaningful Interaction.
theoretical and empirical approaches on this matter (Wensveen, 2005; Green and Jordan, 2002).

The motivation of this study is rooted in the view that designers should approach functionality, usability, semantics and emotion as equally important. This implies a move from the understanding of products as something principally settled to fulfil practical tasks to something that also is able to communicate their qualities to users, and establish emotional and other types of interactions. In the course of this study, the idea of Meaningful Interaction (MI) was developed as a contribution for the study of the relation between semantics, emotion and interaction in design. It is based on the view that the main elements involved in interaction (people, products, and contexts) are active characters that play important roles in the process of establishing meanings that trigger emotional and other types of interactions. As people may attach meanings related to usability and other non-usability related terms, MI offers a systematic means for the scrutiny of semantic issues in interactions in two dimensions and four types of semantic values.

In order to verify MI empirically, the study explores the interaction of a sample of 44 male users with seven product shapes. The experiment looks at current thinking which suggests that male consumption of products has been changing to a more sensitive level (Salzman et al., 2005; Sturrock and Pioch, 1998). The experiment used packaging, which is also known for its semantic qualities despite commonly understood as primary concerned with functionality (Barnes et. al, 2003; Baxter, 1995: 220).

3. Meaningful Interaction (MI)

Meaningful Interaction is defined as a dynamic process observed at the semantic level of the relationship between people, products and contexts. It is based on a dialogical process of communication between these three elements through the combination of actions at the semantic level. MI provides a means to access the distinct and indistinct meanings and associations in design and interactions, including the symbolic and non-symbolic related meanings connected to the inherent quality of products and the external references represented in products. It ascribes two dimensions for interactions (pragmatic and emotional), and four semantic values (practical, critical, ideological and ludic)² for clustering and analysing information about the semantic dimension of interactions. MI is presented as a framework for

² The MI framework, including the two dimensions and the four semantic values, took inspiration from Jean-Marie Floch’s ‘grid of consumption values’ (Floch, 2000: 118).
the systematic analysis of adjectives, associations, statements, and behaviour gathered during interactions.

**The pragmatic and the emotional dimensions of MI**

The *pragmatic dimension* of MI refers to the dimension of interaction where users’ understanding of the product qualities is rooted in product-based values. In this dimension users’ associations and understanding of products are tied to a view of the product qualities themselves.

The *emotional dimension* of MI refers to the dimension of interaction where users’ understanding exposes people-based values. Thus, it is rooted in emotional, affective, and symbolic aspects of design interaction.

**The practical semantic values of the pragmatic dimension of MI**

The *practical semantic values* of meanings in MI cover the users’ semantic associations connected to the physical attributes, including tangible and perceivable qualities of products. In the practical semantic values, users’ understanding about material, shape, proportion, colours, textures, and other features trigger understanding such as proportioned and stable.

**The critical semantic values of the pragmatic dimension of MI**

As in the practical semantic values, the physical features of products also generate *critical semantic values*. However, associations and meanings at this level disclose user’s assessments and indicate how they might feel. For instance, comfortable and friendly reveal how a user feels about a product.

**The ideological semantic values of the emotional dimension of MI**

The *ideological semantic values* imply symbolic paradigms embodied in products. Products that represent social paradigms, status, identity, lifestyle, and personality have symbolic qualities as primary reference for users such as fashionable, male/female, and traditional.

**The ludic semantic values of the emotional dimension of MI**

The *ludic semantic values* disclose user’s responses related to playfulness. They expose a sort of ‘state-of-spirit’ and mood of users projected on products during interactions. Associations such as funny and boring, expose more about users’ feeling than their understanding about the product inherent qualities.

**The MI framework**

MI is proposed as a framework for clustering and analysing information based on empirical and non-empirical data. The four semantic values are the core of the MI framework,
providing systematic analysis of users’ responses (Figure1). The MI framework is divided into two domains of signification: denotative and connotative. The denotative domain encompasses the pragmatic dimension, and the connotative domain includes the emotional dimension. The curved arrows represent the dynamic relationship between the four semantic values, meaning that they could arise isolated or interconnected during interactions.

<table>
<thead>
<tr>
<th>Denotative Domain</th>
<th>Connotative Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pragmatic Dimension:</strong> Product-based values</td>
<td><strong>Emotional Dimension:</strong> People-based values</td>
</tr>
<tr>
<td>Practical Semantic Values</td>
<td>Ideological Semantic Values</td>
</tr>
<tr>
<td>Critical Semantic Values</td>
<td>Ludic Semantic Values</td>
</tr>
<tr>
<td>Pragmatic Dimension: Product-based values</td>
<td>Emotional Dimension: People-based values</td>
</tr>
</tbody>
</table>

![Figure 1](image-url)  
**Figure 1**  
The MI framework.

4. Research method

The empirical study was conducted in two phases. The first phase explored users’ responses to the emotional dimension of MI. Interviews were conducted while participants’ behaviours were observed and videoed during the interactions. Five open-ended questions related to the four semantic values of MI were used as stimulus\(^3\). The second phase aimed to gather quantitative data, and explored both pragmatic and emotional responses. After the videoed interview, the participants completed a semantic differential questionnaire with 20 bipolar adjectives collected during pilot tests. The adjectives were clustered according to the

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\(^3\) The five open-ended questions were: (1) two shapes that seemed to be the most practical for grasping and handling; (2) two shapes that seemed to be the most enjoyable; (3) two shapes that could reflect the participant’s lifestyle and personality; (4) two shapes that seemed to be designed to perform mainly a practical function; (5) two shapes that seemed to be designed to perform mainly an emotional function.
four semantic values (Figure 2). For each shape the participants were asked to rate the bipolar adjectives in a scale with seven levels from strongly agree to neutral.

<table>
<thead>
<tr>
<th>Pragmatic dimension of MI</th>
<th>Emotional dimension of MI</th>
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<tbody>
<tr>
<td>Practical values</td>
<td>Critical values</td>
</tr>
<tr>
<td>Steady-Unsteady</td>
<td>Functional-Not functional</td>
</tr>
<tr>
<td>Solid-Soft</td>
<td>Comfortable-Uncomfortable</td>
</tr>
<tr>
<td>Geometric-Organic</td>
<td>Usable-Unusable</td>
</tr>
<tr>
<td>Proportional-Not</td>
<td>Simple-Complex</td>
</tr>
<tr>
<td>Proportioned</td>
<td>Pleasant-Unpleasant</td>
</tr>
<tr>
<td>Balanced-Not balanced</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2  The bipolar adjectives used in the semantic differential questionnaire.

Seven products were used in the experiment. As we know that men are mostly tolerant to neutral and achromatic colours (Guilford and Smith, 1959), the products were painted in grey in order to focus the participants’ attention on the shapes. The shapes were clustered according to their configuration as: predominantly organic (Shapes 1, 2, 3), predominantly geometric (Shapes 4, 5), and hybrid (Shapes 6, 7) (Figure 3).

Figure 3  The seven products shapes used in the empirical study.

An opportunistic, non-random sample selection was used to choose the participants (Bryman, 2001: 97; Clark-Carter, 2004: 157). In total, 44 men aged 18+ responded to the tests. The sample was divided in two age groups: Group 1 <35 and Group 2 >35. The study aimed to identify the responses of the two groups, as there is the belief that younger consumers are more willing to try new products (Mintel, 2005; Mintel 2004).

5. Empirical study findings

The following text summarises the study findings. First the findings from the questionnaire are outlined. Then, the findings from the videoed interview and the main actions taken by the participants are briefly described.
5.1 Questionnaire findings

Shape 1
Despite triggering significant MI in the emotional dimension, this shape was largely seemed in the pragmatic dimension. The two groups felt similarly induced to make firstly using related evaluations (pragmatic dimension), and then ‘enjoying and playing’ with it (emotional dimension). Group 1 (<35) saw it mainly at the critical and ideological levels whilst group 2 at the critical level. Group 1 had more significant MI with this shape in the emotional dimension than group 2, which was more likely to have MI in the pragmatic dimension. The indentations and waist of this shape were effective to trigger meanings that drive to handling and usability. Nevertheless, it demonstrated potential to induce male users to feel connected to its ludic qualities.

Shape 2
This shape was often criticised and provoked negative feelings. Both groups 1 and 2 saw it primarily in the pragmatic dimension of MI. Its curves activated meanings strongly related to its manipulation, and to how users felt while handling it. Its qualities related to use and function were the most evident to the two groups. Its configuration seemed to be both persuasive about its positive practical qualities, and yet able to trigger negative emotional responses. Most of the associations made by the mature group in the emotional dimension were negatives. In general, most of the participants had MI with this shape in the pragmatic dimension.

Shape 3
This shape caused uncertainty about its function, provoking vague responses of the two groups about its semantic qualities. Among the three predominantly organic shapes, both groups saw it in a positive way in the emotional dimension. Group 2 (>35) had mostly pragmatic understanding though, whereas group 1 (<35) responded more significantly in the emotional dimension. Nevertheless, most of the participants had MI with Shape 3 in the pragmatic dimension. One aspect that should be highlighted is its quality to provoke oddness and misinterpretation of both groups.
Shape 4

The configuration of this shape triggered ideas related mainly to practical and critical semantic values. The strongest reactions of group 1 and group 2 were in the pragmatic dimension. Its physical features had important role on how participants saw it. Its straight geometric configuration was effective to evoke meanings related to its physical qualities. This probably explains why this shape was viewed more in terms that communicate stability and functionality than establishing emotional connection.

Shape 5

Among the seven shapes, this shape provoked the strongest reactions in both pragmatic and emotional dimensions. Despite the two groups had remarkable experiences at the practical and critical levels most of the participants saw it as a ludic object. Nonetheless, group 1 (<35) had stronger experience in the emotional dimension than group 2 (>35). Most of the younger group responded heavily to the emotional semantic values, whereas the mature group responded primarily to the pragmatic values.

Shape 6

This shape, which combines curved and flat surfaces, caused surprise and interest, but also confused the participants. Group 1 and group 2 felt mostly induced to explore its physical attributes and make using evaluations. The younger group gave significant responses in the emotional dimension and yet had mainly pragmatic MI. This supports the idea that participants were uncertain about the semantic qualities of this shape.

Shape 7

Despite it also has a combination of curved and flat surfaces, this shape produced stronger MI – and was identified as simpler – than Shape 6. This might be the reason why the testers had a more balanced experience in the pragmatic and emotional dimensions. Its pragmatic qualities were rated highly by both groups. The responses were somehow balanced between positive and negative qualities. Nevertheless, it provoked mostly negative responses in the emotional dimension.

5.2 Findings from the videoed interview and observation

According to the associations spontaneously declared during the interactions, the curved shapes provoked the largest number of reactions, specially Shapes 1 and 5. Shape 1
triggered associations mostly in the pragmatic dimension of MI, whereas Shape 5 triggered mostly emotional responses. The organic shapes were mostly understood as pragmatic, and the geometric shapes as emotional. The hybrid shapes did not provoke significant responses (Figure 4).

<table>
<thead>
<tr>
<th>Questions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pragmatic dimension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most practical for grasping/handling</td>
<td>82%</td>
<td>52%</td>
<td>20%</td>
<td>2%</td>
<td>23%</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>Perform a practical function</td>
<td>43%</td>
<td>64%</td>
<td>36%</td>
<td>14%</td>
<td>14%</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>Emotional dimension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most enjoyable</td>
<td>34%</td>
<td>16%</td>
<td>32%</td>
<td>23%</td>
<td>64%</td>
<td>23%</td>
<td>9%</td>
</tr>
<tr>
<td>Reflecting personality/lifestyle</td>
<td>27%</td>
<td>13%</td>
<td>20%</td>
<td>20%</td>
<td>30%</td>
<td>9%</td>
<td>16%</td>
</tr>
<tr>
<td>Perform an enjoyable function</td>
<td>20%</td>
<td>11%</td>
<td>14%</td>
<td>14%</td>
<td>50%</td>
<td>27%</td>
<td>29%</td>
</tr>
</tbody>
</table>

**Figure 4** Sample’s responses to the interview during the videoed interactions (percentages of the sample).

The responses to the interview were emphasised by gestures during the interactions. The following text describes some of the participants’ behaviour as means to access how they expressed their view about the shapes. The following text analyses briefly some of these actions and presents video stills from the videoed interactions.

**Approaching, touching, grasping, and handling**

Three main types of approaching were identified (Figure 6).

**Figure 6** The main types of approach: (1) straightforward, (2) reluctant, (3) not touching.

Shapes 1 and 5 provoked the straightest approaches. They triggered most of the choices in the pragmatic and emotional dimensions. The organic shapes were the most effective in impelling the grasping. Shape 1 with indentations was frequently grasped firmly.
Shapes 1, 2 and 3, and Shape 5 attracted the participants to hold them longer than the other shapes. It was not identified substantial differentiation between the two age groups on this matter.

**Figure 7** The main types of holding the shapes.

**Checking/finding out and trying out shape function**

In order to explore the products, the participants usually followed the clues on the shapes. They usually reacted positively when discovering the function and how to use (Figure 8). When they could not identify the function they reacted negatively. Conversely, some very simple and obvious shapes – such as Shape 7 – were qualified as ‘boring’. Shapes 5 and 3 triggered most of the attempts to explore usability.

**Figure 8** Checking/finding out and trying out shape function and use.

**Making analogies**

The analogies expressed during the interactions revealed emotional reactions trough ideological and ludic associations. The shapes that produced this behaviour the most were mainly the organic and curved types, specially Shapes 1 and 5. They triggered analogies related to ball, gun, joystick and controls (Figure 9). The organic shapes with indentations and waists were the most described as looking like a hand or the body (Figure 10).
Figure 9 Examples of behaviour when participants made analogies with: (1) the female body (Shape 2); (2) a remote control (Shape 1); (3) a gun or pistol (Shape 1); (4) a ball (Shape 5); (5) an extension of the arm (Shape 6).

Figure 10 Making analogies with the hand.

Having fun, playing, enjoying

This type of behaviour revealed emotional reactions at the ludic level. Shapes 1 and 5 invited participants the most to play and make jokes, triggering associations to sport, music and gender. The younger group performed spontaneous ludic reactions more readily than the mature group (Figure 11).

Figure 11 Playing with the shapes: (1, 2) Shape 5 as a ball, (3) Shape 1 as a weapon.
Checking out the shape tactile qualities

This behaviour revealed pragmatic reactions at the practical level (Figure 12). Shape 5 inspired the exploration of physical qualities the most. The main aspects explored were the form, the textures and the weight. It was noted that those participants with higher educational level explored, and explained, the physical attributes of the shapes in more detail than those with lower level of education.

![Figure 12](image)

6. Conclusion

The study succinctly described in this paper provided initial evidence about the MI of young and mature men with product shapes, including information about the meaningful connection between the types of behaviour, the spontaneous reactions and the product shapes. The findings indicated that the Meaningful Interaction framework is a valuable means for clustering and analysing product semantics and people’s responses during interactions.

We found that the younger participants were eager to react to the products. Conversely, some mature participants had hesitant and less enthusiastic behaviour. The younger participants tended to have evident interest in new designs, and a more sensitive understanding of the product attributes. The group of men above 35 had more significant MI in the pragmatic dimension than the younger group under 35. The younger participants were keener than the mature to see the products in ideological and ludic semantic values (emotional dimension). Also, the findings showed that whereas the mature group understood the shapes primary at the critical and practical levels (pragmatic dimension), the responses of the younger group were more equally distributed amongst the four semantic values.

The videoed interactions showed a huge diversity of behaviours. The most significant types of behaviour of both groups were identified, and the findings indicated that the younger group responded more immediately and spent more time exploring the shapes. The study
suggests that participants with higher level of education, and in professional occupations\(^4\), had a more inquisitive attitude than those with lower level of education. Those with higher education also explored the shapes more intensely, and made significant comments in both dimensions of MI more frequently. Conversely, those with lower education and in elementary occupation responded less enthusiastically to the interactions.

The findings tell us valuable information about the semantic quality of products. For instance, the organic shape with indentations was more understood in the pragmatic dimension, whereas the spherical shape was in the emotional. In summary, the findings showed that: (1) the organic shapes triggered meanings primary associated to the pragmatic dimension; (2) the geometric shapes were thought to be mostly in the emotional dimension; (3) the hybrid shapes provoked a plethora of different meanings, causing hesitant reactions.

However, there are some limitations of the study. Despite the rigorous process undertaken to select the sample profile, the number of people who attended to the experiment does not allow to generalise the results to the UK male population. Also, the participants who attended to the tests came mostly from the university campus and surrounding area. Thus, the results of tests conducted in different environments with different types of people might be different. The products tested also entail limitations to the study. The pragmatic nature of packaging sometimes led participants’ view and responses. Also, as people have holistic experience with products – especially packaging – brand, colours, textures and material should be considered for future MI investigation.

7. References


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\(^4\) The participants’ occupations declared in questionnaire were assembled according to the UK Standard Occupational Classification 2000 (SOC 2000).


