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# HELPING YOUNG DESIGNERS DESIGN FOR CHILDREN: EVALUATING TOYS AND POSSIBLE VALUES

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**ABSTRACT**
When designing for children, it remains important not only to emphasise elements such as ergonomics and usability but also values, that can be translated into pleasurable user experiences for children. While methods such as interviews are commonly used to better understand our users, interviewing children can be a challenge. Experience as part of a year project on designing toys for children highlighted that children might answer questions in a surprising way, or students might struggle to ask questions that are not suggestive. To overcome some of these difficulties, we developed a Value Matrix, that can help students to explore the various values or incentives children might have while playing. This Value Matrix can subsequently be used to scan existing toys or new concepts and translate these insights into toys that consist of a wider variety of values children like to experience in a game or toy. We evaluated this tool with 118 first year Industrial Product Design students. Our results show that the Value Matrix gives students guidance and support while designing.

*Keywords: Values, design methods, children, toy design.*

## 1 INTRODUCTION

### 1.1 Challenges

Play is characterized by being pleasurable, internally motivated, requiring engagement and being voluntary [1]. However, while these attributes for play are similar for children and adults, designing for children differs in many aspects from designing for adults [2]. Besides being more vulnerable than adults, children are less predictable, more prone to experimentation - using objects in novel ways - and varied in skills even at the same age [3]. Significantly, as noted by Read & Bekker [4] children interact differently with products that adults. Toys should meet a child's expectation of what a toy's purpose and function is, while promoting exploration [3].
While previously emphasis was placed on elements such as human factors and ergonomics during the design for toys [2], more emphasis is being placed on factors such as pleasure and experience [5]. Read [6] further points out that children value the experience of using products more highly than functional aspects or usability.
Designing for children can thus be challenging: children interact in a different way with toys than their (adult) designers, while it is similarly not sufficient to only focus on product features. These issues are also highlighted by Iversen et al. [7] that rather than focusing on functions, it is important to stress motives and values when creating products for children.
Given these difficulties we propose that to design products for children, it is necessary to explore different values when designing, especially for young designers. In our contacts with regional toy manufacturers we discovered that toy design was not always "user centred design" since the design was often based on ideas about what children will like instead of conclusions drawn out of observations and interview with children

### 1.2 Values

Values are *evaluative beliefs that synthesize affective and cognitive elements to orient people to the world in which they live* [8]. Hitlin and Piliavin [8] argues that *values are more durable than attitudes* stressing that values are more closely linked to our identity. A main concern is thus the identification of values. During interviews an often-used technique is laddering, where interviewers follow through with more in-depth questions about topics [9]. To arrive at these values industrial product design students (n=80) were asked to interview children. First the students were taught to recognize biases and perspectives, in order to become better interviewers when they were sent to different schools to talk to their preferences about using toys.

Interviews were problematic: students were unable to gather user values needed, they were often surprised by the reactions of the interviewed children and it seemed hard to improvise with the right questions. For example, a girl said that she loved to play with Barbie's. The student followed through with a good open ended question about what she liked about Barbie's. The little girl answered that she liked Barbie's because they could talk. The student was so surprised about the answer that he forgot to ask more about the talking-capabilities of the dolls, but quickly added 'you like them also because they have lots of clothes and beautiful houses'.

The following exchange further illustrates the surprising nature of interviewing children:

*Student: What do you want to become, when you're older?*
*Girl: I'd like to become a mama*
*Student: Why do you want to become a mama?*
*Girl: Because I want to go to work.*
*Student: What do you want to do as work?*
*Girl: With computers*

According to some of our prejudices the answer of this young girl is surprising. Many people have another idea about what it is to become a mother. The intention of the interviews of the students was that afterwards the students would adapt toys according to the values they could identify with the children. These values were not identified, and in their adaptation of existing toys, they mostly invented toys of their own, instead of building further on the values in the interviews.

These exchanges emphasise how troublesome it can be for young designers to conduct interviews with children. As a result, they also struggle to derive any values that might be incorporated into toys. Given these issues, we provided students with a framework of possible values, presented as a Value Matrix. Based on Schwartz's model of values [10], the values are also introduced by Smith [11], when discussing motivations to play. We selected Schwartz's model, given its previous use in product design [12], [13]. Some of the values introduced by Schwartz may sometimes be less applicable to children. For example, 'respect for traditions' is a value where young children are less familiar with, while values such as creativity, curiosity, independence, success, sense of belonging, pleasure, power, or intelligence may be more applicable to a child's experience. We structured the matrix to include values that we viewed as being appropriate in the context of toy design.

Furthermore, the motivational factor of playing is not solely based on skills and attitudes. Even a crow can open a bottle of milk if it's motivated. Values are *the criteria people use to select and justify actions and to evaluate people (including the self) and events* [10]. While playing, even if we follow attempts of defining play as *done for its own sake* [11], children experiment with these values. It's not only at adult age that values 'pop-up', they are continually shaped and re-shaped throughout life.

In the scope of our research the goal was to adapt existing toys for very young children, taking a hacking approach [14]. In the scope of this article, we focus on how Value Matrix can help students to escape from their own references in order to create concepts adapted to the children's world.

| Construtive | Cognitive |
|---|---|
| Completing something | Discovering |
| Adding Functionality | Problem Solving |
| Invent | Challenging |
| Creative | Social |
| Imagination | Role playing |
| Decorate | Caring |
| Present / show | Contributing |

*Figure 1. Value Matrix based on Schwartz* [10]

Such a framework provides students with an insight into a variety of values that reach beyond those they currently hold. Identifying values by themselves and trying to recognize the presence of these values in others and in possible ways of playing, helps them to escape from their own biased view and ideas about the children's world. Below we expand on how we implemented and evaluated the Value Matrix.

## 2 EVALUATING THE VALUE MATRIX

To evaluate the Value Matrix, we presented it during an intensive design week for junior Industrial Product Design students (n=118). Students were all in their first year, and could thus be considered novice designers [15]. Students were put in groups of 4 or 5 students. During this week the students had to evaluate and then adapt a variety of toys. Researchers first evaluated a selection of toys using the matrix. Toys that were more cognitive included Clics – a construction toy; Castle Logix – puzzle toy; and ordinary wooden construction blocks. Toys that were evaluated as being more social included a Barbie doll with car and ponies, a toy set including baby in bathtub; and a miniature shop.

While the theme of the intensive design week was designing toys, overall the students also worked on skills like team play, brainstorming, project management, quick and dirty prototyping skills and presentation. Ultimately the winning concepts – or a combination of elements found in different winning ideas – would be prototyped into child-friendly versions, which would be tested at the Children's University. This event comprised several workshops that promote Science, Technology, Engineering and Math education for children. The adapted toys would be presented to pre-schoolers (age 3-5). In this article, we restrict ourselves to the efforts by students during the intensive design week.

First, we asked students to do their own review of the one of the toys provided. This helped them think more objectively about the toys, while being able to reflect on the values embedded in each of the toys. For example, Clics, a construction toy, did not have any social values, while the Barbie doll lacked any puzzle or cognitive component, instead focussing mostly on social values.

Following the analysis, students were tasked with thinking about how their particular toy could include one or more of the values that it is currently lacking, or conversely, focus more on one specific value. It was important for the students to understand that they should not substitute the existing toy properties and values by new ones. This restriction and the desired addition of properties created the framework of the design goal.

To think about how their toy could be changed, the students brainstormed, gathering new ideas. Ideas were additionally examined and scored using the Value Matrix. Midweek the students presented the temporary design concepts to a jury of lecturers providing them with feedback, after which the students made final adjustments. The existing toys were modified by quick and dirty prototyping. The ultimate toy concepts were clarified by using a storyboard.

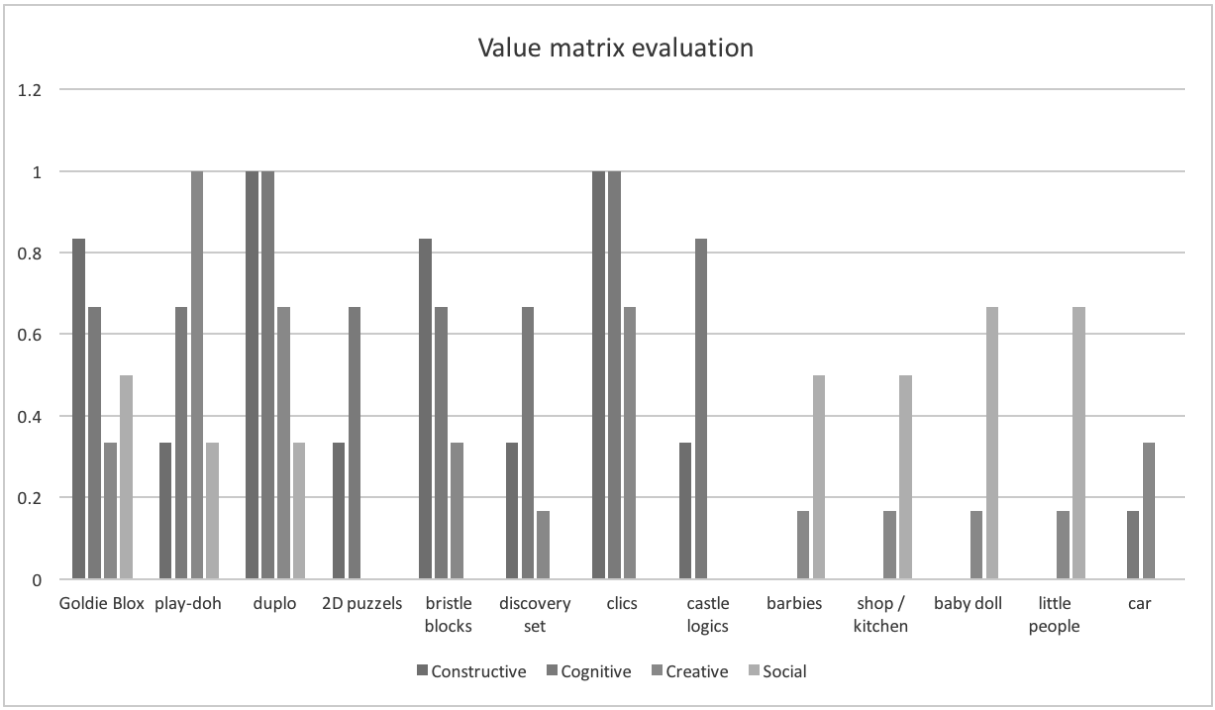


*Figure 2. Evaluation of toys based on the Value Matrix*

## 3 RESULTS

In a short period of time the students had to come up with a wide variation of conceptual toy properties. They still had little experience with brainstorming, evaluating design concepts and decision making, but quick development of these skills was key to being successful in the assignment. Using the Value Matrix, the students felt restricted at first in hacking/adapting existing toys. After a while they found that the tool helped them to open their minds and see new possibilities. It guided and stimulated them to find new properties of the toys that could be improved since the evaluation of toys showed them clearly which properties were present in the current state and which were not. In the end they agreed that the restrictions imposed in the evaluating matrix were necessary to end up with fresh and creative ideas they otherwise would not have thought of.

*Figure 3. Students redesigning a toy based on the Value Matrix*

One issue was that students had trouble with reflecting about missing toy properties. To circumvent this, students were asked think of other toys where these values were explicitly presents. This inspired them and often put them on the right track. It was clear that the excitement about the assignment grew in the course of the week. Ultimately it was clear to the students that the simplest adaptations of the toys were the most likely to be successful with children. It is not about having the most toy properties, which implied the most values, but about combining the right values to obtain a sort of harmony in toy characteristics. The different toy adaptations, hatched during the intensive design week, demonstrated this.

Having a nicely balanced value profile could make a toy more interesting to children. However, producing and testing the toys is required. Adult designers can only guess if and how a child will or will not respond to the designed incentives and recognize the intentional values in the toy. Testing the toy adaptations at the Children's University gave insight about our own prejudices. Adding the values was one thing, but to translate them into the right design was another thing. You cannot simply impose a method of playing by adding toy characteristics. New toy characteristics, implying a new set of values, need to be added to the toy in such a way that it is obvious that the toy needs these characteristics to be complete. Since the assignment was to add new values to a toy without affecting the existing values and incentives made it difficult, if not impossible, to create a unity out of the old and new toy properties. The adapted Clics turned out to be the most popular of the adapted toys since this toy was quite basic and unrestricted which allowed the addition of new characteristics and therefore incentives more easily.

## 4 DISCUSSION

As pointed out earlier, considering values when designing are valuable, both for products intended for adults, as for those made for children. However, uncovering these values may be problematic for young designers. To assist them, we proposed a Value Matrix, based established literature on human values [10].

Firstly, what values are necessary in the matrix, should be closely investigated. Our current approach involves using the values presented by Schwartz [10] and selecting those we deemed most appropriate for toy-design, but does not consider whether a different set of values could lead to more innovative toy results. If these items are investigated, we could make of the Value Matrix a better design, to become a tool, as we see with different other means to make theory of social sciences applicable for design practices [16].

It is also important to stress that using the Value Matrix in order to make a toy have as many possible values is not a guarantee for a successful product for children, but it can help to create a product that incorporates different values in order to make it more rounded. However, we found that students experienced it as a good tool to scan or examine a concept to see which properties it currently has, or which could be added or reduced.

Experience during the evaluation highlighted that the Value Matrix performs well when evaluating toys that are "open ended", such as the wooden blocks, while more closed designs such as Barbies with a pony, are less adaptable. Nonetheless, in order to identify particular values, students were aided by the Value Matrix, which helped them to situate and understand the context of a toy's use. However, we used the Value Matrix with novice students [15]. The experience of more skilled design students may be different, especially if they are more versed in performing user research.

While we informally evaluated the Value Matrix with 7 experts from a toy museum, who shared the opinion of the students that the tool helped them categorise toys, we did not conduct a formal evaluation on the quality of the results, only on how the students experienced using the tool. Given this, the evaluation of the Value Matrix and the effect on results could be a future topic of research.

We must emphasise that we do not view the Value Matrix as an alternative to performing user research, but that it can act as a tool to analyse toys, with the goal of adapting and changing toys to better reflect certain values. Additionally, validation of such a tool by a commercial toy manufacturer would also be valuable.

We note that even the wildest imagination of children can be understood and help designers in their work, as long as the 'adult student' gets a framework to structure all the information of the world of children.


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