Essential concepts in Toy Design Education: Aimlessness, Empathy and Play Value

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Abstract

The paper aims at contributing to the professional development of toy design education programs. It draws from the practice of a children's toy design course at Delft University of Technology. It identifies three major concepts that greatly influence toy quality and that students find difficult to understand and apply: aimlessness, empathy and play value. The paper describes how these concepts are attended to in the educational format of the toy design course.

Aimlessness is a central element of play: the player is motivated for the activity by an interest in the process, not by a desire for a certain lasting outcome. This distinguishes toys from other products and toy design from general design. Students tend to look for ´problems´ to be solved by using a toy rather than offering possibilities for interesting play processes. Within the Delft course, students are requested to discern between children's own objectives in play and those of parents and themselves as designers. Some creativity techniques are used that do not focus on finding solutions for problems but on exploring the solution space around ideas.

Empathy with children and their needs, wishes, preferences and skills does not come from books alone, neither does looking back at one's own youth provide a solid vision on play quality. Some tools and techniques for stimulating empathy with children are used in the course. The more obvious one is direct contact with children throughout the design process. Some other sources that enrich empathy are also discussed.

Play value is a term used to describe the overall enjoyment of a child with a certain toy. It consists of a complex of factors such as complexity and challenge, appropriateness for the context, correspondence to the character of the child. It is very difficult to predict children's use of toys, but detailed assessment of the various factors contributing to play value does give indications of qualities and weaknesses in the design of the toy.

The paper also identifies a gap in the course where it concerns the exploration of children´s worlds of experience prior to the choice of a product domain and suggests development of techniques for such exploration, e.g. contextmapping techniques.

Key words: Toy design education, Quality of toys, Play value, Design methodology

1. Introduction

The design of toys and other objects and environments for playful use requires knowledge and skills that are not all taught in general design education. This conviction of some of the staff of the Department of Industrial Design Engineering at Delft University of Technology led to the establishment of a "course on design for children's play and learning", or "toy design course" in short, in 1999. It is an elective with an 80 hours study load (3 credits) for master students in Industrial Design, consisting of lectures, practicals and a design assignment.

Since its start, some 350 students have followed the course; about 80% of them were Dutch students, but also students from Europe, USA and Asia participated.

When the course was originally set up, the main objective of the lectures was to get students acquainted with academic fields such as child development, child psychology, child ergonomics, behaviour sciences and play research. It was assumed that this knowledge, combined with the general design skills students have at hand, could successfully be applied in a design project on the topic of toys.

In teaching and coaching the design projects in this course, however, it was noticed that theoretic knowledge about children's play behaviour is often hard to integrate in practical design work. Too often, strong preconceived notions overruled that knowledge; preconceptions like 'play is fun and fun is laughing, so play is about laughing'. In some cases, the lectures introduced new misconceptions, for instance the idea that if a child develops through play, then the objective of play must be to develop oneself and toys must always be designed with the specific intention to stimulate development.

Over time, three main areas were identified that proved difficult for students. These areas are named in the next paragraphs. Also the problems associated with them are

explained, and the tools that were developed to assist students in more fully connecting to the nature of children's play.

2. Aimlessness

Generally, product design is considered a problem solving activity (Roozenburg and Eekels 1995). Consumers' needs are satisfied, the execution of tasks enabled, incapabilities met or discomforts relieved through the creation of material objects with certain functions. The quality of these objects lies in how well the explicit or implicit criteria of the users are met, both in its primary task and secondary functions, such as confirming the users' sense of style and aesthetic preferences, or pleasurable experience during use.

Within the domain of play, such criteria are very hard to establish. Even the question what play itself is, is not agreed upon by the experts on child development and play; they use various definitions of play. A well-known overview of viewpoints is the 'Seven Rhetorics of Play' by Sutton-Smith (1997), and some other recent publications (e.g. Canning 2007) build definitions of play as a collage from various scientific disciplines and theories. Within this paper, the core of play will be defined as the urge for experiences through self-motivated activities and behaviour at one´s own discretion and will.

One thing the experts do agree upon, is that play is a very open-ended activity. The goal of play can be achieved in many different ways, all of which are satisfactory, enjoyable experiences. Play is characterised by its many degrees of freedom in its nature, performance and contents.

Furthermore, play is directed towards the experience itself, more than to achieving a specific lasting result or proceeds that compensate for the effort made. Play is about the enjoyability of the process – any process. Thus, it is impossible to define the contents of play or its aims in specific, detailed criteria that a problem solving designer could work towards.

It also means that there is a great diversity of thinkable toys that could facilitate play. It is this openness of the solution space for toys, caused by the aimlessness of play, that students need to understand and get a grip on.

In our course, it is tried to do this by first making students write down a list of things they think are important within the domain they have chosen, and then categorise them per stakeholder.

These students´ lists often contain a mixture of concerns of different types: educational goals, safety concerns, commercial targets, hindrance avoidance, aesthetics, possibilities for group play, inclusiveness of children with various capabilities, etcetera.

This list then is reorganised and rewritten as a personal statement (in spoken language) from the perspective of the child, the parent or caretaker, the designer, and possibly other stakeholders.

The role that the students assign the parents can generally be characterised as a wish that the child learns from playing and that the parent can either participate in the play, or on the contrary is not hindered by the child at play.

To formulate the perspective of the designer is important, as it gives the students an opportunity to state their own personal objectives and at the same time make them aware that they are their own, and not necessarily important from a child's perspective. In class, these are compared to Sutton-Smith's ´Seven Rhetorics of Play´ to give an impression as to what value system they relate.

Then finally, the child´s perspective is composed from those items of the initial list of concerns and criteria that are fitting to a child; this often turns out to be a very vague and broad statement, reflecting the aimlessness of play and hence the openness of the solution space for toy design.

An example of a (compact) set of statements from one of the students projects:

Designer: We aim to develop a toy for early age education of Brazilian children in slums, that contributes to the local economy.

Parent: I would like to be able to buy a toy with which my children can play together and learn something, while I am absorbed with my own work at home.

Child: I would like to have a cool toy that I can play with, building things together with my brother and friends.

A second issue that is directly linked to the aimlessness of play and the openness of the solution space is the difficulty to judge whether a first toy idea is just right, for it can be played with, or if it would gain play value from adaptation. (More about play value is explained later in this paper.) There is always some conceivable way of play with a toy. A designer may easily think that the design is complete, when some sort of interaction is possible. But is it an optimal interaction? Does the toy have a coherent set of characteristics that evoke worthwhile play, or is the designer overlooking elements? That question can be addressed by creative techniques of a kind that focus on behaviour and that facilitate exploration of the solutions space around an initial idea. Two of such techniques are used within our course.

The first one presents the solution space as a diagram with two behavioural dimensions: realistic versus imaginative, and active versus receptive, see figure 1.

The diagram is loosely based on the diagram of learning styles developed by Kolb (1984).

These axis can be understood as the likeliness to behave in a certain manner in reaction to the encounter with a toy or situation: the imaginative child tries to incorporate the toy into a fantasy or storyline, whereas the realistic behaviour would be to test, understand and use the functions and meanings of the toy within a realistic setting (challenges, sports, experimentation).

On the other axis, the active behaviour is to make use of motor skills: running, throwing, dressing up and acting out, whereas the receptive behaviour finds its core enjoyability in the sensory perception within interaction. (Though interaction always is a combination of sensory input and motor output and the two cannot be parted, this diagram invites to consider to what extent one of the two is the dominant factor in creating the enjoyability of the interaction.)

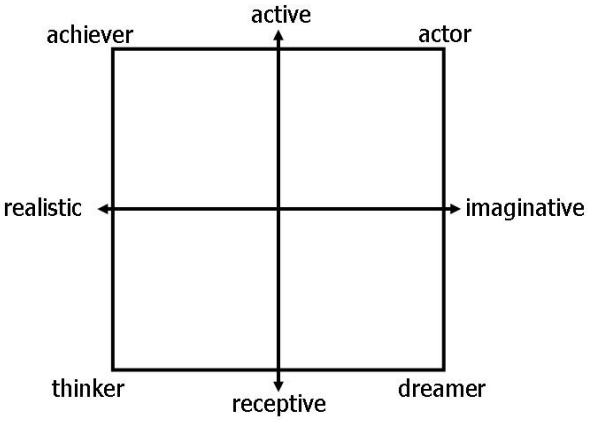

Fig. 1 Diagram of behaviour types

The four corners of the diagram represent four ´opposite´ behaviour styles: when a child takes a toy into imaginative motor behaviour, he or she ´acts out´ a story, thus operates as an actor. Receptive realistic behaviour leads to a ´thinker´ play style in which experiencing and discovering the characteristics of the surrounding world are the focus.

This diagram can be used as a creative tool by placing an idea for a toy and the envisioned use(s) of the toy within the diagram and then thinking of how the toy could be adapted to facilitate a different behaviour style with it. This adapted toy is placed in the diagram and can function as a starting point for a next adaptation, the initial idea being changed again and again to cater for various play types. The variety within the collection of ideas increases, allowing the designer to choose (combinations of) ideas that facilitate potentially interesting behaviour.

An example of the use of this technique is given in figure 2. In this example an existing insect viewer is used as the initial idea. With this toy, children can study an insect through a magnifying glass. This can be classified as a thinker's toy: a toy for realistic exploration of small insects with a focus on visual perception of the insects' details. Other ideas based upon the same theme are then generated for other behaviour types: achievers search their environment to find as many species they can find, actors play out adventures with a life-size bug or use it as a costume to become an insect, and dreamers create fantasy insect figures, think out their life stories and enjoy the beautiful shine of their wings.

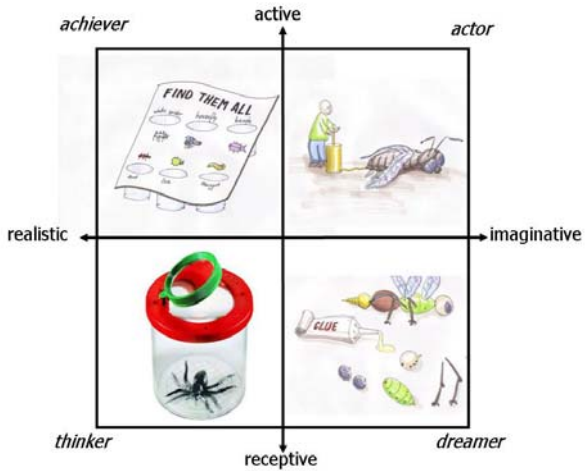

Fig. 2 Example with insect viewer

A second creative technique in use is called ´extreme characters´, after a method described by Djajadiningrat, Gaver, and Frens (2000). This technique is especially useful if a student is having difficulties imagining the freedom of behaviour within play and sticks to well-known, predictable and all too ´decent´ behaviour concepts and toy ideas.

For this technique, a diverse selection of well-known archetypical characters are chosen (Spiderman, Spongebob Squarepants, Bratz Girls, James Bond, or non-fictional but clear and extreme characters). Their behaviour style is summarised in some keywords. Next, the character is linked to the toy idea and the question is asked: what would this character want to do with this toy? How could this toy be changed to support this behaviour better?

The exaggerated behaviour style of the character makes it easier to break self-imposed limitations on the imagination of children's possible play behaviour.

As an example, the Disney character Goofy is used. This creature can be described as naïve, full of plans, good-humoured and most of all as having a great talent for failure. These characteristics are then projected onto a toy idea that is to be developed further. For this example,

we use the hula-hoop. How could a hula-hoop be used in an activity based upon naïve plans and the enjoyment of failure? And how could the hula-hoop be adapted to better suit this activity? Combinations of flexible lasso-like rings and rope that make you stumble come to mind, or heavy hula-hoops that make your body swing outrageously, or rings from which water leaks if you don't spin them fast enough – all activities you could imagine Goofy doing.

The extreme character helps to exaggerate behaviour, but only if one focuses on behaviour. The observation that Goofy has long ears (or any other element of his outward appearance) will not help thinking about behaviour – notwithstanding the possibility that the idea of hula-hoops with long ears attached to them may sparkle other ideas.

Both creative techniques (the behaviour diagram and extreme characters) aim at identifying more diverse options for behaviour and explore possibilities for toys to support those. The outcome of such a creative session is a variety of adaptations and reworked concepts, from which the best ones can be selected, combined or used as inspiration for a next concept.

3. Empathy

A second concept that goes beyond knowledge and that is of importance for students designing for children's play, is the ability to put themselves mentally in the place of the child and get attuned to how children perceive their world. Of course, there has been a tremendous effort to research and describe this; just think of the wealth of information about children's ergonomics, developmental psychology, or development of play, social bonding and friendships, learning strategies, etcetera. For students' use, these have been brought together in very accessible text books, like the ones by Bee (2004) or Frost, Wortham and Reifel (2005). All this information is very useful, if you understand it and can give it its´ right place within the overall picture of what children are. But for those who have limited prior experiences in the social intercourse with children, it can all be very abstract and confusing. All these sorts of research describe different parts of what children are. The phenomenon 'child' gets deconstructed into various types of knowledge on a higher level of abstraction, as visualised in figure 3.

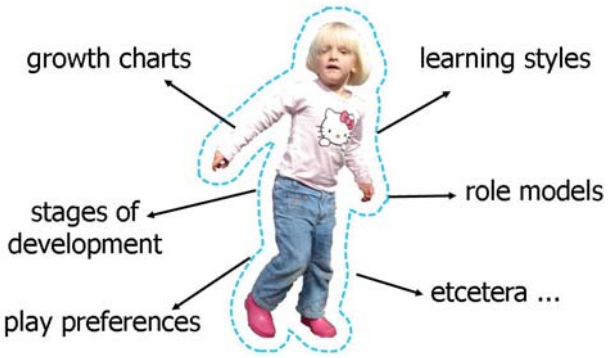

Fig. 3 Deconstruction of the phenomenon ´child´.

A student that uses this information to get a clearer impression of what children are, is reconstructing from a combination of types of knowledge a coherent representation of a child. This may or may not be accurate, depending largely on the ability of the student to understand how various sorts of knowledge are related and how they fit the overall picture of what a child is, see figure 4. If one fails to understand that, a combination of the different elements of for instance Piaget's developmental stages, physical growth charts, youth marketing research, and common knowledge may create the junior equivalent of a monster of Frankenstein.

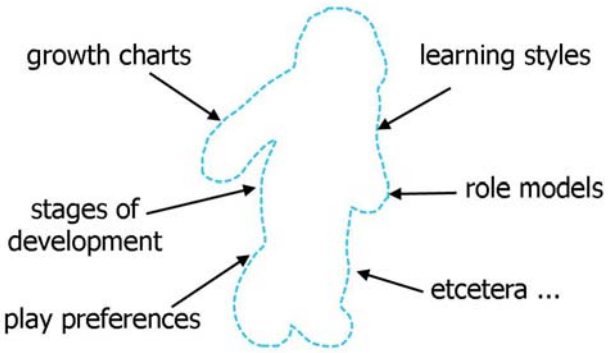

Fig. 4 Reconstruction of the phenomenon child onto a basic frame of empathic understanding

It is of great help if a student has a general empathic understanding of the child as a whole to serve as a frame for all these kinds of information. I call this frame empathy, or empathic understanding.

The way to build this empathic understanding is a lot of exposure to many different children in many situations and over time, and an attentive attitude. In the case of a student carrying out a design assignment, the time and conditions may not allow for such a natural building of empathic understanding. Various techniques generally applied within the successive phases of product design to create an understanding for users have proven to be an outcome in the domain of children´s play too.

In the analysis phase, observations and interviews can be applied, though especially with young children there are limitations, for instance in what they can express about abstractions. Ways to explore the deeper levels of subconscious, tacit knowledge such as cultural probing (Gaver 1999, Mattelmäki 2006) and contextmapping (Sleeswijk Visser et.al., 2005, Gielen, 2008) are being developed and adopted for use with children, and they form another way of creating an empathic understanding of children in a limited time.

Especially in the domain of interactive technology, experiences have been reported on the involvement of children within participatory design. Researchers such as Druin (1999, 2002), Bekker (2002) and Sluijs-Thiescheffer (2007) report about children as informants or co-developers, sharing with the adult designers the creative work, responsibilities and sometimes power to choose and decide.

When it comes to testing prototypes with children, other techniques are adapted to children. A good overview is given by Markopoulos (2008).

But even these techniques may prove too time-consuming or unpractical, for instance in our 80 hours course on toy design. We have tried to condense the experience of live contact with children into a method that we call ´the child ambassador´. The students try to find one single child, be it a neighbour, a niece or nephew or a friend´s child, and ask it to cooperate with the design project as a ´pars pro toto´: the child itself is a representative of a group of like-minded children, and is asked to react to questions, cooperate in brainstorming and idea selection etcetera with his or her own personality but also the group it represents in mind.

Though certainly not scientifically correct, and not comparing to the techniques developed by the researchers mentioned just before, it does have a great effect on the empathy of students for their target group. It allows them to test the notion they have built from theoretic sources against a life child.

In addition to this one child ambassador, some materials that have been produced by children are used to enhance empathy with them. In our course, a television program is used in which children tell anything they want to share about their lives. The children sit in an improvised studio that looks like a puppet theatre. They open up a curtain, tell their story without any intrusions, and close the curtain when they are finished. The program (Dutch television company VPRO´s ´achterwerk in de kast´) has become famous for children´s open self-reports. In the one program used in class, stories about animals and pets are brought together. Children report missing cats, show a trick with a chicken, tell how a dog always had a listening ear after the child´s mother had died, but then the dog itself died (and shows a picture of the dog), or declares its love for animals because they don´t tell you what to do every moment of the day, see figure 5.

Of course, sources like these have to be used with some reservation, as it is unclear what kind of bias is caused by, for instance, off-camera instructions, selection of participants and the effect of children´s knowledge of the program on how they behave in front of the camera. Still, the stories appeal to the viewers´ emotions and help build empathy.

4. Play value

That play is an aimless activity does not mean that every action a child undertakes with it is evenly valuable. Anything can be a toy, but from a designer's perspective, a toy can't be just anything: a designer needs to focus on a well thought-out core use of the toy. A toy is a tool for play, and it must be useful tool.

Fig. 5 Video stills from Dutch television show ´Achterwerk in de kast´ by VPRO.

The term often used to label the worth of play is 'fun' but fun is rather an effect of the activity than an activity in itself. Play is certainly more than laughing out loud all the time, as the term fun seems to indicate.

In the above, the term ´enjoyability´ has been used to describe the experienced value of play activities, without giving a definition of what it is. The term play value is now introduced as an overall definition of the intrinsic worth of the play activity as perceived by the child. Play value is what motivates children to start playing, to continue and elaborate the play activity, what makes them feel satisfied when they stop and what makes them return to the activity.

It is very hard to predict children's play behaviour and the play value of toys. The best way to assess it is to let children use the toys. But in the design process, especially the early phases, choices on product characteristics often have to be made before mock-ups and prototypes are available. This certainly is the matter in our toy design course. As a way to assess play value

of toys, and on the way enrich students' understanding of what makes play worthwhile, a play value assessment is executed on early concepts. The intention of this assessment is not to rubberstamp toys as good or bad, but to judge to what extent the toy has a coherent set of characteristics that facilitate a core activity for the intended users, in the associated environments for use and (social-emotional) context. The five elements used in this assessment are:

- behaviour types

Play is a voluntary activity. A child can choose whether or not to play with a toy. Toys do not need to interest every child. Many toys may be much more valuable if they are directed to children with a certain set of preferences, interests, knowledge, skills, or character. The same diagram of behaviour types used in the creativity session described earlier in this paper, is used to assess if the various activities within a play session with a toy address the same, related or opposite behaviour types. Variation is nice, but too much conflicting behaviour within a play session may disturb the flow of the activity. The design student can then decide to change the toy characteristics so that the activity becomes more balanced, to divide the toy concept into two separate toy ideas, or make diverse forms of use possible without a need to go from one type of use to another one during a single play session.

- types of play

Literature on play discerns between various types of play. For this assessment, the classification is used as defined by Dutch phenomenological psychologists Vermeer (1972) and Vedder (1977): playful movements, sensopathic play, playful handling of objects, construction play, fantasy and role play, success and team play.

Some toys are generic and can easily be used in any form of play (a ball or a rope is a good example of that). Some toys are more specifically suited for one type and level of play. And some toys try to elicit all sorts of play, but ask for conflicting levels of necessary skills and interests and end up being no good for any action. Coherence is the key notion again.

- play phases

From the first encounter with a toy, a child goes through the stages of experimentation, functional play, variation and integration. If the toy characteristics facilitate the transition from one stage to the next, the play will develop more naturally and fluently.

- levels of complexity

The toy as a tool for play will address the child's need for play and its skills. To be useful, the complexity of the toy must be within the same range of development for motor, sensor, cognitive, social and emotional skills. Again, coherence is the striving.

If a toy is to be reused over time, possibilities for increasing the complexity are an advantage, as are smooth transitions from activities with limited complexity to those with greater complexity.

The concept of flow (Csikszentmihalyi, 1975) is used to explain this and explore how flexible the toys are to be used within the borders of children's developing abilities and the challenges they set themselves, see figure 6.

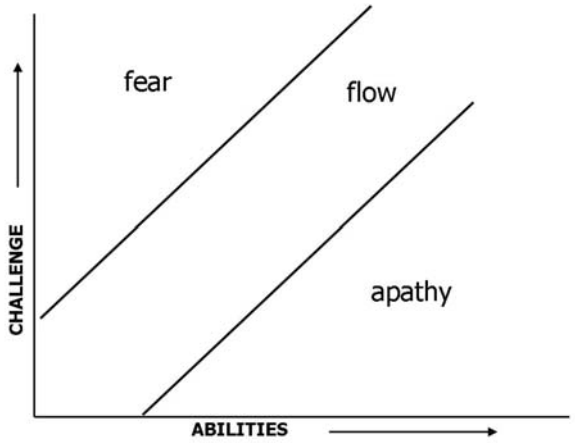

Fig. 6 Csikszentmihalyi´s domain of ´flow´

- context

This last aspect is two-fold. Firstly, there is the suitability of the toy for the direct context of use: indoor or outdoor, alone or together, in rain or sunshine, in quiet or busy surroundings, a place where the child comes only once or frequently, independently or under guidance, etcetera. All these circumstances have an influence on the way a toy is used and that should be reflected in the design of the toy.

Secondly, the experiences that a child has had form a context for play. A young child typically is in indoors surroundings a lot of the time, is primarily focused on the parent or caregiver as a role model and has limited empathic abilities. This child will engage in different sorts of play activities and stories than a child that is often amongst peers, is aware of what is happening around the world through media and can combine that with its personal experiences. Toys are a way to process and experiment with the themes a child encounters in daily life – a designer that wants to cater for that, should know what the daily life context of a child is.

The five elements described here form an instrument to analyse how the toy could perform on several aspects. In a way, it is another deconstruction, not of the child but of the toy. It is a tool to describe characteristics and assess qualities. This assessment should not be regarded as a checklist, in which every element should be optimal,

rich in possibilities and well-developed in order for a toy to pass the test. It is not a black and white matter of good or bad toys. But the entirety of it should preferably be a coherent set of characteristics without obstructions or elements that are detrimental to the experiences potentially offered.

5. Discussion

In the above, we have presented three concepts that are of importance within toy design education and described several techniques applied in our course to assist in the understanding and application of those concepts.

Design is an art as well as a science and a craft. Designers develop their own preferred ways of working. Some designers consciously use techniques, others base their work on vision and gut feeling. The techniques presented here do not give a guarantee for success. They help designers who are new to the field of toy design to make the step from unknowingly incapable to knowingly incapable, and hopefully to knowingly capable.

In the paragraph on aimlessness, it is emphasized that a distinction be made between the objectives for play from a child´s perspective, and those of others; the seven rhetorics of play have been mentioned in that context. When later in the paper the play value criteria are described, it can be recognised that these themselves are not free from a value system that is in part based upon what adults think that play should be. Even when the purpose of it is not to discern supposedly ´good´ or responsible toys from ´bad´ toys, a designer should always be aware of the risk that he or she is creating opportunities for play that serve adults interests, but not the child´s.

Having said this, the opposite is also true: play value is not the only value of toys, and other concerns of parents, educationalists, producers, trade and so on will have their influence on whether the toy design will become a toy in reality.

In the paragraph on empathy, design techniques for gaining understanding of users are mentioned and the application with children briefly described. These techniques strive to cover all phases of the product development process. From our point of view, there still is a lack of attention to the very first phase of product development, where designers explore children´s worlds of experience in all freedom. In this phase they can get inspired by what they learn from children before having chosen the product domain to be developed, a path to be followed, a market channel to serve. It is our belief that from unprejudiced and unbiased exploration of the worlds of experience of today´s children, inspiration can come for quite different toys than the majority of todays´ supply. We think that contextmapping techniques can contribute a lot to this exploration and that it can yield authentic and empathic insights, but we are only starting to develop such techniques suitable for children – and apply them within toy design education.

6. Conclusion

Within the educational setting of an industrial design faculty, the specialization of toy design asks for more than just knowledge transfer to prepare students for the specific skills they need to develop.

Based upon experience with an elective master course at Delft University of Technology, we described three concepts that prove difficult for students: the aimlessness of play activities leaves room for a wide solution space in design in which students may not recognise directions for optimisation; theoretic knowledge about children and play offers limited possibility to empathise with children and may lead to misinterpretation, especially when several sorts of information are combined; and the quality of a toy to facilitate worthwhile play activities (play value) is hard to establish, especially when students try to take the concept of ´fun´ as a singular measure for play value.

The paper described some methods and techniques to help students to understand the aimless quality of play, explore the solution space by creative techniques, use direct contact with children to help understand and combine knowledge about children and build empathy, and make in-depth and multi-faceted assessments of the play value of their design solutions.

Though these techniques do not bring a guarantee for the success of a toy, they help to train design students in creating toys with better play value.

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