A New Approach in Design Learning: Childhood Pretense

Derya GÜRÇAN
İstanbul Technical University
deryagurcans@gmail.com

Deniz LEBLEBİÇİ BASAR
İstanbul Technical University
denizleblebicibasar@itu.edu.tr


Abstract: In this paper a creative problem-solving approach to design learning is proposed, based on the integration of childhood pretense and creative problem-solving processes both from design creativity research and cognitive psychology. Evaluation of human creativity is strongly associated with children’s pretense which involves flexible and divergent thinking abilities. Childhood pretense in the form of pretend play is used for enhancing creative abilities in children. Likewise, enhancing creative problem-solving process in design is associated with improving flexible and divergent thinking skills. Thus, a broad review has been done to identify the features and similarities of childhood pretense in the framework of affordance and adult designing activity that led us to a new approach in design learning to develop designers’ creative thinking capacity.

Keywords: pretense; creative problem solving; design learning; affordance

1 Introduction

Designing is most commonly defined as a creative problem-solving process (Simon, 1969; Thomas & Carroll, 1979; Dorst & Cross, 2001; Hasirci & Demirkan, 2007; Dorst, 2009). World Design Organization (WDO) states industrial design as a strategic problem-solving process that applies creativity to resolve problems and co-create solutions with the intent of making a product, system, service, experience or a business. “It is widely recognised that design problems are ill-defined, ill-structured and wicked” (Cross, 1982, p. 224). This ill-defined nature brings the need for creative thinking (Cropley, 1999) as opposed to analytical problem solving. Condoor and LaVoie (2007) describe this problem-solving process as formulation of a problem in a conceptually new way through designer’s insight, rather than invention of a new configuration. As the central concern of this activity is being creative, enhancing creativity is a significant issue in design research (Lawson, 2005; Cross, 2006).

According to the situated account of design problem depiction, designers examine and interpret the design situation. They construct the design situation by setting the dimensions of the problem space, seeing it from multiple perspectives and creating the moves to find solutions (Schön, 1983; Schön & Wiggins, 1992). The see-move-see sequence of designing process is also described as “the art of seeing the design situation in multiple ways or seeing as”
by Lawson and Dorst (2009, p. 26). Focusing on the seeing as action, posed the question of whether this can be interrelated with the seeing as if ability, referred to as pretense in cognitive psychology literature, also outlined as childhood pretense is an exemplar of human creativity (Carruthers, 2002).

Pretend play or sometimes pretense can be seen as a kind of acting as if something is the case when it is not (Leslie, 1987). Recently, children’s pretend play has gained a considerable attention in creativity related research areas (Russ, Robins & Christiano, 1999; Russ, 1996; 2004; 2014; Carruthers, 2002; Picciuto & Carruthers, 2014; 2016). Pretense, pretend play or acting as if is associated with the notion of affordance (Szokolsky, 2006; Rucińska, 2015). Children are aware of the affordances of different objects and explore the various action possibilities of objects for their different kinds of play events (Szokolsky, 2006). The common definition for affordances is, they are possibilities for actions (Gibson, 1979; Norman, 2013; Rucińska, 2015; Glâveanu, 2016). Rucińska (2015) indicates that pretend play of children enables seeing beyond the known uses of objects in different contexts.

Similarly, in the design process it is important to see potentials of different actions in objects, considering that the interaction between an object and its user enables the action. New possibilities and actions could bring creative solution domains. As there is no single or optimal solution to a design problem, to create new or alternative contexts, Picciuto and Carruthers (2014) claim that it is essential to be open to alternative ideas or behaviours and concurrently bypass more obvious ideas to see the other alternative possibilities.

The observed relation between the object; its possible affordances and the ability of seeing affordances in object forms in different contexts, is the main subject of this study. It is hypothesized that children’s pretense or acting as if has significant similarities with designers’ initial designing process. Developing a method to use pretense in design learning could enable designers to see the action possibilities in new context of use and enhance their creative thinking capacity.

In the present descriptive paper, we sought to assess the hypothesized relationship to propose a novel methodological approach for fostering creativity. However, prior to this, the related literature has been reviewed thoroughly including the cognitive processing of design activity, childhood pretense, and affordances.

2 Pretense

2.1 Childhood Pretense

Generally, when the term pretense is used, children’s pretend play is the first that comes to mind. Around the middle of the second year all normal children commonly engage in pretend as a form of play (Carruthers, 2002; Picciuto & Carruthers, 2016). Mitchell (2002, p. 8) argues that pretense could be equated with the definition of “seeing or experiencing something as something else”. Pretend object play or object substitution means treating one object as if another one (Mitchell, 2002). In other words, an agent uses the object differently than its everyday known use. In pretend play we can see a child treating a banana, basket or cup, differently than its everyday use identity. The literature states that children can automatically do this process (Carruthers, 2002; Mitchell, 2002; Weisberg & Gopnik, 2013; Rucińska, 2015).

Perner’s (1991, p. 43) description of pretense is “knowingly acting as-if the world were different than it really is”. According to Dansky (1999), adopting the as if frame in play may open the door to a mode of problem solving where one can play with ideas and possibilities, so this process enables creative solutions to real life problems. In pretense, an agent uses objects differently than what it usually affords in everyday life. Also, Perner (1991) mentions that pretend can refer to two different kinds of substitutions: a symbolic (or representational) substitution and the substitution of a hypothetical (imaginary, nonreal) situation. Symbolic representation refers to the object substitution. For example, a banana substitutes for a telephone. While a child is pretending that a banana is a telephone, she sees the possibilities of telephone-like actions in the banana.

Szokolsky (2006) suggests that as a cognitively driven activity pretend object play implies the ability to,

- Think of one object as two things at once;
- Think of one object as representing another; and
- Make mental representations.

In acting as if the object is another, the pretend object supports the pretend act with substitution. So how do children pretend or treat one thing as another? Their imaginative capacity has the role of seeing one thing as another (Currie, 2004). “Through play, children develop combinatorial imagination, the ability to combine elements of experience into
new situations and behaviours” (Russ, 2014, p. 36). In pretend play, imagination is required for the capacity to treat one thing as another and it enables to see things in novel ways (Rucińska, 2015).

Accordingly, Perner’s (1991, p. 59) statement of “pretend representations are not representations of the world as it is but of the world as it might be”, resembles Simon’s (1969) definition of design, is the ability to change existing situations into preferred ones. The learned ability of designers to see things as other things, as other forms, in other context, in another reality simulates children’s pretend play. But, while children can automatically do this process until a certain age (Carruthers, 2002; Mitchell, 2002; Weisberg & Gopnik, 2013; Rucińska, 2015), designers learn it. In the simplest description, designers want to see an artefact/experience as if it is something else, try to change the built environment according to preferred needs, trying to see new affordances in objects, environments, human beings as if it does not exist, just like children do in their pretend play.

The literature on childhood pretend play interestingly claims that engaging pretend play facilitates creative thinking skills in children (Dansky & Silverman, 1973; Dansky, 1999; Russ, 2004; 2014). Do these findings contribute to design creativity in the context of our hypothesis? Could practising pretense skills facilitate creative problem solving?

2.2 Pretense and Creative Process

Creativity is defined as the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful) (Amabile, 1983; Sternberg & Lubart, 1999; Runco & Jaeger, 2012). Carruthers (2002, p. 226) suggests that “creativity will normally manifest itself in new types of behaviour, going beyond mere re-applications of established scripts or action-patterns”. Many researches made it clear that pretense or pretend play uses cognitive processes that are involved in creative thinking (Russ, 2004; 2014).

One of the major important cognitive process in creativity is divergent thinking (Guilford, 1968) and pretend play is usually associated with the enhancement of this capacity (Pepler & Ross, 1981; Russ, 1996; Russ et al., 1999; Hoffmann & Russ, 2012; Russ, 2014). Divergent thinking represents the potential for creative thinking and problem solving (Runco, 1999) and it enables our minds to go far from the pre-constructed patterns of thinking. As well as it’s relation with pretense, divergent thinking is generally associated with the design process (Pereira, 1999; Lawson, 2005; Liikanen, 2010; Choi & Kim, 2017). Since there may be more than one optimal solution to a design problem (Lawson, 2005) divergent thinking is used to see alternative ways to produce a wide range of different ideas. Understanding the nature of design problems, opening up solution spaces and developing self-awareness through divergent thinking is also important in design learning.

In addition to divergent thinking, cognitive flexibility and insight emerge in pretend play and in the creative process (Russ, 2014). Russ (2004) mentions about some important cognitive, affective and personality processes that occur in pretend play. The cognitive processes are,

- Divergent thinking;
- Symbolism, for example: transforming ordinary objects into representations of other objects;
- Organizing a logical story; and
- Fantasy/make believe (like the ability to engage in as if play behaviour).

These processes are expressed in pretend play and all involved in the creative act (Russ, 2004). While divergent thinking is about fluidity of thinking, transformational abilities involve reorganizing information and breaking out of old ways of thinking (Russ, 2004; 2014). Russ (2004) emphasizes that practicing with free associations, recombining ideas, and manipulation of object representations help children become more creative. Also, these processes are important in creative production for the design process. To see the new ways of problem solving and come up with novel ideas could be possible with these processes.

Carruthers (2002) believes that adult creative thinking and problem solving and childhood pretend play share essentially the same cognitive basis, they both involve exercises of imagination. The capacity to generate, and to reason with, novel suppositions or imaginary scenarios are the same cognitive underpinnings they share (Carruthers, 2002). During play, a child may suppose a banana is a telephone or a broom is a horse. Pretense also enables to exercise the abilities for suppressing habitual or obvious responses and selecting more unusual possibilities and this is called bypassing the obvious and selecting the non-obvious (Picciuto & Carruthers, 2014). Similarly, designers also try to see beyond the conventional uses of objects and imagine other possibilities.
Practicing with supposition and reasoning mechanisms in pretense also support both the *generate* and *explore* components of the Geneplore Creativity Model (Picciuto & Carruthers, 2014). Geneplore model is developed by Finke, Ward and Smith (1992). According to this model, in the *generative* phase, mental representations of novel ideas are produced; in the *explore* phase, the idea is developed, and conceptual interpretations and functional inferences are made (Finke et al., 1992).

Furthermore, another possible explanation for childhood pretense involves counterfactual reasoning. There are some studies that discuss the relationship between pretense and counterfactual reasoning (Weisberg & Gopnik, 2013; Weisberg, 2015). Weisberg and Gopnik (2013) argue that pretense and counterfactual reasoning both involve considering events that have not occurred yet and thinking about what would be the case if they had. They share the same mechanism: disengaging with current reality, and making inferences about an alternative representation of reality (Weisberg & Gopnik, 2013). Thinking about hypothetical scenarios and reasoning about them could be seen in the design process, too. Thinking about the possible world scenarios and imaginary situations are necessary to bring novel solutions to ill-defined problems, therefore designers need to think about *what if* scenarios creatively.

### 2.3 Affordance-Based Explanation of Pretense

The concept of affordance is first introduced by Gibson (1979); he used this term in his theory of visual perception. Gibson (1979, p. 127) points out that “the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill”. His term of affordance implies the complementarity of the animal and the environment (Gibson, 1979).

Chemero (2003, p. 184) emphasizes that “affordances are not properties of the environment, they are relations between particular aspects of animals and particular aspects of situations”. In the design process, the possible uses of an object depend on its affordance referring to a relationship between the properties of an object and the capabilities of the agent. Also, the interaction is important while addressing the term affordance. Affordances actually mean the possibilities in the world that represent the way of interactions of an agent with something. At the same time this relationship shows that different affordances can be produced even if they are associated with the same object (Norman, 2013).

Costall (2015) mentions about the canonical affordances that are not relative to any individual agent, but relate instead to shared social practices. Known object uses like chair for sitting, knife for cutting, etc., represent the canonical uses. But on the framework of creativity, as Gláveanu (2016, p. 15) puts emphasis on canonical affordances, “the conventional is often associated with less creative because of the material properties, and known intentions.” For going beyond non-creative thinking, discovery of action potentials in objects and generation of objects with novel affordances are essential. Gláveanu (2012; 2016) explains creative forms of expression as expanding our action possibilities by generating objects with novel affordances, and exploiting existing affordances in new ways. For uncovering and exploring affordances of objects one needs to look at objects in different ways. In this respect, the explanation of pretense within the framework of affordance could bring a new perspective for creative thinking.

Rucińska (2015) explains pretense with a new proposal of a sensory-motor account of imagination and its explanatory concept of affordance, and defines the imaginative role of pretense as taking account of the capacity of see *affordances-in*. “Affordances are defined as action potentials in relation to the particular actor at a more basic level of on-line coordination with the object world” (Szokolsky, 2006, p. 68). Related to this definition, Rucińska (2015) associated the affordance-based explanation of pretense with objects’ various uses that are afforded in different contexts. Thus, it can be said that children can treat one thing as another because they see the action possibilities, in other words, affordances in objects while playing in new contexts. She explains pretense with the mutuality of the child and the object in the right pretense context, which involves meaningful interactions.

Tomasello (1999) used the term intentional affordances, based on child’s understanding of the intentional relations other people have with that object or artefact. In pretense “the child perceives and understand the intentional affordance of the pretend object and then decouples it from the object so that affordances can be used with inappropriate object playfully” (Tomasello, 1999, p. 85). This means that, the child searches to match the affordances of a pretend object with a real object suitable to her capacities. “In pretend, the functional fitness of pretend object depends on the structure of the intended action, the action capabilities of the child, and the affordances of the object” (Szokolsky, 2006, p. 73). This implies that in pretend the child follows the affordances revealed by an object.

There are many object forms around us but the significant part of this pretense process is to discover the affordances of these object forms with *seeing as*. Olteteanu (2015) argues that creative problem solving is a kind of seeing as
process which involves looking at something we already know in a different way. Also, Sawyer (2012) states that creativity is about combining existing elements and generating a new combination.

In everyday use, the laundry basket is used for putting the laundry in it. However, in play context a laundry basket could be used in another way: as a boat. This is because the child looks at the object and sees the other possibilities for action in the laundry basket and manipulates it in relevant ways. Her effectiveness matches with its affordance in her pretend play context so now the laundry basket has a new meaning in play. This situation is supported by Chemero’s view (2003) of affordances as relations between the abilities of the subject and the features of the environment. In the pretense context, a child is not just seeing the properties of the object but also what she can do with it (Rucińska, 2015). Different contexts of use can invite different behaviours.

To outline, in different pretend play contexts a child can play with various kinds of objects seeing the action potentials in them. It is seeing the affordance potentials of objects’ relation to the agent that enables pretense behaviour. There are many possibilities for action that objects afford to people and in terms of design. It is important to be able to see these possibilities in different contexts. An affordance depends on both the artefact and the user. There is a dynamic relationship between them. The concept of the affordance-effectivity pair is the main point here, they complement each other (Gibson, 1979). So, in the design process the essential part is matching the affordance of object and effectivity of user pairs under the right conditions of use. Different contexts of use can invite different action possibilities, so for designers it is essential to discover these possibilities of objects. Based on Rucińska’s dissertation (2015) pretense as seeing affordances in objects could be a useful way to practice for creative problem solving in design learning.

3 Discussion: The Integration of Pretense, Affordance and Creative Problem Solving in the Design Process

Design is inherently a creative activity. Design problems are real life problems, usually faced in everyday life (Cross, 2006). Real world problems are rarely neatly presented and as Sawyer (2012) argues, most creativity occurs when people are working on ill-defined problems. In the design process, creative thinking is crucial for changing environmental demands with novel solutions. There may be different solutions to design problems and designers always try to broaden the point of view to find possible solutions. Thomas and Carroll (1979) are concerned with describing design as a way of looking at a problem instead of a particular type of problem. Designers deal with questions like what might be, could be, and should be, instead of what is, how, and why (Lawson, 2005). Therefore, it can be understood that designers imagine and think about the possibilities and create the possible solutions to design problems and satisfy the varied needs of users.

Transforming the way of thinking, re-imagining the problems and creating alternative solutions is a complicated process. Sometimes well learnt object uses and properties cause fixation and people are unable to see new ways of using objects (Purcell & Gero, 1996). Pretense encourages the generation of new ideas while enhancing other cognitive capacities such as suppressing obvious responses while selecting and developing unobvious ones which are important in the creative process (Picciuto & Carruthers, 2016). “Pretense can be viewed as the unconventional use of an object in place of another object in order to achieve a goal” (Szokolsky, 2006, p. 81). Sawyer (2012) claims that creativity is more likely when one rejects convention and there is the belief that children are more creative than adults for this reason. In pretense children can see unusual uses of objects, and go beyond the everyday functions of objects for their purpose. In the design process the designer aims to reach this flexible way of thinking. As it is mentioned before, while children pretend spontaneously, designers learn to do it in the creative design process.

The similarities between children’s pretend play process and designers’ pretense in conceptual design phase, as this study hypothesized, are shown in Figure 1 and Figure 2. Figure 1 schematizes the children’s pretense process. To make a phone call to someone in a play scenario, first the child searches around for the affordances of phone in other objects. Then if the affordance matches with an object (e.g. banana) then he/she uses this object as if it is a phone in her play. Figure 2 schematizes the hypothesized pretense process in the initial form search process in the designing activity. As shown in Figure 2, at the initial form giving process, the designers search for the affordances of the intended use and intended product as well as intended user behaviour. This search process can be seen as childhood pretend play. Designers, like children, try to discover new action possibilities in different contexts. Both children and designers try to switch between ideas, because they look for affordances and they are both pretenders.
In the design process, thinking in a flexible way like children is important for designers because as Lawson (2005, p. 5) puts it: “Designers have to learn to understand problems that other people may find it hard to describe and create good solutions for them”. As a consequence of designing for different users, designers try to see these action and interaction possibilities that give designers guidance for problem solving. Tschimmel (2010, p. 223) argues that “Design thinking is thinking in variety and in new semantic and material combinations.” Also, she continues that as a basis for innovative design, designers need to liberate themselves from routines of perception to think about the possibilities. Therefore, pretense could be an effective practice to inhibit canonical or pre-defined ways of use and may lead to the discovery of new ideas in the design process.

Hoff (2013) discusses that seeing the surrounding world and oneself in a flexible and transformable new way like in children’s pretend play, could be a way for creative approach. Pretend play of children is a way of making non-obvious connections between seemingly unrelated things and this process resembles to creativity. Creative thinking requires the ability to associate mental elements into new combinations which either meet specified requirements or are in some way useful (Mednick, 1962). Thus, in the creative design process one needs to break away from existing ideas...
and beliefs to discover new action possibilities of objects. In the frame of pretense, this statement could be explained by Rucińska’s suggestion (2015) about the role of pretense that enables seeing many possible interactions with objects.

Gero (2010) claims that the interaction of user and design could take many forms and creativity occurs as a result of this interaction: affordance. Rucińska (2015) explains childhood pretense in the framework of affordance and shows how the effectiveness of an agent with the object’s affordances in the suitable context could bring about the explanation of pretense. Children are open to meaning of forms and they can see affordances in objects in a flexible way. An object can have many affordances and in the design process it is important to see these affordances in different contexts related to different users. Designers should consider the mutuality of user effectiveness and object affordances in different context of use. They should ask themselves what if questions and think in a flexible way for possible scenarios.

It is essential for designers to consider the affordances which exist to make the desired actions possible (Norman, 2013). Gibson (1979) stated that an affordance exists even if it is not perceived by the user. In other words, the object could have the affordance even we cannot notice right there at that moment. Thus, in the design process designers should try to think about the action possibilities of objects and discover the new potentials in different contexts.

As Goldschmidt (1999) places particular emphasis on creativity in relation to design, new artefacts are often expected to be innovative and original. Therefore, it is important for designers to be creative while exercising creative processes (Goldschmidt, 1999). In the design process it is essential to go beyond the typical ways of thinking so there is the need to bring new approaches for design learning to encourage designers.

Lawson (2005) mentions that for creating solutions to design problems it is important to consider the principles and strategies to help designers use in their mental processes. There are many models and methods developed to enhance the creative design process, or divergent thinking processes more generally. Some creativity techniques used in the design process are: Brainstorming (Osborn, 1953), Morphological Analysis (Allen, 1962), and Synectics (Prince, 1967), Mind Mapping (Buzan, 1983). These techniques are widely used in the design process both in practice and education, in order to generate novel ideas. As it is previously mentioned, childhood pretend play asserts the facilitation of creative thinking through engaging in play (Dansky & Silverman, 1973; Dansky, 1999; Russ, 2004; 2014); conceptualization of pretend play in the framework of affordances in the design process could bring effective practices for designers and design students as a way of creative thinking.

In this particular context, this study provides the first explorative research creating a conceptual framework on the integration of design creativity and pretense, pointing to an important interdisciplinary topic for enhancing creativity that can benefit many creativity related fields and education. As this paper is a portion of a larger experimental study, future work could establish a structural model of pretense in enhancing creative thinking skills.

References


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**About the Authors**

**Derya Gürcan** is a PhD student and Research Assistant in the Industrial Product Design Department at Istanbul Technical University, Turkey. Her research interests include design cognition and creative process. In her research she is drawing connections between childhood pretense and design process.

**Deniz Leblebici-Basar, PhD**, is an Assistant Professor in the Industrial Product Design Department since 2013 at İstanbul Technical University, Turkey. Her research interests include design cognition, creativity, design methods and design thinking. She always had an interdisciplinary approach to design methods and studied design cognition at the University at Albany, State University of New York, Albany, New York, U.S.A., between 2009 and 2010.