

# Bear deepens the bond between parent and child

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## Abstract

We produced a new mechanical toy named “The Catcher in The River” in the course offered by CBI program at Osaka University. Our team was composed of three students, who are majoring in different fields, i.e., philosophy, chemistry, and artificial intelligence.

“The Catcher in The River” was designed for the following two purposes. First one is to teach children the natural environment. Second one is to encourage parent-child relationship. This toy, recommended for children ages three to five years, is a mechanical learning toy designed to make children engaged by moving their eyes, ears and hands through creative play. Parents slip little fish in the river, and then, children clap their hands and make a sound to move the bear’s arm. The bear can catch fish when children succeed in control the bear’s movement at the right time.

The point is we designed the toy in order to answer our purpose of the production, that is, to enhance an exchange between parents and children through the toy. Two processes, to define design problems and then to conceptualize it, were needed before sketching a detailed design. We also discussed to produce a safety toy for children and thought the way to play to deepen the bond between parent and child.

**Keywords:** Toy design, brainstorming, parent-child relationship,

## 1 Introduction

To begin with, let us introduce a specific program to which we all belong: the Cross-Boundary Innovation Program (CBI). CBI has been established by Osaka University to produce next-generation Ph.D holders, leaders able to build bridges across disciplines and to think “outside the box” by cultivating students with the creative and strategic skills through special curriculum. CBI is open to any student attending a graduate program at Osaka University and the authors are first year CBI students. CBI offers innovative and unique courses focusing on comprehensive skills in research, leadership, business, communication, lifestyle and so on. We, CBI students, study not only our own major but also other fields of study to broaden our insights.

“The Introduction to Design Thinking by Experience Based Learning” is one of the courses offered by CBI. This course is aimed to teach us an essence and importance of design thinking through project based learning. Students are divided into groups consist of three members and each group is required to produce a mechanical toy within a limited material, cost, and time. Students can learn skills of designing, problem-solving, team work, project management, and presentation through the course.

We three attended the course and produced “The Catcher in The River”. At the end of the course, a competition was held to evaluate the toys in terms of its performance, costs and time each group spent to produce it. Five groups were nominated for this contest and our group won the first place. How could we make a high performing product within a limited cost and time? In this paper, we would like to present how we made “The Catcher in the River” based on design thinking method. It will be also stated how we cooperated with each other and made use of our different specialities.

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## 2 Definition of Design Problems

Firstly, the team members discussed to define a design problem. In the class, we were required to make a toy under the given conditions: to make a toy which has mechanical drive systems and is for three to five year-old children.

We researched existing child’s toys individually and then had a brainstorming about the ideas that we hit upon through research. At that time, we realized that two aspects were needed to be considered. First one is to assume how parents decide to buy a toy and set parents’ needs because it is not children but parents who buy the product. Second one is to consider a developmental stage of children at the age of three to five years. In general, it is said that children around that age started to learn to fit into society. Then, we discussed to conceive ideas of a toy to develop communication skills of children. Then, we decided to make a toy aiming to deepen the bond between parent and child through the collaboration by playing together.

After brainstorming session, we created a design concept of a toy that a bear catches fishes swimming in a river. In this process, we also created the two other design concepts, a pop-up book that automatically turn a page by using musical box, and a play house set which is incorporated with a gravity sensor. All three toys were thought to increase interactions between parent and child. However, when we thought about how to play the toy, we realized that we needed to think the way to prevent children from losing their interest after getting used to it. Therefore, we decided to choose the idea of a bear catching fish swing in the river because we thought of several ideas to keep attracting children’s interests. We would like to state it in the following paragraph.

Parents and children cooperate to help a bear to catch fish. This toy also works a teaching material about type of fishes and how bears live. The parent-child correlation can be promoted by teaching the knowledge as well as by playing together. We, therefore, needed to think how conceptualized the detailed design of the toy what we had thought to produce during brainstorming session. This process is going to be described in the following chapter.

## 3 Conceptual Design

We set two problems of designing the toy in order to encourage the parent-child interaction, i.e., appropriate size and appropriate way to play.

Regarding to the size, we referred to psychological theory to consider an appropriate sense of distance between parent and child for developing the parent-child bond. In addition, we discussed to think about the best way to play for both parent and child. Here, we would like to introduce the processes in considering these two aspects in detail.

### 3.1. Size

When we considered an appropriate size of the toy, we referred to research on personal space by Edward Hall [1966]. According to his research, there are four different zones of interpersonal space.

1. Intimate distance(0cm~45cm) : it is reserved for intimate others, such as family and lovers.
2. Personal distance(45cm ~ 120cm): it is used in conversations with friends and in group discussions.
3. Social distance(120cm~350cm) : it is reserved for strangers and new acquaintances.
4. Public distance(350cm~): it is used for speeches and lectures in the public or in official occasions.

Based on the four kinds of personal space, we judged that it was appropriate to make a toy whose size is up to 120 cm. If the toy is too large, parent-child relation cannot be developed. At the end, we decided to set the size of the toy 30cm × 45cm.

### 3.2. Way to play

The following three possible problems, at least, had to be solved when we discuss the way to play, which enable both parent and child to cooperate while they are playing.

1. There is a risk that child touches a bear and break it.
2. There is a risk that child happens to put a piece of fish in the mouth.
3. There is a possibility that child repeatedly pushes the switch which controls the movement of a bear's arm.

Regarding to the first and second problems, our initial idea is to set the switch apart from the toy itself. However, we did not adopt it because it makes a distance between parent and child inappropriate. Instead, we decided to use a sound sensor switch to solve these problems. Children need not to touch the body of the toy during playing, and parents can keep an eye on their children to stop them from taking dangerous actions.

The third problem was related to how to keep attracting children's interests. If children can repeatedly push the switch, it would be easy to catch fish. Then, the game becomes boring. Even if parents ask children to push the switch only once, there would be a risk that children would not follow it. Therefore, we changed the structure of the toy in order to solve it. In the new structure, children cannot push the button repeatedly because parents control the main power source.

### 4. Detailed Design

**Electric circuit :** In order to stop the motor from heating, we installed the stop switches in the circuit. A Stop switch can switch off the electricity when it is pushed. We also used a sound sensor switch (shown in figure 2). The installed sound sensor switch reacts to sound only when the main switch is on. This can prevent malfunction and continuous hits by children.

**Bear :** We designed opposite end of the bear's arm to push the stop switch when the arm rotate 180 degree. This design is able to switch off an electricity when bear's arm half rotate, and be able to prevent heating motor. We also designed the position of the other stop switch for backing to the original position. These two stop switch can control bear's arm half-rotating both clockwise and anticlockwise.

**Base :** We intended to educate children in natural environment by playing this toy. The base which the bear stands on imitated the natural environment in detail. There are moss-grown stones, grass, flow of a river, and trees. A bear catching fishes reminds the players of a food chain. Moreover, we made various fish-parts to educate children about fish's name.

### 5. Prototyping

As we stated before, this toy was made during the class at Osaka University and we had a limitation of time and cost.

**Materials :** 3 switches , sound sensor, 2 acrylic sheet(30 x 45 cm), reduction gearbox, battery, battery box, motor, copper wire 3 m, teddy bear, instant glue, acrylic pipe 1 m, paper clay 200 g, color paints, sand

Production cost: \$ 100

Production time: 8 hours \* 3 days

1<sup>st</sup> day: brainstorming, order the materials

2<sup>nd</sup> day: create the stand and the electric circuit

3<sup>rd</sup> day: put the electric circuit inside the bear; make the power point for presentation

### 6. Demonstration

The toy we made moved as our expectation. Bear's arm moved following sound or voice, the bear can fish when we clap our hand in correct timing. It was necessary to catch the fish, because the speed fish floating down was faster than we expected. However this feature made us keeping interesting for playing. In fact, when we demonstrated this toy in the class, our classmates were excited. Someone released the fish; others clapped hands or shouted to activate the sound sensor. The audiences stayed quiet not to activate the sensor. To catch the fish in correct timing, all of them, players and audiences, concentrated on playing. This sense of unity may reveal among parents and their children.

### 7. Conclusion

We designed this toy aiming to deepen the bond between parent and child through the collaboration while playing together. As the result of brainstorming, we thought of a design concept of the toy that a bear catches fishes swimming in a river. In the process of conceptual design, we took two aspects into account : appropriate size and way to play. Regarding to an appropriate size, we referred to research by Edward Hall on personal space and set the size of the toy 30cm × 45cm. The three problems were examined to consider an appropriate way to play. To solve the problems that we discussed in thinking of conceptual design, stop switches and a sound sensor switch were used. We also decided detailed design so that the toy has an educational purpose.

### Reference

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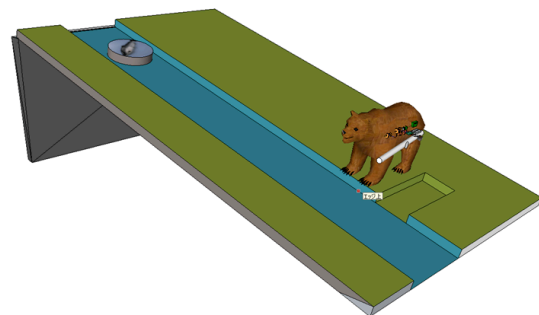


Figure 1: The Catcher in The River

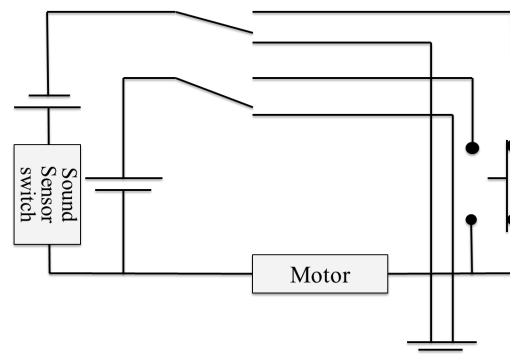


Figure 2: electric circuit