

Preliminary Considerations on Shikake Design Process

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Abstract—In this paper, we first briefly overview the concept of shikakeology and introduce shikake trigger categories and the shikake trigger matrix. Then we propose the shikake design process as a method for creating new shikake. We validate the usefulness of the process through a case study.

Keywords—shikake; trigger; design;

I. INTRODUCTION

A “shikake” is a trigger that induces a specific behavior to solve a social or personal problem. The word is originally from Japanese and does not correspond to a single English word. A shikake is a new concept of the synthetic approach that includes engineering, psychology, and design. The above definition of a shikake was first stated in [4].

To intuitively explain the concept, let us show a simple shikake, “piano stairs”, in Figure 1. The stairs are decorated like a piano, and people can actually make a sound like a piano with their feet instead of their fingers. The stairs attract people’s attention and encourage them to use the stairs rather than the escalators. As a result, more people are willing to exercise. According to a report on The Fun Theory¹, the number of people who used the stairs increased by 66%.

The point in this case is that no one was forced to use the stairs. Those who were interested in the piano stairs voluntarily chose to use the stairs. In other words, a shikake is not a trap to trick people, but provides an alternative behavior that people choose if and only if it seems to be more beneficial or attractive than the individual’s usual behavior.

In this case, the piano-like appearance makes people not only easily associate the stairs with a piano but also with the pleasant experience of playing the piano or listening to music. This psychological association of a piano and experience is the core trigger to drive people to use the stairs. Also, the shikake is implemented with engineering mechanisms, e.g., sensor devices and sound devices. Thus, the shikake is realized as the combination of design, psychology, and engineering.

The technique for creating such a shikake is not well known, even by sophisticated experts who designed what we



Figure 1. Piano stairs in Hollywood

are calling a shikake. Our goal is to clarify the process of designing a shikake to solve a social or personal problem. One of the approaches to realize this goal is to construct a framework of the shikake design process. Various approaches and practices in design thinking have been reported [1], [2]; however, the shikake design process has not yet been investigated.

In this paper, we describe the shikake trigger categories, followed by the shikake trigger matrix. Then we propose a simple model of the shikake design process. Based on a workshop where the model was applied, we report our preliminary considerations on the shikake design process.

II. SHIKAKE TRIGGER CATEGORIES

Shikake trigger categories were proposed in [5] to systematically describe shikake specifications. Originally, the categories were composed of 25 categories and classified hierarchically. We show a revised version of the categories in Figure 2. We added a new category “Taste” under the “Feedback” category for describing shikake cases that catch

¹<http://www.thefuntheory.com>

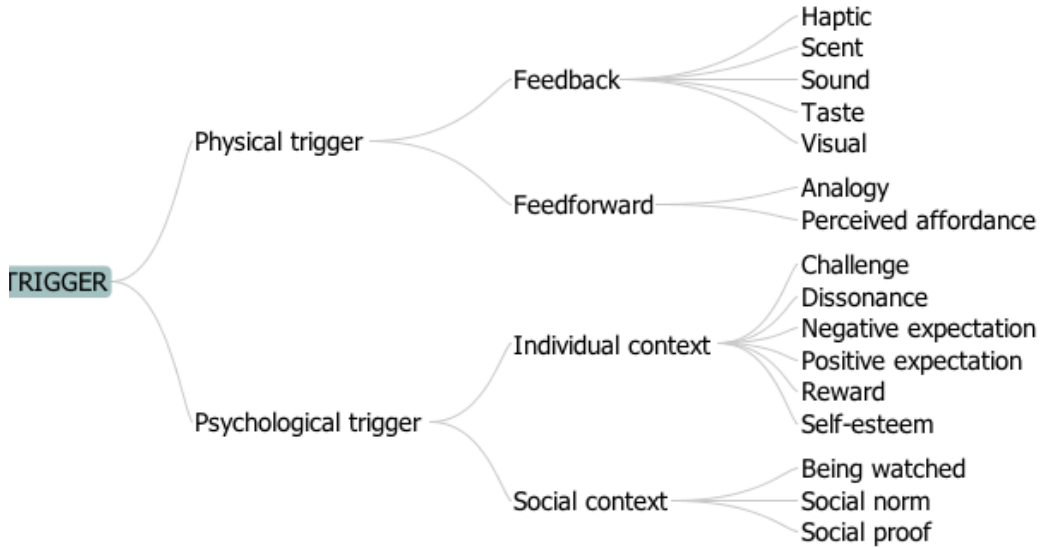


Figure 2. Shikake trigger categories

people’s attention by the taste. Also, we renamed “Signifier” as “Perceived affordance”, “Metaphor” as “Analogy”, “Motivation” as “Individual context”, and “Social effect” as “Social context” to represent more appropriate triggers. In addition, we deleted “Default option” under the “Feedforward” category, and “Reciprocity”, “Scarcity”, and “Self-consistency” under the “Individual context (ex Motivation)” category, because we found out that these categories were too minor to be shikake specifications.

Most shikake cases include both physical and psychological triggers, although some cases include only either physical or psychological triggers. The combination of physical and psychological triggers has a synergistic effect that is sufficient to change people’s behavior, and this could be an explanation to how a shikake works. Once the typical combination of triggers employed in many shikake cases are revealed, they become “rules of thumb” in designing new shikakes. In the following section, we show the combinations of shikake triggers.

III. SHIKAKE TRIGGER MATRIX

The matrix in Table I shows the frequency of physical and psychological triggers simultaneously used in the same shikake cases. The rows and columns represent psychological triggers and physical triggers, respectively, and the numbers are obtained out of 120 shikake cases. These cases consist of the same data used in [5]. As seen from the matrix, non-zero numbers were not evenly distributed.

Some combinations of triggers were used much more than others. For example, the combination of “analogy” and “positive expectation” was used in 13 shikake cases, and the combination of “sound” and “positive expectation” in 11 shikake cases. The numbers generally indicate the rules of thumb for finding promising combinations of physical and psychological triggers.

IV. SHIKAKE DESIGN PROCESS

The point of a shikake approach is to solve a problem by behavior, not by function. This is the most unique and significant point of the shikake approach. We have to utilize this point in considering the shikake design process. The first step is to identify a core problem. Then we have to identify a behavior that might solve the problem. We call such behavior as “behavior solution”. Then we proceed to consider a shikake that can induce that behavior. In this process, shikake trigger categories and the shikake trigger matrix could be used to initiate shikake ideas. Based on these considerations, we tentatively proposed an outline of the shikake design process as follows.

- 1) Identify core problem.
- 2) Identify behavior solution.
- 3) Design a shikake with the help of the shikake trigger categories and the shikake trigger matrix.
- 4) Rapidly prototype the shikake.
- 5) Refine and return to 2) through 4).

Table I
SHIKAKE TRIGGER MATRIX

			Physical trigger							Sum
			Feedback					Feedforward		
			Haptic	Scent	Sound	Taste	Visual	Analogy	Perceived affordance	
Psychological trigger	Individual context	Challenge	0	0	0	0	9	3	2	14
		Dissonance	2	0	4	0	3	4	5	18
		Negative expectation	3	0	1	0	4	1	6	15
		Positive expectation	2	1	11	0	6	13	9	42
		Reward	0	0	1	0	4	0	0	5
		Self-esteem	0	0	2	0	5	5	0	12
	Social context	Being watched	0	0	0	0	5	5	3	13
		Social norm	0	0	0	0	0	4	0	4
		Social proof	0	0	3	0	1	3	8	15
	Sum		7	1	22	0	37	38	33	138

Let us imagine an example of the “cleaning up garbage” problem that often happens in our own backyard. Toward this problem, we next consider behavior solutions that solve the problem. Various behavior solutions include prevent littering, picking up garbage, and putting garbage in trash bins. To prevent littering, for example, here we pick the “social norm” trigger, because littering is anti-social behavior. The social norm is provided by a little cue and therefore is not obvious to us. However, it has been proved that a little cue can change people’s behavior. For example, garbage on a road silently tells people that many people threw away garbage and therefore doing this has become a social norm, that is, people are allowed to litter at this location [3]. However, this social norm is fragile. It is possible to dismiss the social norm and prevent littering just by cleaning up that location.

Therefore, let us consider a shikake to further prevent littering. Referring to the shikake trigger matrix in Table I, we can see that the “analogy” trigger works well with the “social norm” (used in 4 shikake cases). An analogy refers to an associative trigger, which means that something associated with a shikake might work. Considering the situation where we hesitate to litter, we can easily come up with some ideas, e.g., a cleaned-up place, a private property, or a holy place. Something that can be associated with these situations could be a shikake. The tiny shrine gate in Figure 3 becomes a good shikake in this sense because it reminds people of a holy place and is assumed to prevent them from littering [4]. In this way, a shikake could be designed by the shikake design process.

V. CASE STUDY

The first author of this paper attended the Design Frontiers Workshop on “Expressive Movement in Architecture and Design” (July 15-19, 2013 at UC Berkeley). According to



Figure 3. Tiny shrine gate

the workshop web site², the “Expressive Movement” was meant as “intuitive” systems based on recognizing and using motion in domains as varied as architecture, public art and industrial design.

On the first day, workshop participants walked around the UC Berkeley campus to find a problem to be solved by “Expressive Movement”. The author focused on bulletin boards on which many flyers were disorderly attached and pedestrians passed by without taking any notice. The author set the “Expressive Movement” goal to make a bulletin board a popular space for pedestrians. Then, the core problem becomes “attract attention of pedestrians so they stop walking” as (see Section IV) 1) of the shikake design process. In this case, 2) of the shikake design process, i.e., identify behavior solution, is obvious because it is already described as “stop walking” in the core problem above. The author, brain-storming at night on the first day, came up with the idea of a shikake that catches the pedestrians’ attention. Each

²<http://ced.berkeley.edu/academics/summer-programs/design-frontiers-workshop-series>

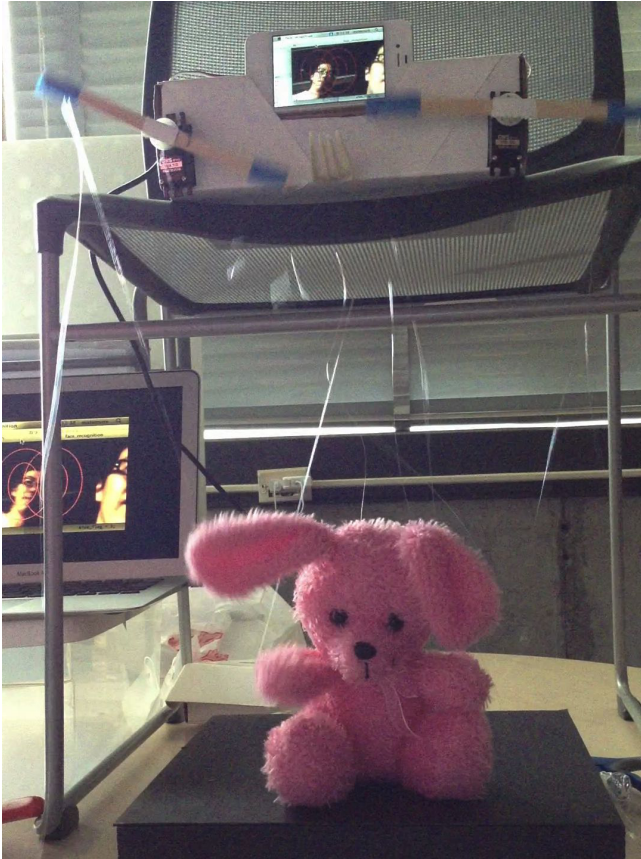


Figure 4. Dancing puppet

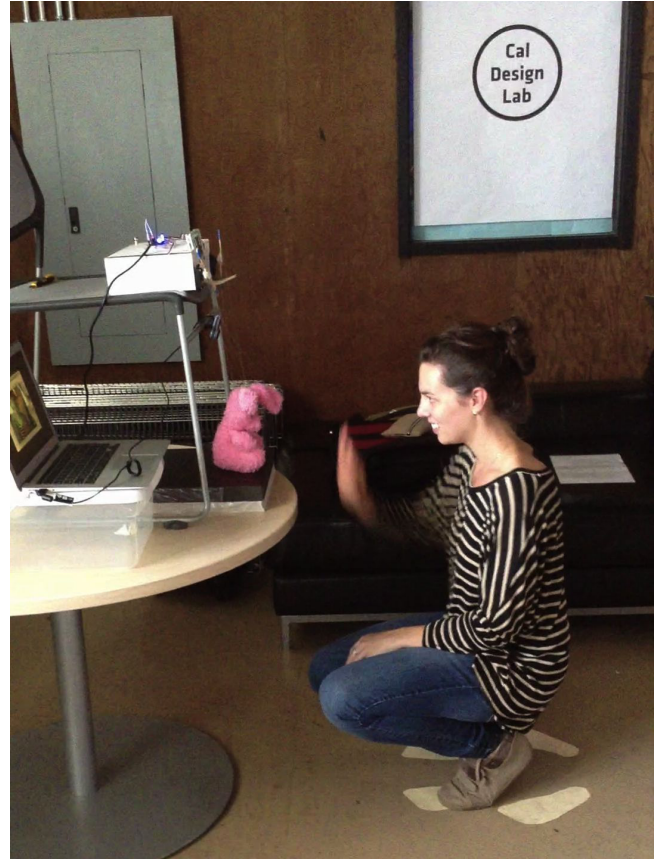


Figure 5. Interacting with dancing puppet

trigger in the shikake trigger categories was checked one by one, and the final idea was a “Dancing Puppet.” The puppet, hanging down just in front of a bulletin board, starts dancing in synchronization with the movement of a pedestrian.³

The Dancing Puppet includes several physical and psychological triggers.

- A puppet is used when playing, and playing is basically associated with fun experiences. (“Analogy” and “Positive expectation” triggers)
- The pedestrian movements are visually reflected as the movement of a puppet. (“Visual” trigger)
- Pedestrians would like to control the dancing according to their own wishes. (“Challenge” trigger)
- The situation where a puppet is hanging down in front of a bulletin board is unusual. It alone attracts the attention of pedestrians and gives the pedestrians a positive expectation that something might happen. (“Positive expectation” trigger)
- A web camera used for capturing the movement of pedestrians gives them an impression of being under surveillance. (“Being watched” trigger)

³This idea is inspired by the evian film “baby&me”. One can view the film at <http://www.youtube.com/watch?v=pfxB5ut-KTs>

As the shikake trigger matrix shows, the “Visual” and the “Analogy” triggers were convenient triggers and they can collaborate with almost all of the psychological triggers. The synergy effect of these triggers might bestow the Dancing Puppet with enough power to fascinate to change the pedestrians’ behavior.

On the second day of the workshop, the author started creating the Dancing Puppet. A stuffed animal was made into a puppet by attaching strings on the tips of both the hands and the feet. A pedestrian was captured via web camera and the face was recognized by processing⁴ and the OpenCV library⁵. The position of the pedestrian was estimated based on the position and the size of the recognized face area, and then the puppet action was decided. Two RC servos were controlled by Arduino Nano to handle the puppet’s hands and feet. Figure 4 is the puppet created in the above processes.

Once the Dancing Puppet was complete, an instant user test was conducted by asking workshop participants to interact with the puppet. Through observation of the interactions, we (the participants and the author) jointly found that it

⁴<http://processing.org>

⁵<http://opencv.org>

was better to lower the position of the web camera to get closer to the puppet, so that pedestrians would kneel down at eye level with the puppet. At first, we had assumed that the web camera should capture the walking pedestrians, but, in that case, eye contact was not realized and, as a result, the interaction between the puppet and the participant was unnatural. We moved the position of web camera and finally created the Dancing Puppet based on shikake design process. Figure 5 is a photo of the interaction between the puppet and a participant.

Throughout the process and experience, the author confirmed that the shikake design process worked to some extent. However, the brainstorming process needs to be improved to further clarify the process.

VI. CONCLUSION

Changing behavior has enormous possibilities for making the world better. A shikake could be an immediate and promising approach to utilize behavior to make the world better. However, the shikake mechanism is not thoroughly understood, and therefore it is still difficult to design a new shikake. The challenge presented in this paper was to consider the shikake design process and to introduce a case study. Throughout the case study, we checked each process subjectively and found the need to revise the process.

This was the first case of creating a shikake based on the shikake design process, and we confirmed the shikake design process was still inexact, even though it worked to some extent. The result is a small step toward making it possible for anyone to create a shikake.

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