Easybottle: *A study of metaphor in interaction design*

Seoul, Korea

Abstract

Lately, various kinds of intelligent products have been invented, and to play a part in the "intelligent" era, I designed an intelligent nursing bottle which can help a user when making up a bottle for a baby in middle of the night. The intelligent nursing bottle, Easybottle is a behaviour induce interaction product, which means that it motivates a user to do something with pleasure. As a mother of one year old, I learned that it is very important for a caregiver to feel satisfied in order to nurse a baby from the heart. Easybottle provides sound modality to notify the caregiver how much water she should pour when mixing powdered formula with water so she does not need to feel agitated to read bottle markings in middle of the night when her eyes are not fully awake.

The methodology that I applied is metaphor. As metaphors, I chose two different sounds to compare; sound of water pouring and sound of a car's proximity sensor. The main goal was to define more useful interface for Easybottle.

I conducted quantitative within-participants experiment. This study explored whether lifelike sound works better or artificial sound works better as an indication interface. Participants evaluated the water pouring sound interface more positively than a car's proximity sensor sound interface. Lifelike and hedonic factor appeared to be attractive to the participants and it implies that even though Easybottle is an electronic product, participants appreciate more when it reminds them of nature. Also, entertainment factor is important when doing a chore.

Keywords: *Design strategy, interaction, interface, user experience*

Study Design

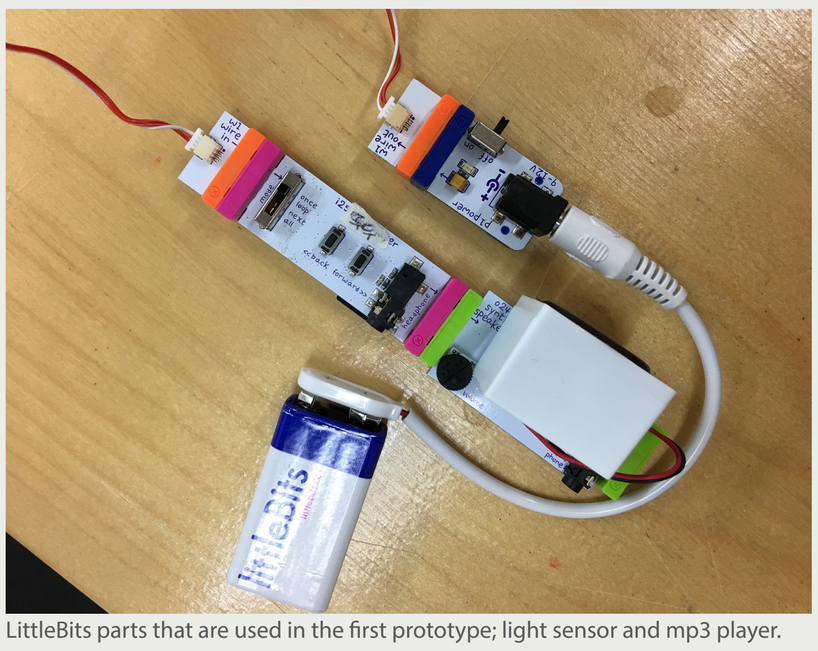
The experiment is designed to compare lifelike sound interface and artificial sound interface. Water pouring sound was used as lifelike sound interface (Pokpo), and beeping sound was used as artificial sound interface (Bibeep).

Participants

Thirty-six people aged from 15 to 85 (twelve males twenty-four females) who live in Seoul Korea participated in the study.

Materials

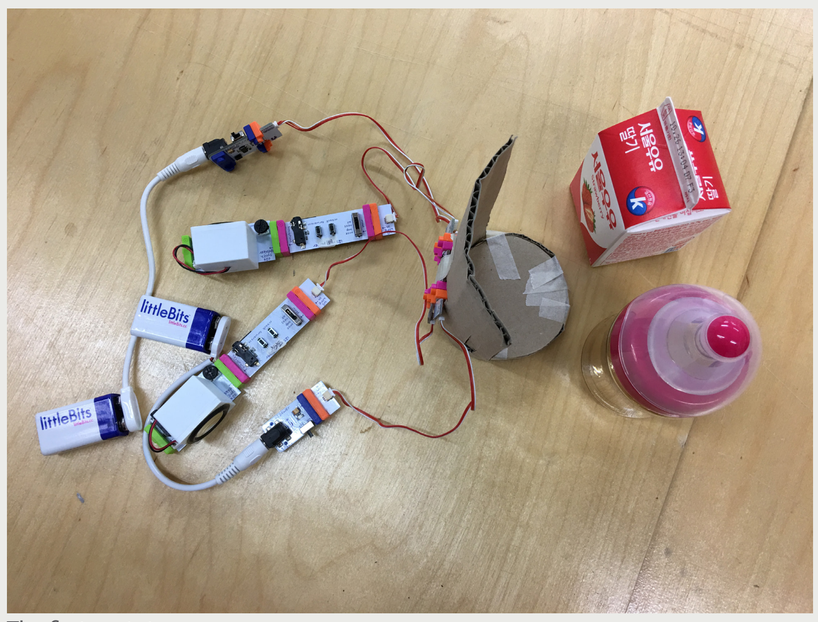
To begin the experiment, I built the interface using LittleBits which is very useful in the beginning stage of the design process. Two light sensors and two mp3 players are used in the first prototype. The LittleBits circuit is shown as figure 1, and two sets were used in the prototype.



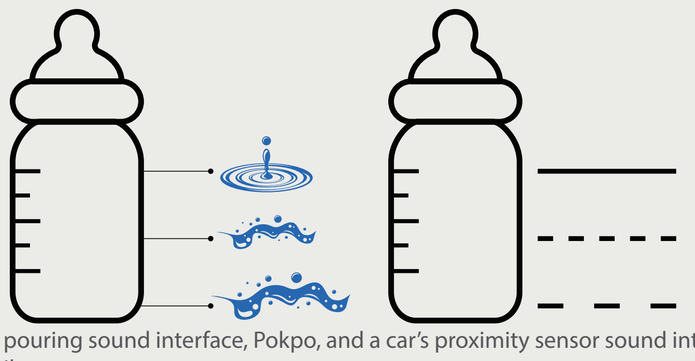
LittleBits parts that are used in the first prototype; light sensor and mp3 player.

Two light sensors are allocated vertically so when the lower light sensor is triggered, the mp3 player plays repeated short interval beeping sounds, and when the higher light sensor is triggered, the mp3 player plays a continued beeping sound.

The first prototype was used for a pilot survey and based on this survey, I built a developed version with Arduino IDE. In this version, I added one more light sensor to be triggered when milk pouring starts. When milk pouring starts, either water pouring sound or beeping sound will start.



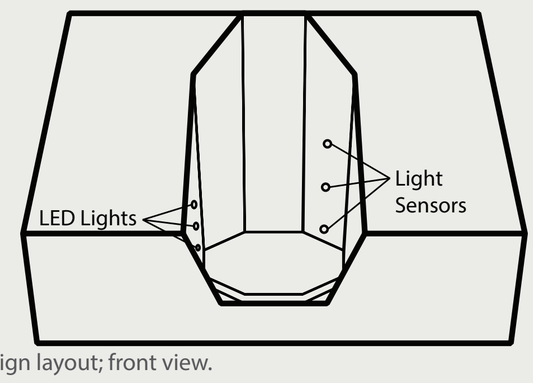
The first prototype.



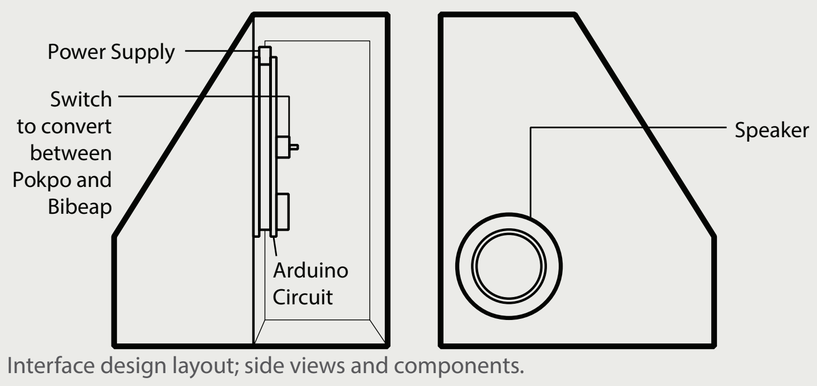
Water pouring sound interface, Pokpo, and a car's proximity sensor sound interface, Bibeep.

I designed the sound interface in three-steps. As for Pokpo interface, water pouring sound begins when the participants start pouring the milk, smaller volume of water pouring sound will play as milk reaches the middle point, and when it reaches 160ml point, water dropping sound will play to imply to stop pouring the milk. For beeping sound interface, longer interval beeping sound begins to play when the participants start pouring the milk, shorter interval beeping sound will play as it reaches the middle point, and continued beeping sound will play when it reaches 160ml point to signal to stop pouring the milk.

For the first prototype, I used cellphone flashlight to provide light as the light source for , but for the later version, I embedded red LED lights for the light source.



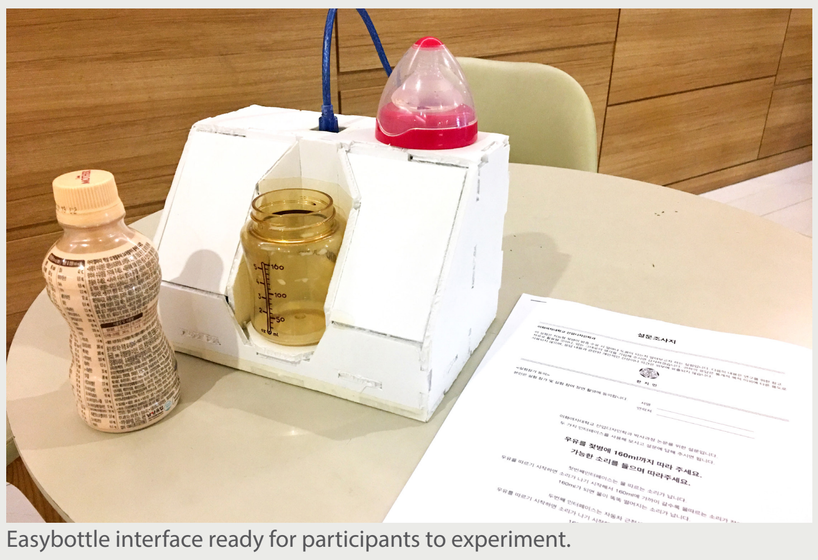
Interface design layout; front view.



Interface design layout; side views and components.

Procedure

Participants were welcomed to the lab and were instructed to pour milk into nursing bottle twice, once with Pokpo interface and another with Bibeep interface, in random order. After participants poured milk into nursing bottle with each sound interface, they filled out questionnaires.



Easybottle interface ready for participants to experiment.

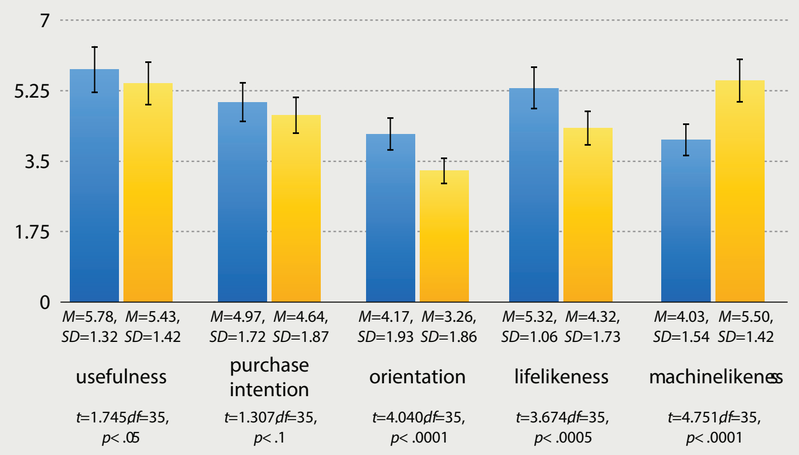
Measures

In the first part of the questionnaire, I asked usefulness of the interface, and product evaluation. Usefulness of interface is for dependent measure, and is an index of two items, "I think this nursing bottle is useful to me" and "It would be convenient for me to have this nursing bottle". The index is very reliable ($\alpha = .957$). Product evaluation is an index of four items. The four items are "very bad / very good," "very poor / very excellent," "very negative / very positive," and "very unfavorable / very favorable." The index is very reliable ($\alpha = .969$).

In the second part of the questionnaire is composed of questions asking about purchase intension, orientation between utilitarian and hedonic, animacy, machinelikeness and behaviour induce product. Purchase intension is an index of two items, and they are "How much do you wish to purchase this nursing bottle?" and "How much do you really wish to purchase this nursing bottle?" The index is very reliable ($\alpha = .979$). The orientation is an index of four items. The items are utilitarian/hedonic, useful/fun functional/pleasant, and assists to accomplish one's purpose/gratify one's senses. The index is very reliable ($\alpha = .944$).

For manipulation check measures, degree of animacy is measured by using the six items; dead/alive, stagnant/lively, mechanical/organic, artificial/lifelike, inert/interactive, and apathetic/responsive. The index of animacy was very reliable ($\alpha = .913$).

Results



Interpretations of the Results

Participants evaluated the water pouring sound interface more positively than a car's proximity sensor sound interface. Lifelike and hedonic factor appeared to be attractive to the participants and it implies that even though Easybottle is an electronic product, participants appreciate more when it reminds them of nature. Also, entertainment factor matters when doing a chore.

Conclusion

From this study, I invested whether lifelike sound works better or artificial sound works better as an indication interface. The result showed that lifelike sound is more effective that artificial sound. I suggest that both engineers and designers should consider naturelike sound feedback when they design baby nursing bottles,

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