



International Conference on Knowledge Based and Intelligent Information and Engineering Systems, KES2017, 6-8 September 2017, Marseille, France

Measurement of the Effect of Digital Play Therapy Using Biological Information

Atsushi Hoshina^a, Ryota Horie^a, Irini Giannopulu^b, Midori Sugaya^a *

^a*Shibaura Institute of Technology, Tokyo, Japan*

^b*Bond University, Gold Coast, Australia*

Abstract

We developed the new therapy device named “Digital Play Therapy Device”, which combines house-shaped device with sensors attached and CG. The device was targeted for children with learning disabilities. We obtained the result from routine developed children, and obtained the result of increasing the number of speaking and decreasing the number of miscommunication, comparing to normal dollhouse. However, it’s difficult to compare these results objectively. This paper analyzes the effect of “Digital Play Therapy Device (DPTD)” with more detailed method by using biological information. We compared the effect between DPTD and just operating house-shaped device, DPTD and just operating CG. Analysis of the experiment indicates that participants who experienced DPTD exerts higher concentration than operating house-shaped device or CG individually.

© 2017 The Authors. Published by Elsevier B.V.
Peer-review under responsibility of KES International

Keywords: Therapy, Biological Information, Concentration

1. Introduction

The Digital Dollhouse we proposed enhanced traditional psychological play therapy with digital sensors and computer graphics combined together [1]. For the children, the environment is much like their home, so it is

* Midori Sugaya. Tel.: +81-03-5859-8517.

E-mail address: doly@shibaura-it.ac.jp

possible for them to immerse themselves through playing with the device. We consider that this environment is adequate for training the children to improve the required social skills. To accelerate the basic effect of the dollhouse and compensate to meet the requirements, various sensors are installed to sense their physical world, to share feelings and emotion with one another; the result would be visualized on the computer screening in order to share information more easily. Though they share the sense of the physical world in the dollhouse and the visual appeal of augmented reality on the computer, we assumed that children would easily immerse themselves in play and express themselves by sharing the situations visually and sensuously with the trainee. Based on it, we evaluated with a 6-year old child that is neurotypical, who is the almost same developmental level of the developmental disorder children with higher age. It obtains significant difference in reaction of children that compared with normal dollhouse especially in taking the responsive actions are twice as much as the normal device, and for the abstract concept three times, the number of miscommunications are 80% less than the normal one. Even more, children spent playing with this device twice as longer time as the normal device. Based on the result, we, brain scientist and human computer interaction researchers, have an assumption that there is a possibility for enhancing biological effect on collaboration of touching and viewing, compared with just touching, and just viewing. Based on this assumption, we define the cooperation of the action of touching the device, and reflection of action to CG for viewing the result as a feedback of their action, and proposed Digital Play Therapy Device. Fig. 1 is image of our proposed device. It includes not only the collaboration method of house-shaped device and CG, but also present the novel human-computer interaction technology that collects touching information of humans with several sensors and present it for some representative image for the display.



Fig. 1. Digital Play Therapy Device

In this paper, a first step of our research, we will present an experimental evaluation that uses biological responses of participants with brainwave and heartbeat. In the field of using biological information for estimating human consciousness, many researchers had proposed various methods using Galvanic Skin Reflex (GSR), Electrocardiogram (ECG), breathing rate and Electro Encephalogram (EEG). Some researchers proposed a method of estimating “Wakuwaku (Japanese word mainly represents excitement)” by using heart rate, earned from ECG and GSR [4]. The field of measuring brainwave using EEG, some researchers showed the result of measuring concentration and relaxation when playing with toys [5].

In this paper, we used heartbeat and brainwave for evaluating DPTD. Heartbeat was treated as the measurement of excitement and stress, and brainwave were treated as the measurement of concentration and relaxation. The result of the experiment showed that DPTD has various results, different from each participant. Especially, concentration showed significant difference.

This paper’s sections are organized as follows. In Section 2, we present the Digital Play Therapy Device, and the evaluation method of the device. In Section 3, we describe implementation of DPTD with new functions implemented. In Section 4, we analyzed and evaluated the result of the experiment which used DPTD. We concluded the paper in Section 5.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات