The World is Canvas: A Painting Application for Children based on the Social Constructivism System

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This research focuses on creativity about painting in artistic creativities and aims to increase children's motivation about painting. This research assumes that drawing support as well as fun in the learning, which focuses on social elements relating to the Social Constructivism system, increases the motivation. We developed 2 features for social elements composed of mobility and network, and implemented an iPhone application "The World is Canvas". This application allows the users to choose any image as a draft for coloring.

Children, fun, motivation, painting, coloring

1. INTRODUCTION

Vygotsky said that children love to express creativity by painting before elementary school, but they lose the passion to paint after entering elementary school when their interest changes to language [1]. Children do not lose the passion to paint if their family or school continues to stimulate them. This practice means a training to acquire skills of drawing. This training imposes suffering on children and children cannot stay motivated. This research aims to tackle the problem in a fun way relating to the relationship between children and art by using a painting application based on the Social Constructivism system, and increases the motivation of children to paint.

To achieve this purpose, we implemented the iPhone application "The World is Canvas". This application enables the user to use any image as a draft for coloring and to support drawing which most children do not do well. To be concrete, the user shoots any object using the camera embedded on iPhone. Next, the user chooses an image on the application. This application traces the image loaded on the application and generates a draft for coloring. The user can enjoy coloring on this processed image using his/her favorite color and brush size (Figure1).

2. RELATED RESEARCHES

Learning system for children in Human Computer Interaction (HCI) is strongly influenced by some theories of development psychology. The representative researchers are Jean Piaget and Lev Semyonovich Vygotsky. Piaget's position is called Constructivism and Vygotsky's position is
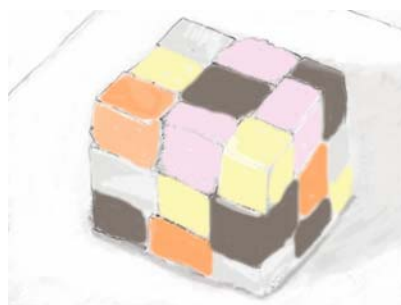
Figure1. An image created by The World is Canvas.

later called Social Constructivism. Piaget's Constructivism [2] is based on his theory that children actively compose new knowledge from their experience through the process of assimilation and accommodation. However, Constructivism System has a significant problem that children have to correct mistakes by themselves, and they cannot exceed their own intellectual boundary. On the other hand, Vygotsky's Social Constructivism is a theory that children acquire higher knowledge with help of their society including adults based on the concept of Zone of proximal development (ZPD) [3]. Vygotsky emphasizes importance of communication with language and collaborative activity. The World is Canvas, which we propose in this paper, increases the motivation for children to paint through having fun in the learning experience focusing on social elements as Social Constructivism system.

3. CONCEPT

The World is Canvas decreases the element which children feel uncomfortable in painting and increases fun. The former is achieved with drawing support by using any image as a draft for coloring. The latter is achieved focusing on social elements,

Table 2. Questionnaires, options and results in the interview

Questions	Options	The whole	Pre-school children	School children
Q1．Which do you have fun, normal coloring or The World is Canvas?	a. normal coloring b. The World is Canvas	18(16%) 92(83%)	6(30%) 12(60%)	12(13%) **80(88%)**
Q2．Which do you have fun, normal painting or The World is Canvas?	a. normal painting b. The World is Canvas	24(22%) 83(75%)	6(30%) 10(50%)	18(20%) **73(80%)**
Q3．(To parents) Do you think your child painted with fun compared to normal painting?	a. didn't look as having fun b. looked as having less fun c. looked as having fun d. looked as having much fun	0(0%) 6(8%) 26(34%) 43(56%)	0(0%) 2(11%) 9(47(%) 8(42%)	0(0%) 4(7%) 17(29%) **35(60%)**
Q4．(To parents) How do you think you talked more with your child compared to normal coloring?	a. Not excitedly b. less excitedly c. excitedly d. very excitedly	3(4%) 16(21%) 32(42%) 26(34%)	0(0%) 5(26%)) 8(42%) 6(32%)	3(5%) 11(19%) 24(41%) 20(34%)

which generates fun in the learning experience and increase the motivation to paint.

This application has 2 features as a learning system based on the Social Constructivism system which focuses on social elements in learning. The first feature is the social element through mobility. Mobility enables the users to go to any place and reflect the information in the place to the application. In addition, it allows them to communicate with a variety of people in each place. The second feature is the social element through network. Network enables the users to send and receive the data to their friends, family or other people. Based on these features, we implemented an iPhone application "The World is Canvas" based on the Social Constructivism system.

4. EVALUATION

We organized a workshop for children and conducted a user study of this application. We retrieved the shot photos and the images created by the children as log data, retained them, and conducted interviews. The workshop was held in two days, and 111 children from the age of 4 to 13 years old attended.

First, we analyzed the number of sending email as log data for the quantitative evaluation (Table1). This result is divided into gross children and children with parents. This is because the attendees were children; most of them hardly had their own e-mail address. As a result, the children with parents got 8.6 points higher than the gross children.

Table 2 is the result of the questionnaires in the interview. The 3rd and 4th questions were asked to answer if the children are accompanied by their parents. As a result, the ratio of the positive answer from children after entering elementary school increases in all questions except for the 4th

question. There is no significant difference in the 4th question between pre-school children and elementary school children.

Table1. The percentage of sending data

population	The number of requests	The rate of requests
Gross (111 children)	51 people	45.9%
With parents (77)	42	54.5

5. CONCLUSION

These result indicated that the children and their parents acted reflecting the aims of two features, which we adopted based on the Social Constructivism system; communication between children and their parent in the same place were prompted(question 4), and they ran the e-mail function to remote place(quantitative evaluation). In addition, the results of the question 1 and 2 as the subjective opinion from the children and the result of the question 3 as the objective opinion from the children's parents shows that The World is Canvas is more fun than normal painting and normal coloring. We suppose that the World is Canvas, which is more fun compared to the original activity, should be the highest motivation for children to paint.

6. REFERENCES

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