



# Designing for Children

- With focus on 'Play + Learn'

## Drawing with Fun: What We Can Learn From the Children

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**Abstract :** Drawing is the act of creating a representation of any object by the use of lines and/or value. Since drawing is a form of visual expression, drawing is thus used as a mean for developing creativity among the preschoolers in Malaysia. With the advancement of computing technologies, there are a number of digital drawing applications that have been developed to help enhance the children's creativity. We selected two drawing applications: *Drawing for Children* and *Tuxpaint*. From this study, we recorded a few interesting observations: how fun and useful should be related to children experience. We found that fun was further enhanced with the social interaction with other children. Special effect features also, were seen merely as an added value to children's drawing experience and "*being aesthetically appealed*" is an important factor that influences their decision. This study proved that fun is an important element in designing for children learning experience.

**Key words:** *Aesthetic Experience, Creativity, Fun, Perceived Usefulness, Social interaction, Usability*

### 1. Introduction

The use of computers in education system in Malaysia has grown tremendously in recent years. As a result, all educational institutions including preschools have experienced increased pressure to integrate Information and Communication Technologies (ICT) into the classroom as proposed in National Preschool Curriculum (MOE, 2003).

Educational technologists believe that a child's academic performance can be enhanced with the use of interactive computing technologies such as multimedia and web applications. These technologies can help motivate children to learn, help them understand concepts, and thus help them develop problem-solving skills (Sivin-Kachala & Bialo, 2000). However, many of studies on the use of technology in education focus on the aspects of logical-mathematical development and social-linguistic development of children

((Clements (1999), Clements, Nastasi and Swaminathan (1993), Finegan and Austin (2002), Genishi, McCollum and Strand (1985), Haugland (1992), Haugland (2000), Muller and Perlmutter (1985), Wright and Shade (1994)). Studies on the use of technology for the development of child's creativity largely focus on the use of Logo programming language (Clements, 1995).

Recently there is a growing effort in interactive multimedia technology that focuses on the development of drawing applications to help enhance creativity among young children. Some examples of these applications are TuxPaint, Drawing for Children, and Shidonna. These applications can be downloaded from the websites respectively. In our opinion, these applications have better user interfaces than the existing PC drawing application, MS Paint. From our study, we found that these applications were primarily designed for the children.

In Malaysian preschools, children still draw pictures using pen, pencil, and paper. None of interactive drawing applications such as TuxPaint have been introduced to these preschoolers yet. We as HCI researchers would like to see how easy it was for the young children to use these applications in their drawing activities. Hanna et. al (1997) argues that children's products should be evaluated by children in order to find out whether they were usable for the children.

To evaluate the usability of drawing applications, we chose four (4) preschool children who were pre-selected by their teacher to participate in our study. Three of these children were boys and only one of them was a girl. They were different in terms of level of IT exposure and personal characters. For the drawing applications, we chose to use TuxPaint and Drawing for Children. Below are the user interfaces of the selected drawing applications, Figure 1 for TuxPaint and Figure 2 for Drawing for Children.



Figure.1 Tuxpaint

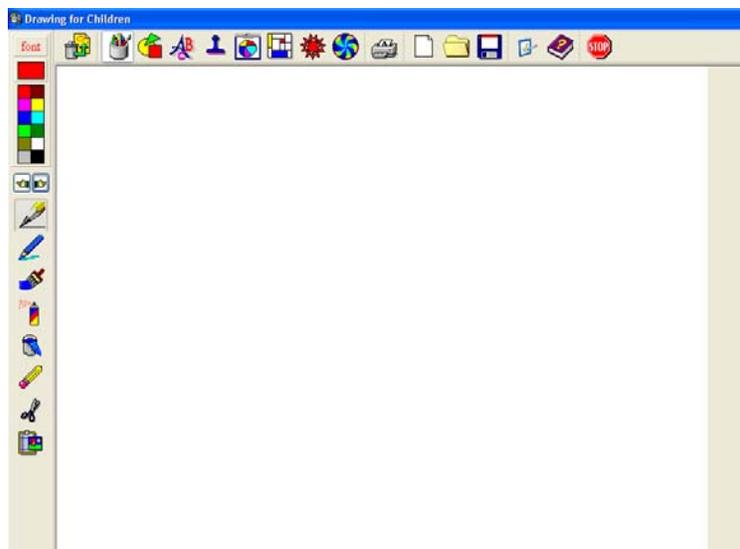


Figure.2 Drawing For Children

For the next section, this paper examines these two applications to assist children in drawing in order to quicken the creativity and expression of child art and explores issues related to usability for children. More particularly, this paper will inform the usability experiment that was carried out with children working with the drawing applications. This paper also reports on the results and finally, the paper is concluded with some suggestions for future work of the study.

## **2. Computer and Drawing Application**

Children love to draw. They can create magical scenes whenever we give them a piece of paper and a pencil. However, in this study, we would like to introduce an alternative to the preschool children on how to draw using a computer. The children needed some assistance to familiarize with the features offered by the drawing software in the beginning; yet the children were able to draw freely using basic tools such as pencil and paintbrush although they were novices. Functions like pencil and paint brush formulated the children to be more expressive in the drawing.

These two applications, Tuxpaint and Drawing for Children have many qualities that can help extend children's expressiveness in their drawing activities. They provide a blank canvas and a variety of drawing tools to help the children be creative. Moreover, they have some fun tools like the Stamp tool, a set of rubber stamps or sticker that lets the children paste pre-drawn or photographic images in their drawings. The Magic tool contains a set of special tools that change the way the children's drawing looks by adding effects or objects like grass, bricks, rainbow and sparkles.

## **3. The Study**

### **3.1 Participants**

Four 5-year-old children were chosen as participants and two researchers were involved as facilitators in the study. As mentioned above, the children were familiar with basic computer literacy since their preschool incorporating the computer usage in its classrooms. Each child was required to do a series of tasks using identified drawing programs and their actions were closely observed and recorded.

### **3.2 Location**

When working with children, contextual inquiry is an important part of the design process because it gives insight into how children behave in their natural environment (Druin, 1999). Furthermore, it is easy for the children to take part in the study conducted in their own environment. For this reason, we decided to do the observational study at their preschool. Since their preschool has become a part of their everyday lives, it was important that the observational processes would not interfere with their everyday lives too strongly. We felt that these children should feel comfortable throughout the observation and their preschool environment could help provide such a natural atmosphere for them.

### **3.3 Design of experiment**

To find out how these preschool children use the drawing applications, we conducted an observation with the children. The primary goal of the study was to find out whether the applications were usable for the children.

First, the researchers described the nature of the project to the children in the classroom. After that, each researcher escorted one child to a computer that was installed with the selected drawing application. Every effort was made to set the children at ease and they were asked about their experience using computer. During the experiment the researcher was standing behind the participant. Three series of tasks were given to the children: wrote their names, painted basic shapes and finally, painted any pictures they like. Tasks took approximately 30 minutes to complete. Each participant was individually asked to complete one sequence of fully assigned tasks. Children were encouraged to behave as normal as possible and to find out difficulties for themselves. Children in the group of 5 years old do not have enough direct experience and therefore needs to be guided during their explorations on the drawing application. Hints were given only when children were not able to make further independent progress.

We observed the children interacting with the selected drawing applications. They enjoyed experimenting with colors, different backgrounds, and various paint brushes. All interactions were logged for each participant; the children's attitudes and behavior, the problem encountered by them and their feedback including affective reaction such as gestures, facial expressions, amusement or dissatisfaction.

### **4. Results**

Experiences related to the drawing process were gathered both from the perspective of the children and from the researchers. In terms of this study, from the children's point of view, the purpose was principally related to how they perceived their own skill in the drawing, and how they experienced the participation activities in general. From the researchers' perspective, it was examined how they felt the children's participation aided their work and affected their study.

From this study, we recorded a few interesting observations: firstly, how the children perceived the usability of a product. Secondly, how fun should be related to children experience in the context of usability and thirdly, how aesthetic experience affects children's interest or preference or decision.

#### 4.1 Perceived usefulness of product

An interesting observation in the experiment was about how the children perceived the usability of a product. In the study of human-computer interaction (HCI), a usable product can be defined as a product that is easy to use and learn and supports the users do their work effectively and efficiently. The drawing applications were both easy to use and learn, and the children were able to draw pictures with them. Ease of use is a critical determinant of engagement, and can therefore be a key factor to determine whether a product is a success or not [Hanna et. al, 1999]. If the children cannot use the drawing application effectively, they certainly will not learn through the process of using it. [Bruckman and Bandlow, 2002].

#### 4.2 Fun

From this study, we also recorded another interesting observation: how fun should be related to children experience. Wiberg in his paper says, when discussing fun in the context of usability, the most closely related notion is user satisfaction. In this study, fun can interpreted as first, a result of ease of use and second, as features to be added on the user interface design. Both drawing applications have features that can make the drawing experience fun and interesting, for example, Magic and Stamp in Tuxpaint add special effects to the drawings thus making the drawing activities more fun.

In children's learning experience, fun is a very important factor and they learn from playing. In addition, in this study, we found that fun was further enhanced with the social interaction with other children. These children had more fun when they could do and share the drawings with their friends. Special effect features were seen merely as an added value to the children drawing experience.

Usability of a children's software application as defined by Hoysneimi et. al (2003) is that a child is able and willing to teach other children how to use it. In this experiment, one of the participants seemed to enjoy even more as his friend joined him during experiment. Children, as we observed, preferred to work with a friend rather than alone even though both drawing application is developed for single user. Our observation shows that the children were more adventurous, they were not afraid to try new features and more confident during the experiment. They explored more special features in the drawing application such as magic, special effect and stamping where fun element was established. They learned that drawing can be fun where they acquired more pictures and more effects from the special features that make their drawing more real. Eventually, the

children became more creative in conducting activities and there is a greater and more spontaneous peer teaching and helping when children were using computers (Clements and Nastasi 1992).

#### 4.3 Aesthetics experience for children

This study however found that *being aesthetically appealed* to these children is an important factor that influences their choice decision. *Tuxpaint* was perceived usable because *Tuxpaint* was more aesthetically appealed to the children than *Drawing for Children*. *Tuxpaint* has a cartoon figure, a penguin - a lovable character for children, that attracts the children's attention, thus, indirectly influencing the children's choice for the drawing application. For the children, it is about the physical design (in this case, the user interfaces) that appeals to them; and this factor overweighs the functions and features of the drawing applications. The children tend to choose the application that features characters they recognize from books or films. They clicked on the familiar icons, rather than on the unfamiliar ones.

#### 5. Conclusions

This study shows that children experience should be fun; in this case, children love to see fun design which was appealed to them and children had fun when they were drawing with their friends, as well as fun drawing activity. Based on our study, social learning aspect should be highlighted by software designer for children's software to make the drawing activities more fun. We therefore propose that such drawing applications for children should support social learning activities so that the children's creativity can be more exploited and enriched. It is suggested that drawing software is no longer restricted to a single user; children can sit down and collaborate with their friends face to face in an entirely natural way. It can provide children with a social experience. Our research shows that children are more productive when they cooperate, therefore compared to a single child, a group of children may be able to do a task more efficiently and benefit more from the experience. Throughout this study, we strongly argue for a participation of peer interaction among children in the drawing activities, as we experienced that meaningful inputs and significant ideas from the children can be very beneficial to the interaction design and result in a better and more usable product for children.

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