# Evaluating the Interaction Design of General Tasks in Children's Mobile Apps

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**Abstract**

The poster reports current findings in a project focusing on UX evaluation of children's mobile apps. We adopt field study in the research to first evaluate the interaction design of general tasks, including selecting, saving and deleting, in typical children's mobile apps. Qualitative analysis is conducted to summarize the interaction behavior of children aged from 4 to 6 based on video data collected from participant observation. We derive corresponding design principles to provide insights for designers in the industry. The poster also discusses future focus in this research field.

**Keywords:** digital youth; interaction design; interaction behavior; mobile application; children-computer interaction

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## 1    Introduction

Since iPhone made its debut in 2007, mobile device became more and more popular. And its influence extended to a much younger generation. Among families with kids under 8, 40% of the children have access to tablets, and 63% of them have access to smart phones in their daily lives (Common Sense Media, 2013). This percentage is still on a continuous spike. According to the statistics retrieved from Apple's App Store in August 2013, 60% of educational apps in Chinese market are targeting K12, while the percentage of which is even higher (up to 80%) in US market (Shuler, Levine & Ree, 2013).

Children love mobile apps more than PC software, because manipulating objects on a touch screen is much easier than manipulating the mouse or keyboard, and mobile apps do better in interaction design. Parents also find children's mobile apps, be it educational app or entertainment app, helpful to intrigue children's interest in learning and develop their abilities in many ways. While the educational functions of mobile apps are more valued by society, students in Georgia Technology Institute found that usability of those educational apps is a more critical issue, because it is hard to evaluate the educational achievement when usability issues intervene. We can't count on the learning outcome, if they can't use the apps efficiently (Bruckman, Bandlow & Forte, 2008). Yet we see a lack of research on evaluating the interaction design from the perspective of usability, which also leads to lack of guidance for industry practitioners.

Thus in our research, we hope to start from the 3 most basic task modules, including selecting, saving and deleting, which are very common in popular educational apps for children. We'll explore the user experience of each task module, and find out children's needs and cognitive level on each task module. The key goal is to analyze the usability of current design of these tasks and derive corresponding design principles based on children's interaction behavior and cognitive level.

## 2    Research Design

### 2.1    Methodology

Field study is adopted in this exploratory research. We selected typical mobile apps and designed evaluation tasks for each task module. We then collected video data from participant observation. We chose to use video data because it can reveal more information on their facial expression, gestures and other body languages, which are helpful for further analysis. And also the behavioral information is more

reliable than words when it comes to children, because they tend to give positive answers to please adults (Hanna, Risden & Alexander, 1997). And in the current stage of our study, we've only conducted qualitative analysis based on the video data.

## 2.2    Participants

Participants for this study are children aged from 4 to 6. In total, 12 children in China participated in evaluating the task modules of selected apps. The participants were recruited from kindergartens and parks by convenience sampling. We chose this age group because among the educational apps targeting K12 in Apple's App Store, 82% of them are specialized for children aged 4 to 6. And also according to previous social psychological and cognitive theories, children in this age group share common psychological and cognitive features. Although there are limited participants, we could still see some clear patterns in their interaction behavior.

## 2.3    Apps and Tasks

We selected 4 apps with typical interaction designs in the general task modules we are examining and designed evaluation tasks for each module. Here we present the features of the interaction design of each module in Table 1.

|  | Doodlecast | Draw & Tell | Draw Animals | Shou Hui Yi Shu Jia |
|---|---|---|---|---|
| Selecting | List, swipe up/ down | N/A | Pages, Swipe left/ right or click arrows | List, swipe left/ right |
| Saving | Save automatically | Save automatically, return to "My Drawings" | N/A | N/A |
| Deleting | N/A | Click trash can- select object- confirm; Or drag stickers out of screen | N/A | Swipe to right position- click trash can- confirm |

Table 1. Interaction Design Features of Selected Apps

The tasks we designed for each selected module is presented in Table 2, where the tasks on the saving modules are to ask questions about their understanding on the task.

|  | Doodlecast | Draw & Tell | Draw Animals | Shou Hui Yi Shu Jia |
|---|---|---|---|---|
| Selecting | Find a cat | N/A | Find a duck | Find a fish |
| Saving | | Inquiry: Was the picture you drew saved? Do you understand what it means to save a picture? Could you find the picture you saved? (Start from homepage) | N/A | N/A |
| Deleting | N/A | Delete a picture in the gallery; Delete a sticker in the picture | N/A | Delete a picture in the gallery |

Table 2. Evaluation Tasks

## 3    Analysis and Findings

Based on the qualitative analysis, we compared children's performance in each task and found some

consistency and trends in that. For each task module, we provided insights in their cognition to the task and suggested better design solutions to streamline usability. We want to stress that the following discussion should not be viewed as the results of a comprehensive scientific study, but rather as exciting indications that a lot of design details in children's mobile apps could be improved in a way that is more effective for kids.

## 3.1   Selecting

Most of the selecting modules in children's apps adopt the most intuitive list to presents all the alternatives to select. The way to navigate through the list is to swipe left and right, swipe up and down or click the arrows. The three apps we chose for this task each uses one of the above interaction designs. Here are our key findings from the selecting task based our video data.

a)  Using borders in the selection page makes children frustrated. The interface in the app "Draw Animals" has a rectangular border in each page, which looks like a book page. It seems like there are no more following pages to provide more options. This makes participants feel confused and hesitated when they can't find the target in the first page. In comparison, children find the target much more fluently in the other two apps with no border.

b)  Swiping is a more effective interaction than clicking arrows for navigation. Most of the participants swiped naturally when they navigated through the options. Only 2 of them intuitively clicked the arrow many times in a row to finish flipping the page.

## 3.2   Saving

The two apps chosen for this task both use the mechanism of automatically saving. The only difference is that when a drawing is finished and saved in "Draw & Tell", it will return to the "My Drawings" gallery. Based on the participants' answers to our inquiry and other performances, we learned about how children perceive saving.

a)  Children aged 4 to 6 understand "save" and have the desire to save their outcomes. But they have no intention to retrieve the saved works. In the task, participants either asked whether they can save the drawing or expressed willingness when asked if they want to save it. When asked to retrieve their previous drawing, many participants went to the original blank canvas instead. It seems retrieving the drawings doesn't make sense to them.

b)  Provide feedback for automatic saving. Most participants know their drawing has been saved in "Draw & Tell" where feedback is given. But in "Doodlecast", where there is no feedback after automatic saving, participants are not sure whether their paintings are saved.

c)  Taking pictures, like the design in "Toca Tailor", is a better solution because children are familiar with it. 3 participants requested to take a picture for their drawing upon finishing. To them, taking picture is the most natural way of saving images.

## 3.3   Deleting

There are mainly 3 patterns of deleting. The first one is to select the object and then manipulate selected object. The second one is to choose the manipulation and then select the object. The last one is to directly manipulate the object, such as drag the item out of screen.

a)  Children are more used to the pattern where they can first select the object and then manipulate. In "Draw & Tell", which adopts the second pattern, many of the participants make mistakes by first clicking the object. And most of them got confused and have no clue of what to do when deleting the stickers in "Draw & Tell", which adopts the third pattern.

b)  Use symbols that children are familiar with, such as trash can and crossing. In the task of deleting, all participants click these symbols as soon as they find them. But when there is no trash can, they don't understand where to drag the object to. For example, they got lost when deleting the stickers in "Draw & tell".

## 4    Conclusion

The performance of the 12 participants shows some behavioral patterns that could be used for deriving design principles, which could be referred to by professionals. However, the results now are limited by lack of participants and experimental study. In the follow-up study, we will recruit more participants to generalize the findings and conduct quantitative study to test our findings.

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