Initial Observations on Children and Online Instructions

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ABSTRACT
When children use a computer, they often need instructions for how to proceed. However, giving instructions in the user interface is challenging: young children do not know how to read, or the instructions might be in a language they do not master. We describe three small scale usability studies where the amount and method of advice giving in the interface varied. Our results show that children manage to use properly designed software with no instructions at all. Some usability test protocols emphasize giving children spoken instructions to help them get started. In our case studies we report two kinds of adult presence in the group for providing the spoken instructions, and the mixed findings of the role of the adult.

Keywords
Children, usability testing, instructions, online help

ACM Classifications Keywords
H.5.2 [Information Interfaces and Presentation]: User Interfaces – evaluation/methodology, screen design, help

INTRODUCTION
Children can start using the computer at a very young age, since computers are becoming common in their everyday environment. Children are fast learners, and playing with the computer can bring much joy. They are eager to explore and do not fear trials and errors. But when something unexpected happens or the child does not know how to proceed, without reading skills the child is often left clueless. Instructions are often given only as written text, and often also in such wordings that adults, too, have problems interpreting them. In this study we focus on instructions in the user interface, and collect experiences from three usability studies of various types of instructions and their usefulness in solving problems that the users (children aged 5 or 6 in our case) had.

Starting with the empirical guidelines on usability testing with children [6], several later studies have empirically evaluated different methods for child participation (see [1] and [8] for reviews of them). One key finding in these studies is that age matters. Young children, in particular,

should be treated differently from adults in usability tests. Small children are different in many respects, not only because they don’t know how to read. If they are requested to think aloud, it often happens that it just doesn’t give the results the tester has sought for [4].

In the following, we first describe briefly the three different ways of giving instructions to children in the applications tested. We then focus on our data collection – we ran usability tests with children, but for practical reasons our tests also involved adults. The presence of adults in usability testing together with children has not been studied much. We found them to be a hindrance to a successful test, even though they were able to help the children when the instructions provided by the software were not sufficient. We also present our first observations on the different approaches to presenting instructions to children in the interface.

THREE APPROACHES TO GIVING INSTRUCTIONS
Boohbah – No Textual Elements
The Boohbah web site [3] does not provide any written or spoken instructions. Instead, children (as well as adults) are expected to try out its functionality, explore and have fun. The site contains small games built as interactive flash animations (Figure 1). Some parts of the site require clicking on the images while the others change by mouseovers. The child launches each game on the top level, and needs to navigate back for new games.

![Boohbah – color and movement.](image1)

Figure 1. Boohbah – color and movement.

The developers of the Boohbah site [13] have not used textual instructions, because text would not fit into the visual and aesthetic design of the pages. Textual instructions would decrease the international audience and universal user community of the pages, and limit their applicability for small children. Their reasons for not...
including audio and spoken instructions included uncertainty of the language to be used, and also concerns of the bandwidth of the network connections: audio files would not be practical over slow connections [5].

Alma’s and Olivia’s Preschool – Written Instructions
Alma’s and Olivia’s Preschool (A&O) is an educational prototype to teach preschool aged children to read and count [10]. It follows a standard way of giving instructions to the user: each page has written instructions (in Finnish) above the working area, and the system also gives written feedback on the success or failure of the child in solving the small exercises. The instruction (“Ohje”) in Figure 2 advises the user to click first on words starting with the letter A, and then on the Check button (“Tarkista”).

Figure 2. A&O – finding words that start with an A.

Though the importance of spoken instructions to small children is well known (e.g., [2]), audio files are available in A&O only on some special content (rhymes read aloud).

KidPad – Animations and Spoken Explanations
KidPad [9] is an application for children’s storytelling. The tools in KidPad mimic standard Paint tools but offer much richer features (hyperlinks, x-ray images, animation) and support collaboration between children by allowing the use of several mice [7]. The instructions are animated demonstrations that appear on the drawing surface.

Figure 3. KidPad animation.

The three screenshots shown in Figure 3 illustrate steps in an animated help sequence. It has been launched by clicking first the Question Mark tool and then the actual drawing tool. The animation takes control of the screen and hides the current drawings. In addition to the animation, a child’s voice narrates the steps of using the tool. Since the audio is in English, we couldn’t use that in our tests, and thus the children had to cope with the animated help sequences only.

DATA COLLECTION IN THE USABILITY TESTS
Our studies have involved several separate groups of preschoolers (5-6 year old Finns). Table 1 lists the total number of participants in our studies.

Table 1. Study participants.

<table>
<thead>
<tr>
<th>Study</th>
<th>Children involved</th>
<th>Adults involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boohbah</td>
<td>13 children, one child twice, in groups of 2</td>
<td>1 tester</td>
</tr>
<tr>
<td>A&amp;O</td>
<td>4 children, 1 at a time</td>
<td>4 preschool teachers and 2 testers</td>
</tr>
<tr>
<td>KidPad</td>
<td>11 children, some twice, in groups of 2; altogether 7 groups</td>
<td>1 preschool teacher</td>
</tr>
</tbody>
</table>

Our participants fall between the preschool and elementary school age groups introduced by Hanna et al. [6] (Finns start elementary school at the age of 7). Some of them were already able to read at least a bit, and all of them had used a computer at least in the kindergarten. They were recruited from preschool groups, and knew their peers well.

With children younger than 6 year old, Hanna et al. suggest having the child’s parent in the test room together with the child, but emphasize how the adult should be instructed not to interfere in the test [6].

Since all our tests were arranged in kindergartens, it was easy to involve the teachers of the children. The motivation for asking the teachers to participate in the A&O tests was to make the situation more natural for the children. Furthermore, since the goals of the prototype are educational, children might have needed assistance in working out the correct answers. However, with KidPad the whole data collection was done by the teacher of the children, in connection of their everyday activities of learning together. KidPad was among the applications they tried out in their exploratory learning groups [14]. These tests did not involve other instructions except to try it out, and the teacher collected experiences to see if the kindergarten can use KidPad in small groups later.

No teachers were present when Boohbah was tested, and the children seemed to manage working together quite naturally. The tester was in charge of turn taking between the children but in some groups the children themselves managed turn taking in a voluntary fashion.

MAIN FINDINGS
Usability problems were encountered in all tests, even with Boohbah. We will look at the usability findings mainly from the viewpoint of the instructions provided. The test protocols are also discussed. The work is based on [11].

Boohbah – Explorations without Getting There
The children were free to explore those parts of the Boohbah site they wanted. They were sitting with a friend, so it wasn’t hard for them to collaborate (Figure 4). The main findings of the usability of the site related to mouse buttons: the secondary button opened a settings window...
and the children were confused about its meaning and on how to close it: “O-oh, something’s wrong.” There were some problems in finding the games in the interface especially for those children with less computer experience. Some children started to wonder after 15 minutes if they had found all games of the site: “Isn’t there anything else?” Without textual information, they were uncertain of whether they had missed something.

Figure 4. Children collaborating in Boohbah.

**A&O – Instructions Given by the Teacher**

We knew in advance that the children would have problems in reading the instructions: “I don’t know how to read those letters.” That was one of the reasons why the teacher was present in the test (Figure 5). We counted altogether 26 occasions where the teacher read aloud the textual instructions to the child. We couldn’t foresee that the children would not understand words like “button” – the concept common in user interfaces but for a child the graphical appearance did not resemble a button.

The teacher helped in solving the problems the child had – if she could. The usability tests also revealed a situation where even the adult couldn’t figure out what to do next. Thus, the goal of the A&O designers to keep the texts short and simple did not always work in practice.

Figure 5. A&O test by a child and his teacher.

Perhaps due to the presence of the two testers and the preschool teacher, the children taking part in the A&O tests were very shy and rarely expressed their opinions. They had control of the mouse, but if they encountered problems, they looked for help from the teacher, without resorting to the on-screen instructions. It was surprising to the testers that on many occasions the teacher took an active role: they wanted the child to succeed in using the prototype and provided explanations and comments too soon when the child hesitated, thus resulting in even less verbalization by the child.

**KidPad – Funny Animations but Seldom Help**

Two groups out of seven didn’t use help animations at all during the KidPad trials. The other five groups encountered the help 24 times in total. What motivated the children to use Help in the first place? One group tried Help because the teacher asked about the Question Mark tool and two used it because a peer who already had some KidPad experience gave a hint. Two groups encountered Help unintentionally, by mistake. For example, a child wanted to use the X-Ray but accidentally clicked on the Question Mark located next to it. With the second attempt to click on X-Ray, the child then launched the X-Ray animated help.

To the children in these groups the first appearance of the animation was surprising. The children were confused why there was only one cursor visible, and who was moving that cursor: “Oh gee, why did you get it?” They were worried about their own drawings suddenly disappearing when the animation started: “That’s taking it away!”

For most children the animations were surprising and fun, but the children whose work was interrupted by the animation did not enjoy them. The situations where the animated help in KidPad was used can be divided into five categories.

1. Using Help to explore (5 times), when the child intended to see the help animation about a tool. In these cases the help animation seemed very useful, giving better results than when the teacher tried to explain verbally.
2. Clicking the Question Mark to see what happens without understanding the resulting animation as help or that the tool clicked next would be demonstrated (5 times).
3. Using Help to tease (8 times), usually in friendly ways.
4. Accidentally initiating Help (3 times). This didn’t provide any learning since the children were not watching the animation but were instead trying to figure out what was going on.
5. Watching a funny animation (3 times). Children found the help animations amusing and entertaining (Figure 6).

Figure 6: Boys viewing help for the Grouping Tool.

Based on our video material on the KidPad trials, not all children understood that they were actually watching instructions for the tool they clicked on. They did not use the tools much in their own drawings. However, they used the Zooming tool, which had some unintentional results.
When zooming out, the children lost their drawing and were not able to find it, and zooming provided unexpected results to the other child who was not zooming but suddenly lost the ability to draw. There was no help provided in the application for these usability problems, and no easy recovery of the previous status.

Though the preschool teacher was present in the trials, her role wasn’t too prevalent in the group. Instead, she seemingly applied the guidelines of [6]: never answer a child’s question directly but try to reply with a question thrown back at the child to evoke her own thought process.

**DISCUSSION**

In a well designed user interface, the user should not need instructions. This principle of user centered design is especially promoted by Norman [12] in the context of everyday things. It has not been studied, though, how it applies to graphical but still mainly textual user interfaces.

It is challenging to test the usability of help and instructions: if the user succeeds in using the interface, the test will not reveal any problems in instruction design. However, in real usage the user is likely to encounter situations where well-designed instructions are needed.

The words used in textual instructions should be easy to read and understand, and they should also cover content issues, not just instructions for using the application. The user should be able to read them at her own pace. On the other hand, reading text on-screen can be tiresome for adults, let alone for children.

The main usability issues involved with the varying types of help are collected in Table 2 with design recommendations.

Table 2. Findings and recommendations.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Usability issues</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>No textual instructions</td>
<td>How do I start?</td>
<td>Give visual cues to help get started and find new content.</td>
</tr>
<tr>
<td></td>
<td>Have I seen it all?</td>
<td></td>
</tr>
<tr>
<td>Written instructions</td>
<td>What does it say over there?</td>
<td>Provide reading help and encourage own reading by splitting instructions into manageable steps.</td>
</tr>
<tr>
<td></td>
<td>What does it mean?</td>
<td></td>
</tr>
<tr>
<td>Animations</td>
<td>What happened?</td>
<td>Visually separate help from the other tools. Support stopping and resuming the animation.</td>
</tr>
<tr>
<td></td>
<td>Why did it happen?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How can I go back?</td>
<td></td>
</tr>
</tbody>
</table>

While the animations in KidPad did not always result in learning and better mastery of the functionality, they certainly added fun in the KidPad trials. Since the pre-recorded KidPad audio help was not available in our trials, our study lacks an important modality for giving the instructions to children. While not feasible on the web with limited bandwidth connections, audio help seems to overcome the limitations of written instructions.

**ACKNOWLEDGMENTS**

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**REFERENCES**


