Kids´ Space

Michael Schiessl, Sabrina Duda & Rico Fischer

eye square GmbH, Schlesische Str. 29, 10997 Berlin, Germany

Abstract. In this study we evaluated virtual environments for children. We compared two virtual web applications: 4kidz and KinderCampus. The aim of the study was to evaluate children`s acceptance of the system and the usability of the virtual environment. Usability was measured with a scenario based testing of the website. The kids should fulfil a variety of tasks. While exploring the web site the attention of the kids was measured by counting the eye-fixation time and rate on the screen. Concerning usability KinderCampus which could be characterized as a very intuitive virtual environment showed the best results. The navigation of the system is based on a space metaphor. Even illiterate children at the age of four were able to use the system and showed great pleasure while exploring the virtual environment. 4kidz caused many usability problems. Contrary to the other systems the navigation concept was not based on a metaphor concept. Especially the younger kids were not able to use the system and therefore, got frustrated. Results highlight the need for navigation concepts that follow a consistent spatial metaphor. Results also showed that the system has to give a very fast and clear feedback, otherwise kids loose track very easily.

1   Introduction

In the last years many new virtual environments for children have been developed. All of them have the intention to be a safe and funny place for kids on the web. But how does a virtual environment have to look like in order to achieve a high acceptance from children? This study was conducted to demonstrate the important role of the structure of an interface and its relation to usability and acceptance by children. For this reason we tested two virtual web applications: 4kidz and KinderCampus. The basic concept of the providers will be briefly explained.

Fig. 1. Loading pages of KinderCampus (left) and 4kidz (right). While the instruction of the 4kidz-page only indicates a delay, KinderCampus offers a "loading-game" to keep children busy for the mean time.

Figure 1 shows the loading pages of the two virtual web applications. Both designed a comic space ship which will be used as a medium to get to different topics of the sites. This is meant to transfer the concept of a world of its own, away from reality – a kids universe with lots of interesting things to explore. Figure 2 and 3 clearly demonstrate the different strategies used within the system.

Figure 2. Throughout the whole system KinderCampus continues the "space metaphor". Different planets circle in space and the space ship called cab is used to virtually transport children to the topics of interest. Once a kid is "on" a planet, comic characters do funny things if the mouse arrow is pointed at them, indicating that something will happen when clicked on it. This kind of presentation reflects an outside perspective.

Figure 3. 4kidz focuses more on a "gameboy" or desktop metaphor. The buttons up and down in the lower left can be used to switch between topics which are indicated beside the buttons. The windows connected through wires and cables offer direct access to the different topics. If one would want to continue the space concept then this gameboy or desktop metaphor would reflect an inside view of the space ship.

To summarize the two providers we state that KinderCampus realizes a consequent space metaphor in which navigation is supported by stimuli features (i.e. moving objects) whereas 4kidz uses a "gameboy" strategy in which symbols as navigation tools play a more important role.

2 Methodology

2.1 Subjects

Thirty children from 4 to 12 years (mean: 8.9) participated in this study. Results showed that the internet competence of average German kids is very high. Even the 4 year old kids where able to use a mouse and generally got along with the websites.

2.2 Procedure

To answer the questions how children are able to use the two virtual application and which impact this has on the general acceptance we applied qualitative methods and the Semantic Differential Scale. In the usability testing the two different providers were balanced within the subjects. A scenario based testing required subjects to perform on a number of KinderCampus- or 4kidz -relevant tasks. (KinderCampus: i.e. How many phones are in the city hall? Send an email! Go into the zoo! 4kidz: i.e. Go to the skateboard-game! Send an email! and so on) While solving the tasks performance was observed and recorded. In addition, quality of performance was rated on a scale from 1 (solved tasks without any problems) to 5 (needed lots of help to solve the task). The attention was also recorded as a function of fixation time and rates on the screen and the times of looking away. Afterwards participants were interviewed about their likings and problems concerning their performance on the two web applications (i.e. Which site did you like better and why? Which age group do you think this site is suited best for?). A normally used standard method of thinking aloud while performing the tasks could not be included in this study. We found that children less than 7 years were not able to succeed in this method.

3 Results

Results indicate a clear preference of the KinderCampus website. Nine out of ten children who made preference statements preferred KinderCampus to 4kidz. Surprisingly, these preferences for KinderCampus were not related to age. Only one child had no preference. In addition, participants were asked to give a total score on a scale from 1 to 5 (1 equals very good, 5 equals very bad) concerning their general judgment of the provider. KinderCampus was scored with 1.6 and 4kidz with 2.1. The rating of the performance quality (usability tasks) on an equivalent scale (1-5) revealed an advantage of the KinderCampus sites with a 1.7 compared to 4kidz with 3.5. That means, usability tasks were much easier to solve when using the KinderCampus sites. 4kidz sites revealed more usability problems. Not all children could use the navigation system 4kidz as efficiently as the one of KinderCampus. They described it as more difficult and complicated. In addition, concerning 4kidz especially younger children reported problems with the ambiguity of symbols that lead to mistakes.

4   Discussion

The aim of this study was to investigate the acceptance and the usability of two virtual environments which were based on two different interface structures. KinderCampus represents a strict "space-concept" in which navigation is primarily guided by intuition. Different application levels are indicated by planets that move through space. This "space-metaphor" makes it especially for young children easy to shift levels without the necessity of creating a mental representation of the system structure. KinderCampus made thoughtfully use of psychological knowledge about capturing visual attention in the design of the virtual environment. Links that indicate a gate to a different level contain so called "invitation-characteristics". Animations, pop-out effects, faces and animals are known in their ability of capturing visual attention in a bottom up manner. Kids are therefore, invited to attend to those stimuli and often times just naturally try to click on them. Once they did so, the figure or the face does funny things and leads to a different level. Kids learn to use these stimuli as navigation tools. That is what we described as navigation by intuition. It is not surprising that only basic mouse-competence is needed to perform in such an environment.

The usability results of our study confirm these assumptions and demonstrate how easy it is even for illiterate children to navigate in this kind of "space-metaphor" structure. The ease of use is connected to a low frustration rate and leads to a enormously high preference of this environment compared to the competitive provider.

4kidz on the other side focuses more on a "game-boy" metaphor. The structure of the system is less intuitive and, moreover, different levels and applications are placed in a hierarchical order. Navigation tools carry a more symbolic character than self-inviting features (see also figure 3). Therefore, attention is not as much captured by physical features - it has to be directed intentionally towards the symbols and can be described as a controlled top-down process. This leads to the problem that children must understand, that the symbols represent actions or commands similar to street signs. They have to encode the signs and associate them with their anticipated goals. In order to navigate successfully within the virtual environment of 4kidz it can be summarized that children must have created a mental representation of the system structure. It can be assumed that especially younger children will have problems with this.

Our results show a tendency that is consistent with this hypothesis. Especially younger children report complexity and difficultness of the 4kidz sites as negative. All children show a less accurate performance on the usability tasks compared to KinderCampus. It is interesting to note, that even older children which seem to have less problems with the navigation prefer the KinderCampus site.

To summarize the results of this study we can state that an interface using an ecologcal context (i.e."space metaphor") and additionally involves links that are action coherent, as described above, lead to a better task performance and acceptance than interfaces using a hierarchical structure. It can be assumed that the younger the children the more intuitive the navigation within the system should be.