

# Voice-Controlled Search User Interfaces For Young Users

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## ABSTRACT

In this work, we investigate children's speech patterns and interaction tactics during a web search using a voice-controlled search engine. Therefore, a user study in form of a Wizard-of-Oz-Experiment was conducted during which children interacted with a search engine using voice commands. The results of this study can serve as fundamentals to develop voice-controlled search dialogues for young users. Our long term goal is to take the emotional states of young users into account in order to support search processes and make a search engine more user-friendly. Our first results indicate that voice control in combination with touch interactions will increase the user acceptance and usability of web search engines.

## MOTIVATION

During a (web) search, children need to be more supported and motivated than common users like adults. Children can get easily frustrated if they do not find relevant results or if a failure emerges.

### Approach:

- The young users can be supported by a voice-controlled search interface that allows a voice interaction in both directions, i.e. in- and output.

### Benefits:

- Support for users with undeveloped writing skills
- Interaction with a voice-controlled system can be more intuitive and hence more motivating
- Speech interaction can provide necessary information about the emotional state of the user

## USER STUDY

To develop a suitable voice control for children, it is necessary to investigate children's speech patterns and interaction tactics.

Therefore, a study in form of a so-called "Wizard-of-Oz-Experiment" was conducted. Here the user assumes, that he or she interacts with a fully autonomous application but actually it is controlled by a hidden operator.

The user study was conducted at the trilingual international elementary school in Magdeburg, Germany. Our ten participants were of age eight to ten, seven female and three male. They were third and fourth grade pupils.

## STUDY PROCEDURE

The study procedure consisted of the following four steps:

- **Pre-interview** to gather the user's demographic information, their experiences with computer systems and the Internet
- **Introduction** to the search engine "Knowledge Journey" and how to use it
- **Search Experiment** where the children could execute a free, explorative, voice-controlled search
- **Post-interview** to evaluate the users' attitude towards the voice-controlled search user interface



Screenshot of the Knowledge Journey user interface: a guidance figure and a treasure chest on the right hand side, query input elements on the top, a navigation menu on the left hand side and a coverflow with search results in the middle.

## EXAMPLES FOR VOICE COMMANDS

### Command "Search for":

- "I'm searching for Lord of the Rings movies"
- "I would like to ahem ... search for ... YouTube"
- "I would like to ahem ... I'm searching for a ... for ahem information about"
- "hmm horses"

### Command "Menu navigation":

- "I'd like er to go to the bag"
- "at culture er at history I'd like ahem to the steering wheel at the volcano"
- "I would like ... (click) on st at in steering wheel to ahem the calculation task"
- "steering wheel tree"
- "once again to the tree"

### Command "Next page":

- "I would like to see the second page please"
- "I would like to see the second page"
- "page five"
- "the next"

## RESULTS

### Patterns and Tactics:

- Eight children used almost exclusively elliptical constructions for commands where a word or phrase implied by context is omitted from a sentence, e.g., "close", "next page" or "go back"
- If an explicit keyword input per voice was done or if a category in the navigation menu was selected per voice, then half of the children also continuously used the descriptive terms for the UI element
- 70% of the young participants explicitly told us that they would rather use touch to accomplish certain tasks directly on the user interface

### Problems:

- The commands used during the search were very often ambiguous. Therefore the context is important to carry out the commands without errors
- For some of the children, it was extremely difficult to name "clickable" elements that only contained pictures within web pages or on the SUI surface

## CONCLUSION

The results of this study indicate that a voice controlled search user interface in combination with touch can increase the usability of web search engines for children. In order to develop completely voice-controlled search dialogues, further conceptual adaptations are necessary, in particular to provide young users with suggestions of possible voice interactions.

### Pro:

- All children enjoyed to interact per voice control. This is a good sign as their motivation to use the search engine increases.
- Voice control supports the user interaction because search queries don't have to be typed (avoid spelling mistakes)
- If descriptive terms are used continuously, corresponding voice commands can be detected automatically

### Contra:

- Voice control was perceived as unusual by 90% of the children
- Especially at the beginning of the study, the young users were overstrained a little bit because they did not know what they can actually say to the system.

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