Chapter 6

Differences in Usability and Perception of Targeted Web Search Engines between Children and Adults

Previous research shows differences between children and adults in their search behaviour. However, these findings were mainly based on observational studies, [e.g. 17], or log file analysis, [e.g. pub:15, 52], and do not provide details about user perception of the search engines’ interface elements during information seeking. To complement existing findings eye-tracking devices can be used.

Eye-tracking provides information about users’ line of sight at any given time. In the context of a web search, this means that information can be gathered on what web interface elements caught users’ attention (fixations), for how long (fixation duration) and in which order (scanpaths) (Figure 6.1). According to Granka et al. [71, p. 348] “a fixation is generally defined as a spatially stable gaze lasting for approximately 200-300 milliseconds, during which visual attention is directed to a specific area of the visual display”. The so-called Strong eye-mind Hypothesis [98] states that a displayed item that is fixated is also being thought about. The hypothesis holds only if the user’s current task requires information from the visual display to be encoded and processed [99], as in the case of an information seeking task. Nevertheless, duration of the gaze provides only an upper bound for the duration of cognitive processes [99]. To summarise, eye-tracker data is very important in order to study the usability of search user interfaces (SUIs) and to design novel search engines for children. It provides information about UI elements that are the most eye-catching, that cause confusion or are ignored altogether.

In this chapter we describe the design and results of an eye-tracking user study with children of primary school age and adults. We study their seeking behaviour and search engine perception during informational and navigational search (in terms of Broder’s taxonomy [24]). The purpose of informational search is to find information about a topic assumed to be available on the web. Children tend to employ informational search. Adults most frequently employ navigational search with the immediate intent to
reach a particular website that the user has in mind [pub:15] (see Section 5). Therefore, we study both search variants. We also study the information seeking behaviour not only on a standard search engine (Google), but also on a web search engine for children (Blinde-Kuh.de).

Our participants are children in third and fourth school grade. At this age, children already have sufficient reading and writing skills to perform the web search, but they are only superficially familiar with web search engines [14]. Therefore, they are an appropriate user group to study how intuitive search engines are. Druin et al. [49] also call these children “developing searchers” who have challenges with spelling, typing, query formulation and results interpretation (see Section 3.1).

In summary, the contributions of this user study are threefold:

- Using an eye-tracking user study, we analyse the differences in information seeking behaviour between children and adults during informational and navigational search.