Chapter 7

Search User Interface Design for Children

Based on the user studies previously conducted by other researchers (Section 3.1), theories of human development (Section 2.2), and the findings from our user studies (Part II), in this chapter we derive conceptual challenges when designing web SUIs for children. We also discuss the possible solutions for these challenges and demonstrate some of them in a novel user interface called Knowledge Journey (Section 7.2). The evaluation of the Knowledge Journey interface is described in Section 7.3. We also conduct a user study in order to investigate the potential of voice controlled interactions. The results are presented in Section 7.4.

7.1 Conceptual Challenges and Possible Solutions

In the following we underline seven challenges in the design of web search user interfaces for children and propose feasible solutions. A part of this analysis has been published previously [pub:8, pub:13, pub:14]. In our analysis of previous studies and of our own research, the following challenges have emerged:

▶ Emotional Support: Based on Erickson’s theory of psychosocial development [62] children require emotional support and a feeling of success (see Section 2.2.3). Children are frustrated by too many search results [92] and give up faster than adults in case they do not find the desired search results or if a failure emerges [17]. Children’s search sessions are shorter than of adults with a smaller number of query reformulation (Chapter 5, [52]). This behaviour of children is a possible indicator of a greater level of frustration of young users.

So far, the problem of emotional support was not covered in Human-Computer Interaction in Information Retrieval (HCIR) for young users. In case of an ideal search engine children would always be satisfied with the search results and would not get frustrated. Until this ideal search
engine is developed we suggest supporting children during their search. This can be achieved for example through proper guidance. The idea here is to provide children with enough help during their search process to avoid frustration. We propose building a guidance figure that captures children's failures, e.g. getting no results or spelling mistakes, and explain how to do better. In contrast to adults, less experienced young users, and thus those who especially require support, are willing to read instructions and would pay attention to well-designed help instructions [140]. Furthermore, spoken instructions would be appreciated by children whose reading skills are not well developed.

In order to automatically detect children’s emotional states, we can also analyse user’s facial expressions and speech. Emotion recognition during the search makes it possible to react not only in cases of obvious failure. Emotion detection is a promising approach especially in the case of young users as they do not have a fully developed ability to control their facial expressions [28]. However, facial recognition would require a camera and good lighting conditions. Children also use impoliteness and insult more frequently than adults when interacting with spoken dialog system [194], thus making it easier to identify emotional states.

Language Support: Children, especially in the primary school age, read slowly and are still learning to write [186]. Additionally, children have a limited domain knowledge [85] and have difficulties with typing using a keyboard [179]. This results in problems with query formulation and spelling errors (Chapter 5, [17]). Children use too generic or too specific (natural language) queries [17]. On average, children formulate shorter queries than adults (Chapter 5, [52]). Short queries indicate that young users may have difficulties with query formulation and finding the right terms. This makes it harder for children to find the right results. Thus, spelling correction and query suggestion mechanisms in keyword based search tools are important. Furthermore, a search UI for children should provide different possibilities for children to formulate their information need. Previous research addresses this problem by suggesting alternative ways for query formulation like using a predefined term dictionary in JuSe [157] or a set of tangible objects which represent the search terms in TeddIR [90] (see Section 3.2).

As children pay attention to a category menu (see Chapter 6), we can combine catalogue and query oriented search. We suggest using a menu with various categories that correspond to children’s typical information needs. This menu should be image based and audio supported to