Children and Information Access: Fostering a Sense of Belonging

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Abstract
In this vision paper, we spotlight children as often underserved users in the digital ecosystem. With online search as a use case, we discuss the need for a multi-perspective approach to designing interactive interfaces and technologies that can enable information access systems to better respond to children's requirements while respecting the cultural and social norms impacting their upbringing.

Keywords
Children, Information Access, Culture, Inclusion, Information Discovery, Web Search

1. The Social Role of Search Engines

Search engines (SE) are a "powerful intermediary" [1] between users and online resources. With power comes the responsibility for what is presented to users as they seek information. Researchers have looked into this matter from different perspectives: from auditing retrieval and ranking algorithms to proposing interfaces and other technologies that empower users to curate the resources they are exposed to [2, 3, 4, 5, 6]. The conversation is ongoing, yet, we note that on issues of representation, existing works primarily study interactions or propose technologies focused on dimensions of interest to mature (and mostly English-speaking) searchers (e.g. news or political viewpoints) [1, 7].

We advocate for a greater examination of users impacted by the power of SE, starting with children. For these young searchers, SE are the portals to leisure and educational resources [8]. As children develop, they become more aware of the reality surrounding them. Thus,

it is not surprising that the resources they are exposed to influence how they see the world. At the same time, there is no "stereotypical child searcher": each searcher is unique in their individual learning and the development of their abilities, as well as their cultural background and social context. This begs the question of whether is *possible to personalize children's interactions with SE to foster their sense of* <u>belonging</u>.

2. One Culture Does Not Fit All

Consider the SE Result Pages (SERP) in Figure 1. A child looking for holiday cookies will notice that all the top results are Christmas-themed (Fig. 1a). However, not all children celebrate Christmas; other holidays around this time of the year include Diwali, Hanukkah, and Kwanzaa. Adult searchers may reformulate their queries to include "non-christmas," resulting in the top-2 results being mostly culture-agnostic, but by the 3rd, the sole holiday mentioned is Christmas (Fig 1b). Nonetheless, children are known to struggle with query (re-)formulation [9], which might hinder their ability to find results that match their beliefs and expectations. This issue is not restricted to Google as Bing yielded similar results. KizSearch, which is designed for children, retrieved Christmas-related cookie recipes for both queries.

Retrieved results are an artifact of the SE's attempt to provide the most frequently useful results for most people. But identifying "most people" requires an assumption of the norm, and excludes those who deviate from that group [10]. The issue of exclusion goes beyond religious traditions. While Christmas is widely celebrated in many Latin American countries, gingerbread cookies on the SERP are not common. The concern here is not simply that Christmas dominates the SERP. True, many people celebrate Christmas and cookies are perhaps a

(a) 'holiday cookies' (b) 'holiday cookies non-christmas' (c) 'holiday cookies non-christmas'
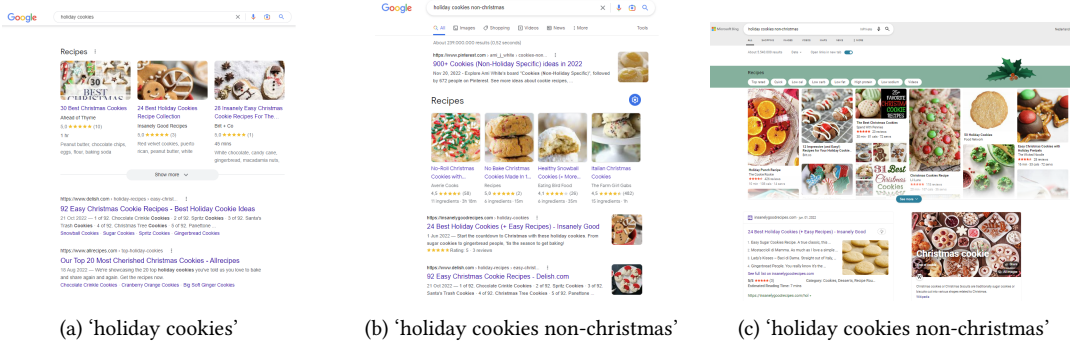
Figure 1: Snapshot of SERP generated in response to sample search queries during December 2022.

more integrated part of this celebration than other winter traditions. However, the absence of representation of other cultural heritages sends an implicit message of who the internet is for and, more importantly, who it is not for. This also spotlights the missed opportunity of using search tools as a means to foster cross-cultural understanding [11].

3. The Quest for Interactive Personalization

With this work, we emphasize the need for SE to leverage interactive interfaces and technologies to attain broader representation and better serve children. Starting for example with the use of *clarifying questions* [12] which is already an alternative to disambiguating traditional users' information needs and helping them navigate the oftentimes overwhelming information space (Fig. 1c). In this context, clarifying questions could also help diversify SERP results, without burdening children with reformulation. Children expect SE to cater to their specific intent [13], and therefore disambiguating possible intents would require alternative categorizations of what could be searched for. Instead of simply being derived from an existing English vocabulary, as is the case with traditional search (i.e., terms that are observed by crawlers on indexed websites), this more *child-oriented ontology* would expose children to a more diverse set of results for them to learn from (e.g., *christmas* is-a *holiday* at a time of year when there are other holidays, so SERP resources should include other holidays). *Filtering* is another aspect influenced by cultural and social constructs. Safe search filters are known to eradicate lewd content; still, there are other topics for which agreement might not be as uniform [14, 15]. Presenting a *mixed-language* list of resources on SERP [16] could better support children growing up in multilingual households. These are just a few ideas to consider. We invite readers to think about

how interactive interfaces and technologies could also be adopted to improve other search modalities such as mobile devices and voice assistants.

Lessons learned emerging from this use case can also impact the design of other information access tools, such as *recommender systems*, so that they can explicitly mitigate stereotypes and address cultural and social aspects about children, in addition to promoting diverse representation and in turn fostering a sense of belonging.

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