

Building an Inclusive Community around Digital Information Access for Children in an Educational Setting: A Multidisciplinary, International Approach

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ABSTRACT

In this work, we discuss lessons learned that resulted from an ongoing effort focused on advancing knowledge pertaining to online information access for children in the classroom context, as nowadays digital literacy is essential to connect with others and be an active part of the community. We aim to provide *equal access to information for children of all ages participating in formal and informal learning*. Adopting a multidisciplinary, international viewpoint, we have actively involved children and teachers as experts in designing, developing, and evaluating information access systems, like search and recommender systems. Along the way, we bring awareness of other concepts deeply intertwined with information access: information pollution and the pervasive nature of AI systems like ChatGPT that are known to be used to access information, even if they were not designed for it.

CCS CONCEPTS

• **Social and professional topics** → **Children**; • **Applied computing** → **Education**; • **Information systems**;

KEYWORDS

children, education, information access, multidisciplinary research

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1 EXTENDED ABSTRACT

One way computing can effectively connect everyone is by providing equal access to online information to all, starting with *children*. Since 2018, we have dedicated research efforts to exploring the world of *children* and *information access* in an *educational setting*, using a *multidisciplinary* approach that includes experience in Education, Information Retrieval, Child-Computer Interaction, and

Industry [5–8, 10, 12]. Here, we share lessons from our ongoing work on a crucial digital literacy skill: how children use search and recommendation technology in the classroom, regardless of the teaching modality (i.e., in-person, remote, or hybrid). We concentrate on findings emerging from studies in which we (i) engaged with two groups of primary school children speaking different languages on curriculum-related inquiry tasks [1, 10], (ii) investigated the differences between children’s search behaviour when interacting with a classic graphical user interface (GUI) and a vocal assistant [7], and (iii) observed children’s interactions and perceptions of recommender systems [11, 13]. During these studies, we identified new related challenges requiring immediate attention: how to deal with information pollution [9] and the use of AI systems based on generative Large Language Models (LLMs) as sources of information, when they might not be [3]. Moreover, we gathered evidence of the essential role played by the ‘expert-in-the-loop’ often tasked with facilitating the use of these technologies: the teacher [6, 12].

Highlights include understanding the role emotions play in engaging children with search tasks [10] and how vocal assistant and GUI have comparable usability while fostering different behaviours [7]. Emotions, whether joy or fear, produce a keen and more productive search effort with longer sessions and query reformulations. Children expressed that finding the correct answer to questions tinted with fear could contribute to its dissipation by resolving the problem that caused it. Interacting with a vocal assistant influenced children’s ability to stay focused on the search task and avoid distractions; GUI instead encouraged children to browse and explore the search space beyond the assigned task. We also looked at how children reacted when offered recommendations as a guide to good sources in the search engine result pages (SERP) [13]. We recognised how critical it was for them to grasp where the suggestions came from, revealing trust and explanations as crucial elements to consider when designing recommendation technology for the classroom. We expanded upon these findings through a literature review, which allowed us to document the challenges inherent to recommendation technology that children could utilise unobtrusively to assist their learning [11]. Finally, we ran a two-stage study on how children imagine a search companion pre and post-Covid-19 and learned that children’s requirements have changed [1]. Hence we discourage the research community

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from building on old assumptions and instead revisit explorations to capture current needs and open challenges.

Children's roles in collaborative design must be revisited, as much as the power balance in inter-generational research teams. Lastly, the growth of familiarity with technology opens a window of opportunity for educational experts to use it in teaching more extensively and seamlessly.

With the rise of ChatGPT (<https://chat.openai.com/>), considering the unprecedented speed with which this application spread among users, we enlarged our interest in LLMs. We know that ChatGPT is not explicitly designed to enable information seeking, less so being used in an educational context with children. ChatGPT itself, when asked to explain the possible benefits of its use in the classroom, answers, "(...) Another potential benefit is that I can be used as a research tool. I can help students find and analyse information for their assignments and projects, by providing them with the relevant resources and help them understand the material. (...)". That said, we are working on a preliminary study to determine if and how ChatGP can play a role in supporting teachers and students in providing responses adapted to the specific needs of children and helping them to understand the concepts familiar to the curriculum. As we deal with a vulnerable user group, it is implied that children are stakeholders who require caution and protection when designing technologies targeted to them. We posit that (AI) technologies should respond to the child as a whole and emulate teachers' approach when supporting students by adapting their actions to context and traits descriptive of individuals. Embracing teachers' perspectives, we identified the challenges of incorporating existing information access technology in the classroom as this needs to support teachers catering to the broad range of cognitive and cultural backgrounds that impact how children learn [6, 12].

In [9], we outlined how information pollution affects children and hinders their right to access information. While seeking information, children may encounter irrelevant resources that do not match their needs or interests, leading to frustration and confusion. They may inadvertently find misleading, harmful or distracting resources; or even be presented with resources not matching their age or development, including inappropriate content. These are some of the reasons evincing the urgent need to consider the presence, in the web search ecosystem, of content with harmful or poisonous effects—the dictionary definition of pollution—that can prevent children from accessing *genuine information* online [4, 14].

Accessing and selecting resources presented by search engines or recommender systems, as well as engaging with responses provided to inquiries posted to AI systems based on LLMs, like ChatGPT, involves acquiring and practising numerous skills [2, 4]—all essential building blocks of digital literacy, more so when the goal is to leverage retrieved resources for learning purposes. This is why we believe the understanding we gain from studying children's information access needs and behaviour in the classroom can be applied to informal learning environments—and even other user groups. In light of this, and acknowledging that children, immersed in today's digital society, have a right to information access [15], our goal is to establish a *diverse and inclusive community of researchers and practitioners* passionate about and dedicated to ensuring *equal access to information for children of all ages involved in formal and informal learning*. This includes researchers and practitioners focused

on developing technologies, such as text simplification generation, recommendation generation, or adaptive interfaces, that can enable this vision, in addition to the searchers themselves and the stakeholders who are at the epicentre of educational settings where information access takes place, like libraries, museums, schools, and universities. This would advance knowledge in the area and, most importantly, improve all learners' education quality by creating a more equitable learning environment. Unequal access to information has a negative impact on children's academic trajectory; proper support and resources can empower them to reach their full potential and succeed in their academic pursuits and beyond. Joining this community would be an opportunity to positively impact the lives of children and contribute to building a brighter future for all. Let us come together and work towards a common goal of providing equal access to information for all children in educational settings as a way to exploit the power of computing to connect everyone.

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