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Some Things Never Change: Overcoming Persistent Challenges in Children IR

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Abstract

There is a lack of a steady and solid influx of information retrieval (IR) research that has **children** (as the user group) as the protagonist. Existing work is scattered, conducted by only a few research groups, and often based on small-scale user studies or data that cannot be widely shared. Moreover, much of the current research focuses on specific age ranges and abilities, neglecting the broader spectrum of children's needs. Consequently, the paucity of IR research on how search and recommender systems serve and/or ultimately affect children translates into one of many '*Low-resource environments*' in IR. Drawing from the literature and our experience in this area, we highlight key challenges and encourage greater attention from the IR community to address this critical gap.

CCS Concepts

• **Social and professional topics** → **Children**; • **Information systems** → **Information retrieval**.

Keywords

Children, Data, Challenges, Information Retrieval, Community, Search, Recommender Systems

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1 Some things need to change?

Despite the growing role of search engines and recommender systems in shaping the information seeking behaviour of youngsters—and the type of information they ultimately encounter—Information Retrieval (IR) research specifically dedicated to identifying and addressing the needs and expectations of this user group remains

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scarce [6, 26, 30]. Children IR emerged almost 30 years ago with Yahooligans! [1], the earliest commercial systems for children launched in 1996. PuppyIR [2], a major European project focused on helping children use the Internet safely that ran from 2009–2012, led to significant publications. However, with data locked behind proprietary walls, studies over the last 30 years have been fragmented, and the broader IR community often overlooks children as a user group. Efforts to rally researchers around this area have faced obstacles, and contributions on Children IR struggle to gain recognition [16, 28, 33].

IR is stuck in a cycle where the lack of datasets and benchmarks stifles progress, making it difficult to attract fresh perspectives. More so, children are not a monolithic group; their language, comprehension, and interaction behaviours with IR systems evolve. Standard IR metrics fail to capture perspectives that matter, e.g., content fit, potential harm, and understandability [17, 39, 40]. Even 'relevance' cannot be taken at face value for this audience [25]. Artificial Intelligence (AI) and Large Language Models (LLMs) offer promise but also risk reinforcing biases [3, 31, 37, 38]. Yet, the challenge is worth tackling: young users deserve improved access to information so that they can grow into better-informed and skilled adults. Additionally, as a research community, we should come together to use the insights gained from research with children as protagonists, not just to better support them but also to transform and tailor IR for many other underserved communities ('low-resource environments'). The question is *not whether we should just accept some things never change—it is how can we afford not to change them*.

2 Why does building community to advance Children IR remains a struggle?

Advancing Children IR research remains a struggle as this effort cannot be limited solely to a handful of IR researchers [e.g. 4, 5, 8, 12, 13, 20, 21, 24, 39, 41, 42]. It demands participation from the broader IR community willing to engage in the discussions and bring their expertise on core concepts—relevance, evaluation, rankings, query performance prediction, multilingual IR, to name a few—to advance understanding and outline the gaps inherent to this user group. It also requires a multidisciplinary approach, so that experts in language (as children's vocabulary differs from adults', and terminology changes inevitably over time), education,

and child development can inform the discussion to produce meaningful advancement. Initial attempts made to build community at conferences like ACM RecSys, ECIR, and ACM SIGIR resulted in workshops such as KidRec¹ and IR4U2², which were attended by relatively few researchers and practitioners already involved in work focused on children and other understudied populations that share challenges [16, 22, 33]. While these workshops provided a platform for positive interactions and facilitated ongoing discussions, they did not succeed in reaching a broader audience within the IR community.

At first glance, insights from studies on the use of popular web tools or new proposed algorithms based on simple/established IR solutions are viewed as ‘not novel enough (known insights just for another user)’ or ‘show no technical innovation (perhaps they are simply replicating work with another sample)’. However, this perspective overlooks that novelty lies at times in confirming applicability for a very distinct type of user [9], identifying unknown gaps and research needs, or addressing a particular problem focused on children that may also benefit a broader range of users. While such works do exist, perhaps due to their multidisciplinary nature, they often appear in other venues; one could argue that this is a loss for the IR community’s body of knowledge.

3 So what do we need to do?

Several key issues have emerged from the limited research efforts undertaken over the last three decades. Below, we highlight those that, informed by prior experience, we consider fundamental.

The *lack of dataset and benchmarks* hinders engagement, reflection, and proposed solutions coming from the wider IR community. One of the main reasons behind this is surely legislation designed to protect this vulnerable audience, which inadvertently restricts the collection and curation of such datasets. Although some data samples exist, such as query samples produced by children and relevance assessments from a child’s perspective [e.g., 17, 29, 36] a joint effort between the research community and governmental institutions could help ensure access to representative user data, enabling the development of better IR technology for children [14, 27].

Traditional assessments are insufficient, as most metrics focus on the standard sense of relevance and ground truth. However, for children, relevance extends beyond simply meeting an information need—it also involves factors such as harm, information disorder, appropriateness, comprehension, emotional sensitivity, and trust. Additionally, *children are not a homogeneous user group*; they differ in development, skills, preferences, behaviours, but also habits and modalities in which they seek for or are exposed to information, and then contexts in which that takes place [10, 11, 18, 19, 25, 34, 40].

Children’s preferred *modalities and platforms* for seeking and consuming information are evolving—traditional text-based queries on popular search engines that lead to SERPs are no longer the standard approach. Instead, children increasingly favour conversational (voice-driven) interactions, the use of agentic search systems, and relying on Social Networks to become informed. This shift expands the range of research challenges and opportunities for the IR community must address to produce algorithms and interfaces that can

effectively assist children in making good use of powerful and pervasive tools for information discovery [7, 15, 43]. The key is being proactive, not reactive; we should prioritise children and design technology with their needs in mind from the outset, rather than adapting mainstream IR technology to them as an afterthought.

AI and LLMs have the potential to help lower barriers to modelling and personalisation for this user group. With a noticeable increase in IR technology that leverage AI and LLMs, it has become imperative to better understand children’s specific needs, both in terms of literacy skills [23] and how to support their searching and engaging with (potential) information inside and outside the classroom. However, we must also recognise the risks associated with these technologies, particularly when applied to research involving children. A major challenge is preventing the reinforcement of biases and stereotypes inherent in LLMs and AI technologies, as the training data—at least to our knowledge—does not adequately or comprehensively represent this audience [31, 32].

4 If it is challenging, why should we do it?

As a community, collectively, we *have the skills*, so why not use them to serve broader audiences? With their idiosyncrasies, children are not only future ‘mainstream’ users of IR systems but are also actively shaping their understanding of the world based on the information they encounter. Search options and recommender systems in the platforms children commonly engage with influence their opinions, critical thinking, and digital literacy, ultimately impacting how they grow into skilled adults able to make the best use of available IR tools. We have a *responsibility* to allocate research efforts toward understanding how children interact with, are affected by, and can be better served by IR technology.

Moreover, what we learn as a result of working with children can and will *influence and inform research on other understudied user groups*: if we think about it, factors such as cultural, linguistic, and economic barriers, as well as digital/information literacy and many other facets that are related to Children IR naturally overlap with challenges in other low-resource environments. Addressing these issues can benefit the community as a whole, moving beyond the stigma of ‘low resource’ or ‘understudied’ labels [27]. It will not be not easy, and it will require building on the existing core of experienced researchers working on this area as well as including a new wave of *diverse* (approach, focus, expertise, etc.) researchers and practitioners for whom the ‘understudied or underserved’ label will no longer result in research relegated to a side issue of fairness or bias, but to the central goal of providing information access (broadly defined) to all [26, 27, 35].

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References

- [1] [n. d.]. Yahoo Kids - Wikipedia — en.wikipedia.org. https://en.wikipedia.org/wiki/Yahoo!_Kids. [Accessed 04-03-2025].
- [2] 2009. PuppyIR- An Open Source Environment to Construct Information Services for Children (EU ICT FP7). <https://liir.cs.kuleuven.be/projects.php?project=175>. [Accessed 04-03-2025].
- [3] Nikša Alfrević, Darko Rendulić, Maja Fošner, and Ajda Fošner. 2024. Educational Roles and Scenarios for Large Language Models: An Ethnographic Research

¹<https://kidrec.github.io/2017/>

²<https://ir4u2workshop.wixsite.com/ir4u2>

- Study of Artificial Intelligence. *Informatics (Basel)* 11, 4 (Oct. 2024), 78. doi:10.3390/informatics11040078
- [4] Mohammad Aliannejadi, Monica Landoni, Theo WC Huibers, Emiliana Murgia, and Maria Soledad Pera. 2020. Say it with emojis: Co-designing relevance cues for searching in the classroom. In *1st Joint Conference of the Information Retrieval Communities in Europe, CIRCLE 2020*. CEUR.
 - [5] Garrett Allen, Ashlee Milton, Katherine Landau Wright, Jerry Alan Fails, Casey Kennington, and Maria Soledad Pera. 2022. Supercalifragilisticexpialidocious: Why using the “right” readability formula in children’s web search matters. In *European Conference on Information Retrieval*. Springer, 3–18.
 - [6] Ion Madrazo Azpiazu, Nevena Dragovic, Maria Soledad Pera, and Jerry Alan Fails. 2017. Online searching and learning: YUM and other search tools for children and teachers. *Information Retrieval Journal* 20 (2017), 524–545.
 - [7] Thomas Beelen, Roeland Ordelman, Khiet P Truong, Vanessa Evers, and Theo Huibers. 2024. Does conversation lead to better searches? Investigating single-shot and multi-turn spoken searches with children. *International Journal of Child-Computer Interaction* 41 (2024), 100668.
 - [8] Dania Bilal and Jacek Gwizdzka. 2018. Children’s query types and reformulations in Google search. *Information Processing & Management* 54, 6 (2018), 1022–1041.
 - [9] Dania Bilal and Joe Kirby. 2002. Differences and similarities in information seeking: children and adults as Web users. *Information processing & management* 38, 5 (2002), 649–670.
 - [10] Hrishita Chakrabarti, Diletta Micol Tobia, Monica Landoni, and Maria Soledad Pera. 2025. Inside Out 2: Make Room for New Emotions & LLM. In *Proceedings of the 48th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR’25)*. ns.
 - [11] Hrishita Chakrabarti, Diletta Micol Tobia, Monica Landoni, and Maria Soledad Pera. 2025. Online Information Disorder & Children. In *ROMCIR 2025: The 5th Workshop on Reducing Online Misinformation through Credible Information Retrieval (held as part of ECIR 2025: the 47th European Conference on Information Retrieval)*. ns.
 - [12] Nevena Dragovic, Ion Madrazo Azpiazu, and Maria Soledad Pera. 2016. “Is Sven Seven?” A Search Intent Module for Children. In *Proceedings of the 39th International ACM SIGIR conference on Research and Development in Information Retrieval*. 885–888.
 - [13] Sergio Duarte Torres, Djoerd Hiemstra, and Pavel Serdyukov. 2010. Query log analysis in the context of information retrieval for children. In *Proceedings of the 33rd international ACM SIGIR conference on Research and development in information retrieval*. 847–848.
 - [14] Michael Ekstrand. 2017. Challenges in evaluating recommendations for children. In *International Workshop on Children & Recommender Systems*. Available at: [shorturl.at/osFV9](https://arxiv.org/abs/1705.09459).
 - [15] Adobe Express. 2025. Using TikTok as a Search Engine | Adobe Express — adobe.com. <https://www.adobe.com/express/learn/blog/using-tiktok-as-a-search-engine>. [Accessed 25-04-2025].
 - [16] Jerry Alan Fails, Maria Soledad Pera, Franca Garzotto, and Mirko Gelsomini. 2017. KidRec: Children & recommender systems: Workshop co-located with ACM conference on recommender systems (recsys 2017). In *Proceedings of the Eleventh ACM Conference on Recommender Systems*. 376–377.
 - [17] Maik Fröbe, Sophie Charlotte Bartholly, and Matthias Hagen. 2025. How Child-Friendly is Web Search? An Evaluation of Relevance vs. Harm. In *European Conference on Information Retrieval*. Springer, 214–222.
 - [18] Lauren N Girouard-Hallam and Judith H Danovitch. 2025. Children’s trust in Google’s ability to answer questions about the past, present, and future. *Computers in Human Behavior* 165 (2025), 108496.
 - [19] Emilia Gómez, Vicky Charisi, and Stephane Chaudron. 2021. Evaluating Recommender Systems with and for Children: towards a Multi-Perspective Framework. In *Perspectives@ RecSys*.
 - [20] Tatiana Gossen and Andreas Nürnberger. 2013. Specifics of information retrieval for young users: A survey. *Information Processing & Management* 49, 4 (2013), 739–756.
 - [21] Jacek Gwizdzka and Dania Bilal. 2017. Analysis of children’s queries and click behavior on ranked results and their thought processes in google search. In *Proceedings of the 2017 conference on conference human information interaction and retrieval*. 377–380.
 - [22] Theo Huibers, Monica Landoni, Emiliana Murgia, and Maria Soledad Pera. 2021. IR for Children 2000–2020: Where Are We Now?. In *Proceedings of the 44th International ACM SIGIR Conference on Research and Development in Information Retrieval*. 2689–2692.
 - [23] Kaiyue Jia, Teresa H. M. Leung, Ngai Yan Irene Cheung, Yixun Li, and Junnan Yu. 2025. Developing a Holistic AI Literacy Framework for Children. *ACM Trans. Comput. Educ.* (April 2025). doi:10.1145/3727986 Just Accepted.
 - [24] Hanna Jochmann-Mannak, Theo WC Huibers, and TJM Sanders. 2008. Children’s information retrieval: beyond examining search strategies and interfaces. In *The 2nd BCS-IRSG Symposium: Future Directions in Information Access, London: The 2nd BCS-IRSG Symposium: Future Directions in Information Access*. British Computer Society, 64–72.
 - [25] Monica Landoni, Theo Huibers, Emiliana Murgia, Mohammad Aliannejadi, and Maria Soledad Pera. 2021. Somewhere over the rainbow: Exploring the sense for relevance in children. In *Proceedings of the 32nd European Conference on Cognitive Ergonomics*. 1–5.
 - [26] Monica Landoni, Theo Huibers, Emiliana Murgia, and Maria Soledad Pera. 2020. We’ve only just begun: Children searching in the classroom. In *1st Joint Conference of the Information Retrieval Communities in Europe, CIRCLE 2020*, Vol. 2621. CEUR-WS.
 - [27] Monica Landoni, Theo Huibers, Emiliana Murgia, and Maria Soledad Pera. 2024. Good for Children, Good for All?. In *European Conference on Information Retrieval*. Springer, 302–313.
 - [28] Monica Landoni, Emiliana Murgia, Theo Huibers, and Maria Soledad Pera. 2022. Report on the 1st IR for children 2000–2020: where are we now?(IR4C) workshop at SIGIR 2021: the need to spotlight research on children information retrieval. In *ACM SIGIR Forum*, Vol. 55. ACM New York, NY, USA, 1–7.
 - [29] Ion Madrazo Azpiazu, Nevena Dragovic, Oghenemaro Anuyah, and Maria Soledad Pera. 2018. Looking for the movie seven or sven from the movie frozen? a multi-perspective strategy for recommending queries for children. In *Proceedings of the 2018 conference on human information interaction & retrieval*. 92–101.
 - [30] Ashlee Milton, Emiliana Murgia, Monica Landoni, Theo Huibers, and Maria Soledad Pera. 2019. Here, there, and everywhere: Building a scaffolding for children’s learning through recommendations. (2019).
 - [31] Emiliana Murgia, Zahra Abbasiantaeb, Mohammad Aliannejadi, Theo Huibers, Monica Landoni, and Maria Soledad Pera. 2023. ChatGPT in the classroom: a preliminary exploration on the feasibility of adapting ChatGPT to support children’s information discovery. In *Adjunct Proceedings of the 31st ACM Conference on User Modeling, Adaptation and Personalization*. 22–27.
 - [32] Emiliana Murgia, Maria Soledad Pera, Monica Landoni, and Theo Huibers. 2023. Children on ChatGPT readability in an educational context: myth or opportunity?. In *Adjunct Proceedings of the 31st ACM Conference on User Modeling, Adaptation and Personalization*. 311–316.
 - [33] Maria Soledad Pera, Federica Cena, Theo Huibers, Monica Landoni, Noemi Mauro, and Emiliana Murgia. 2024. 1st Workshop on Information Retrieval for Under-studied Users (IR4U2). In *European Conference on Information Retrieval*. Springer, 409–414.
 - [34] Maria Soledad Pera, Emiliana Murgia, Monica Landoni, and Theo Huibers. 2019. With a little help from my friends: Use of recommendations at school. In *ACMRecSys 2019 Late-breaking Results - CEUR Workshop Proceedings*, Vol. 2431. CEUR-WS, 61–65.
 - [35] Maria Soledad Pera, Katherine Landau Wright, Casey Kennington, and Jerry Alan Fails. 2023. Children and information access: Fostering a sense of belonging. In *Joint Proceedings of the IUI 2023 Workshops: HAI-GEN, ITAH, MILC, SHAI, SketchRec, SOCIALIZE (CEUR Workshop Proceedings, Vol. 3359)*, Alison Smith-Renner and Paul Taele (Eds.). CEUR, Sydney, Australia. 254–257.
 - [36] Carsten Schnober and Maarten Sprenger. 2025. 100 Queries: What do Dutch Children See on the Web?. In *ROMCIR 2025: The 5th Workshop on Reducing Online Misinformation through Credible Information Retrieval (held as part of ECIR 2025: the 47th European Conference on Information Retrieval)*. ns.
 - [37] Kevin Stowe, Benny Longwill, Alyssa Francis, Tatsuya Aoyama, Debanjan Ghosh, and Swapna Somasundaran. 2024. Identifying Fairness Issues in Automatically Generated Testing Content. *arXiv.org abs/2404.15104* (April 2024). doi:10.48550/arxiv.2404.15104
 - [38] Helma Torkamaan, Steffen Steinert, Maria Soledad Pera, Olya Kudina, Samuel Kernan Freire, Himanshu Verma, Sage Kelly, Marie-Therese Sekwenz, Jie Yang, Karolien van Nunen, et al. 2024. Challenges and future directions for integration of large language models into socio-technical systems. *Behaviour & Information Technology* (2024), 1–20.
 - [39] Robin Ungruh, Murtadha Al Nahadi, and Maria Soledad Pera. 2025. Mirror, Mirror: Exploring Stereotype Presence Among Top-N Recommendations That May Reach Children. *ACM Transactions on Recommender Systems* (2025).
 - [40] Robin Ungruh and Maria Soledad Pera. 2024. Ah, that’s the great puzzle: On the Quest of a Holistic Understanding of the Harms of Recommender Systems on Children. *arXiv preprint arXiv:2405.02050* (2024).
 - [41] Frans van der Sluis and Betsy van Dijk. 2010. A Closer Look at Children’s Information Retrieval Usage. In *33rd Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR’10)*.
 - [42] Nicholas Vanderschantz and Annika Hinze. 2021. Children’s query formulation and search result exploration. *International Journal on Digital Libraries* 22, 4 (2021), 385–410.
 - [43] Siqi Yi and Soo Young Rieh. 2025. Children’s conversational voice search as learning: a literature review. *Information and Learning Sciences* 126, 1/2 (2025), 8–28.