

We've Only Just Begun: Children Searching in the Classroom

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ABSTRACT

In this extended abstract, we present an overview of our ongoing project. Specifically, we briefly discuss the motivation for our research agenda, research goals in the short and long term, and the body of work we have published thus far that serves as the foundation upon which we build the next steps related to *Information Retrieval and Children in the Classroom Setting*.

CCS CONCEPTS

• **Social and professional topics** → **Children**; • **Information systems** → **Web searching and information discovery**.

KEYWORDS

Children, Search, Classroom, Team

1 INTRODUCTION

Information Retrieval Systems (IRS), including search and recommendation systems, are meant to minimize information overload by offering users resources that satisfy their information needs in a variety of contexts. The research focus in this area continues to thrive, as evidenced by rich proceedings for conferences and journals like ACM SIGIR, Information Retrieval, ACM CHIIR, ACM ECIR, to name a few. Unfortunately, we found scarce resources, in terms of academic literature and benchmarks, related to IRS for which children are the major stakeholders.

Existing literature related to how IRS can better serve children in their quest for resources, both for leisure and learning, is for the most part limited to (i) empirical examinations to gauge problems with query formulation and information-seeking behaviour [2, 4, 7], (ii) efforts from the Human-Computer Interaction community focused on interface requirements [6, 10], and (iii) algorithmic responses to tailor IRS to suit children needs that have been evaluated solely based on small user studies or proprietary datasets, restricting comparison across new strategies [1, 5].

We argue for the need to take a comprehensive look at IRS design, development, evaluation, and deployment; one that simultaneously considers different perspectives that must coexist, if the resulting IRS (and associated strategies) are to better serve main stakeholders and appeal to the research community. We were inspired by the PuppyIR project [3]. Its research team strongly argued for information services to be specifically designed for children and delivered

an open framework for assisting developers in the production and evaluation of such services in non-formal context (e.g., hospitals and museums). Starting from such a seminal research experience, we embarked in a *research journey* to discover the many factors that contribute to defining *children's* needs and preferences when using IRS to access online resources that can specifically support *classroom* instruction.

Our *team* is comprised of industry experts, along with researchers in information retrieval, human-computer interaction, digital media, and education. Combining different expertise, experience, perspectives, and interests provides the ideal equipment for the journey ahead. As good travel companions, we share our resources to deal with the many facets of the comprehensive approach described above. Together, we have designed the parading illustrated in Figure 1, which we use to guide project-related endeavours to ensure an iterative, yet cohesive, body of work. In the rest of this manuscript, we briefly discuss outcomes from our journey thus far, in addition to the next steps.

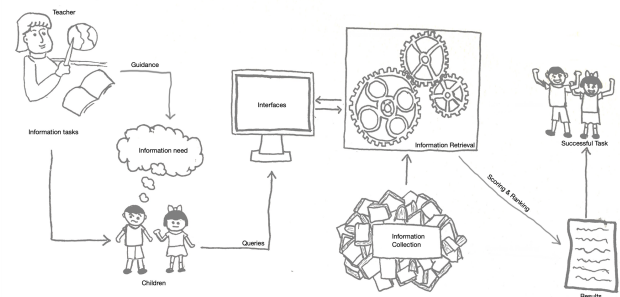


Figure 1: IRS in the classroom: Our overview.

2 THE JOURNEY SO FAR

We envision our *project* as a long-term journey, one with multiple stops (i.e., milestones), upon which we build new knowledge to share with the research community. Like postcards sent from different destinations, we share findings and achievements with peers at international conferences of interest to computer science and educators, including CLEF, ACM RecSys, ACM IDC, and ICERi.

Outcomes from our project thus far include a framework—our compass—organised along with four cardinal points for design and

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evaluation of IRS for children: (1) strategy, (2) user group, (3) task, and (4) environment [11]. We treat this framework as the foundation for project-related work and let these four cardinal points guide us when comparing and contextualizing our work and its findings within the space defined by the state-of-the-art.

In one of the initial stopover of our journey, we explored the requirements imposed by the classroom context if IRS are to be of use—in terms of fostering learning and supporting teacher instruction. This has resulted in two in-depth analysis based on literature and teacher feedback discussing the needs related to the IRS for the classroom, as well as the limitation of current IRS [15, 16].

We have leveraged lessons learned from [11, 15, 16] in the design of a vocal assistant that can aid primary-school children in locating suitable resources to complete curriculum-related assignments [9, 11]. Along the way, preliminary work in the design of such an assistant required involving children and teachers in the design, analysing the limited, yet informative, query logs gathered as a result of preliminary studies and contextualizing results observed from comparisons of children use of traditional search interfaces versus the use of a vocal assistant to complete search tasks. Children feedback inspired us to take a detour and explore the potential of recommender systems to support young searchers [14, 19], from which preliminary results reveal a need to inform children of recommendation sources if they are to trust offered suggestions.

3 THE NEXT STEPS OF THE JOURNEY

Our research journey in the area of the IRS for children in the classroom has only just begun. To keep the momentum going, we believe in the value of investing in building a community around this significant subject. Thus, together with plans for exploring new venues, we have set some stopovers at regular gatherings where we can share details of the journey so far. For instance, we have co-organized previous editions of the KidRec workshop (<https://kidrec.github.io/>) co-located with ACM RecSys and ACM IDC [8]. This workshop explicitly focuses on exploring and ultimately defining "what is good" when it comes to the IRS for children, which is why we plan to continue future editions in order to bring awareness to the importance of taking a holistic look at the design, development, evaluation, and deployment of IRS for children in the classroom if they are to be of value.

Teachers' perspectives, in terms of tools, need as well as search literacy resources for both themselves and their students, continue to be at the forefront of our project objectives. Evidence of this includes our participation at the upcoming ATEE conference (Association for Teacher Education in Europe), where we will present our analysis on teachers' attitudes to the use of search tools for classroom instruction; we will also host a workshop related to search literacy for teachers [17, 18].

Future stopovers include dedicating research efforts to the design of a search companion, one that can foster completion of successful search tasks, offering support when needed, while remaining non-intrusive or disruptive for the classroom. This involves understanding what are the perspectives that define relevance when it comes to searches conducted by children in the classroom: from ensuring reading and understanding to considering the emotions evoked by results presented on search engine result pages. (Note

that preliminary work related to the design of such a search companion for the classroom will be presented at this year's ACM UMAP [12, 13].)

It is clear by now how we are on early stages of this complex, exploration and as such are quite far from the destination; but as it is often the case, the journey is more important than the arrival.

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REFERENCES

- [1] Ion Madrazo Azpiazu, Nevena Dragovic, Oghenemaro Anuyah, and Maria Soledad Pera. 2018. Looking for the Movie Seven or Sven from the Movie Frozen. In *A Multi-perspective Strategy for Recommending Queries for Children*. In *Proc. of the 2018 Conference on Human Information Interaction & Retrieval*. ACM, 92–101.
- [2] Dania Bilal and Jacek Gwizdzka. 2018. Children's query types and reformulations in Google search. *Information Processing & Management* 54, 6 (2018), 1022–1041.
- [3] Doug Dowie and Leif Azzopardi. 2013. Re-leashed! the PuppyIR framework for developing information services for children, adults and dogs. In *European Conference on Information Retrieval*. Springer, 824–827.
- [4] Sergio Duarte Torres, Ingmar Weber, and Djoerd Hiemstra. 2014. Analysis of search and browsing behavior of young users on the web. *ACM Transactions on the Web (TWEB)* 8, 2 (2014), 1–54.
- [5] Jerry Fails, Maria Soledad Pera, Oghenemaro Anuyah, Casey Kennington, Katherine Landau Wright, and William Bigirimana. 2019. Query formulation assistance for kids: What is available, when to help & what kids want. In *Proc. of the 18th ACM Conference on Interaction Design and Children*. 109–120.
- [6] Tatiana Gossen. 2016. *Search engines for children: search user interfaces and information-seeking behaviour*. Springer.
- [7] 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 *Proc. of the 2017 conference on human information interaction and retrieval*. 377–380.
- [8] Theo Huibers, Jerry Fails, Natalia Kucirkova, Monica Landoni, Emiliana Murgia, and Maria Soledad Pera. 2019. 3rd KidRec Workshop: What does good look like?. In *Proc. of the 18th ACM Conference on Interaction Design and Children*. 681–688.
- [9] Monica Landoni, Davide Matteri, Emiliana Murgia, Theo Huibers, and Maria Soledad Pera. 2019. Sonny, Cerca! evaluating the impact of using a vocal assistant to search at school. In *International Conference of the Cross-Language Evaluation Forum for European Languages*. Springer, Cham, 101–113.
- [10] Monica Landoni, Emiliana Murgia, Fabrizio Gramuglio, and Giorgio Manfredi. 2018. Fiction Design of a 3D Tutor for and with School Children. In *Proc. of the 11th Conference on Advances in Computer-Human Interactions*. 94–97.
- [11] Monica Landoni, Emiliana Murgia, Theo Huibers, and Maria Soledad Pera. 2019. My Name is Sonny, How May I help You Searching for Information?. In *3rd International and Interdisciplinary Perspectives on Children & Recommender and Information Retrieval Systems (KidRec) what does good look like? - Co-located with ACM IDC 2019*. 6–pages.
- [12] Monica Landoni, Emiliana Murgia, Theo Huibers, and Maria Soledad Pera. 2020. You've Got a Friend in Me: Children and Search Agent. In *Adjunct Proc. of the 28th ACM Conference on User Modeling, Adaptation and Personalization*. To appear.
- [13] Monica Landoni, Maria Soledad Pera, Emiliana Murgia, and Theo Huibers. 2020. Inside Out: Exploring the Emotional Side of Search Engines in the Classroom. In *Proc. of the 28th ACM Conference on User Modeling, Adaptation and Personalization*. To appear.
- [14] 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).
- [15] Emiliana Murgia, Monica Landoni, Theo Huibers, Jerry Fails, and Maria Soledad Pera. 2019. The Seven Layers of Complexity of Recommender Systems for Children in Educational Contexts. (2019).
- [16] Emiliana Murgia, Monica Landoni, Maria Soledad Pera, and Theo Huibers. 2019. When will the promises of search technology in the classroom come true?. In *12th International Conference of Education, Research and Innovation (ICERI)*. 10.21125/iceri.2019.2547, 10409–10415.
- [17] Emiliana Murgia, Monica Landoni, Maria Soledad Pera, and Theo Huibers. 2020. Moving forwards: Using search tools on the classroom. In *Annual Association for Teacher Education in Europe - Spring Conference (ATEE)*. To appear.
- [18] Emiliana Murgia, Monica Landoni, Maria Soledad Pera, and Theo Huibers. 2020. Training the trainers: Search tools in the classroom. In *Annual Association for Teacher Education in Europe - Spring Conference (ATEE)*. To appear.
- [19] Maria Soledad Pera, Emiliana Murgia, Monica Landoni, and Theo Huibers. 2019. With a Little Help from my Friends: Use of Recommendations at School. In *ACM RecSys 2019 Late-breaking Results*, Vol. 2431. 5–pages.