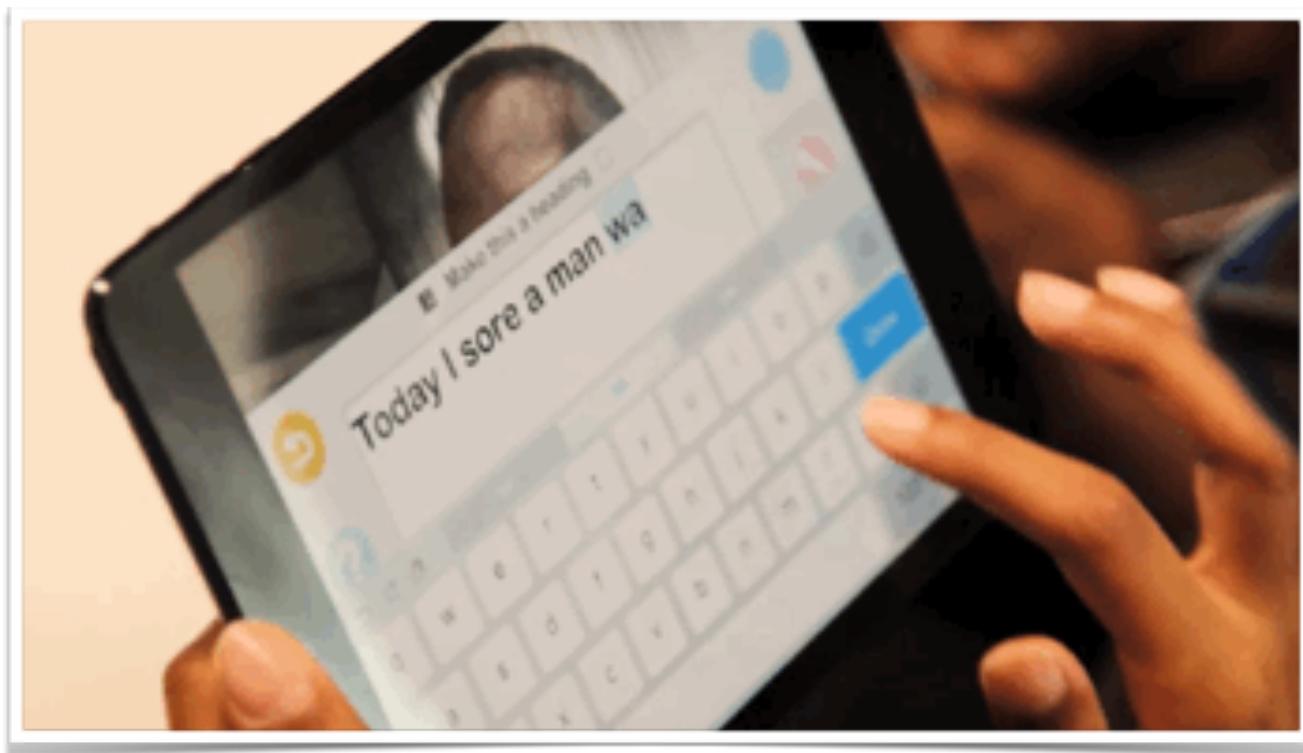# Children and Search/Recommendations Algorithms

What Adults Need to Know

Natalia Kucirkova, J Fails, S Pera and T Huibers

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Why this document?

Today's children spend considerable time online, searching and receiving information from various websites and apps. Article 17 of the UN Convention on the Rights of a Child adopted in 1989 lists that:

> Every child has the right to reliable information from a variety of sources, and governments should encourage the media to provide information that children can understand. Governments must help protect children from materials that could harm.[1]

The ability to guarantee this fundamental right for children is both enhanced and limited by algorithms. This Brief explains some key opportunities and threats of algorithms for young children's learning and the important role of parents and educators in maximising their benefits.

What are algorithms?

Algorithms are a set of instructions decided and programmed by a group of individuals to produce a particular outcome or solution to a problem. Algorithms leverage multiple sources of information in order to yield better outcomes. These can include identity-related data, such as name, age, gender, location, or it can be usage-related data such as historical use of a website, content viewed and accessed, and likes and comments. Algorithms can respond to data directly provided by a given user or based on data inferred from websites they visited. Algorithms influence sites that children use on a regular basis. From interactive websites such as YoutubeKids, classroom-management and communication apps such as Class Dojo, and popular video games such as Fortnite, to the most popular search site: Google.

We need algorithms to navigate the vast amount of information online, without algorithms there would be no Internet. We need algorithms to find what we are looking for via search engine platforms or search boxes within individual websites. We need algorithms to determine the best match to a given problem. However, the way algorithms are designed determines how we access the Internet and all that can be known about us. Adults play a

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[1] A Summary of the UN Convention on the Rights of the Child, Available from Unicef:
https://www.unicef.org.uk/rights-respecting-schools/wp-content/uploads/sites/4/2017/01/Summary-of-the-UNCRC.pdf

crucial role in ensuring that children find relevant and not harmful information online. No algorithm is neutral – all algorithms were designed with certain pre-conceptions and theories in mind. Adults therefore need to ask some questions before they accept the information generated by algorithms either in the form of results retrieved in response to an online inquiry or in the form of resources suggested in response to user interaction/behaviour on the corresponding site.

When a system recommends or personalises content to the child, then it runs an algorithm to make the recommendation. If the recommendation is to some extent personalised, then the algorithm collects information about individual users and uses it to tailor content to the individual's characteristics. For example, a text is adjusted to a child's reading score or children of lower age get easier texts recommended first. Personalisation is essential for processing digital content and widely used in information retrieval via search engines or voice recognition software. A key asset of personal technologies (and particularly social media like Facebook and Instagram) is that they can collect multimedia personal data (photographs, sounds, texts, patterns of use, geographical location) and accommodate algorithms that can process different types of data to make recommendations.

However, the use of children's personal data is a source of ethical and social concern, especially if uncritically adopted for children's learning. This is because most current algorithms follow adult design and are very often based on commercial models[2]. There are some significant problems with adult algorithms (think of how personalised news propagates echo chambers and the Cambridge Analytica scandal). Adults therefore need to be very careful about algorithmic education and entertainment for young children. Adults also need to see the benefits of certain algorithms to pre-select and recommend relevant information from a large content database and facilitate online search with suitable products and services.

Asking the right questions

Algorithms filter and guide children as they find, curate and offer online materials. Similar to how you would vet someone watching over, or guiding your children, you should be aware of the types of algorithms content providers use, knowing who and how they are being guided. With this in mind when using algorithm-based websites, apps and programs for children, we recommend that you ask:

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[2] See the 5Rights document on Persuasive design and the use of algorithms that follow persuasive design,, https://5rightsframework.com/resources.html

WHO is behind the recommender system/search engine/report- and performance-tracking?

Given that algorithms are not neutral, the underlying question is 'what is the provider's intention and purpose'? This leads to additional questions, including: Does the company have a good record of protecting children's data and checking the content they provide? Is the provider a commercial company who will benefit from certain recommendations through selling children's data to third parties or using it for targeted advertisements? If based in Europe and the UK, does the company clearly list how it complies with the General Data Protection Regulation (GDPR) and if based in the USA, does the company endorse and follow the Children's Online Privacy Protection Act (COPPA)?

If you don't know answers to these questions because the company does not provide clear answers, then you can request them from the website provider. If the company doesn't respond you can assume that the answer to the above questions is "no". Child-friendly algorithms provide relevant and reliable online information, they are economically and politically independent, and their recommendations are informed by facts and sound science (not just popular votes or likes).

HOW does the company process data to identify, rank and recommend information?

Companies are unlikely to share their exact formulas for commercial reasons, but you can gauge answers to this question from the way the search or recommendation engine is designed. For example, you can establish what kind of philosophy the company uses based on the information that is requested of you before you use the system. For instance, if they ask for your child's age and gender, they are likely to offer recommendations based on these, rather crude, estimates. If the website doesn't ask for any information, chances are it collects information while your child uses its services. This is called stealth personalisation and should be properly disclosed before you sign up for the service.

Examples of child-friendly sites that offer search and recommendation capabilities

Researchers are currently working to develop more child-friendly and less commercially exploitative algorithms for child-oriented websites and products. Algorithms take time to develop because researchers use iterative design and make design decisions in conversation with several groups of children. Researchers also need to verify the content

the algorithms work with. Below are examples of search and recommendation engines that adhere to the principles of child-friendly design that have positive responses to the questions parents should ask when evaluating resources for their children.

1, http://www.ivyjoy.com/rayne/kidssearch.html

This search engine recommends children-safe and children-appropriate materials but it sends your children to third-party websites which are less careful about it. So make sure that after children view or visit the content they return to this site and do not further search on the third-party website.

2, https://webforclassrooms.com/

The web for the classroom by WizeNoze is the largest curated safe-for-school collection of online content for children available in the world today. The Web for Classrooms provides rapid access for students and teachers to over 6 million pages of curriculum supportive online material from a vast range of respectable sources – all searchable by reading level. Sources were checked by teachers for relevance to the curriculum. Furthermore, it is powered by the very latest in machine learning technology and curated to ensure that material retrieved is reliable, age-appropriate and readable by the child – whatever their level of literacy.

3, https://storyweaver.org.in/

The Storyweaver reading platform allows children not only to read but also create their own books and share them with others. The website runs a simple but transparent algorithm to help narrow down the thousands of openly licensed multilingual stories. Under the "Read" tab, users can select the categories that the system uses to select stories of most relevance to the user. There is also an Images Library, where children can search illustrations created by the community and professional illustrators.