

Executive Summary Artificial Intelligence and Children's Rights

*This is an executive summary for the
research memorandum on artificial
intelligence and children's rights*

Executive Summary

As Artificial Intelligence-based technologies become increasingly integrated into modern life, the onus is on companies, governments, researchers and parents to consider the ways in which such technologies impact children's human rights. The potential impact of artificial intelligence on children deserves special attention, given children's heightened vulnerabilities and the numerous roles that artificial intelligence will play throughout the lifespan of individuals who are born in the 21st century. As much of the underlying technology is proprietary to corporations, corporations' willingness and ability to incorporate human rights considerations into the development and use of such technologies will be critical. Governments will also need to work with corporations, parents, children and other stakeholders to create policies that safeguard children's human rights and related interests.¹

In this memo, we briefly outline a series of case studies to illustrate the various ways that artificial intelligence-based technologies are beginning to positively and negatively impact children's human rights. We identify valuable opportunities to use artificial intelligence in ways that maximize children's wellbeing, and spotlight critical questions that researchers, corporations, governments, educators and parents should be asking now in order to better protect children from negative consequences. We hope that this memo will help a range of stakeholders better understand and begin to lay a framework for addressing the potential impact of artificial intelligence on today's children, and on future generations.

Methodology

At the request of UNICEF and its research partners, a team of students at the Human Rights Center at UC Berkeley School of Law spent the Fall 2018 semester researching how artificial intelligence technologies are being used in ways that positively or negatively impact children at home, at school, and at play.² We also reviewed and identified the disparate human rights that may be disproportionately impacted,

both positively and negatively, by its use.³ Importantly, while any technology that affects adults will have secondary impacts on children, for the sake of space we focused only on applications that have been designed specifically for children. In this summary, we spotlight three case studies that are particularly illustrative of emerging issues. For other examples, please see the full memorandum.

What is Artificial Intelligence?

With the recent rise of and attention given to deep learning technologies, the terms artificial intelligence, machine learning, and deep learning have been used somewhat interchangeably by the general public to reflect the concept of replicating “intelligent” behavior in machines. For purposes of this memo, we use artificial intelligence to mean a subfield of computer science focused on building machines and software that can mimic such behavior. Machine learning is the subfield of artificial intelligence that focuses on giving computer systems the ability to learn from data. Deep learning is a subcategory of machine learning that uses neural networks to learn to represent and extrapolate from a dataset. In this memo, we focus on the ways that machine learning and deep learning processes impact children’s lives and ultimately, their human rights.

The collage features several elements: a Python code snippet for a neural network implementation using tflearn, a graph showing a sigmoid function, a hand holding a pen, a circular pattern of binary code, and a diagram of a neural network layer. The code snippet is as follows:

```
import tflearn
# 2. Logical OR operator / the data
OR = [[0., 0.], [0., 1.], [1., 0.], [1., 1.]]
Y_truth = [[0.], [1.], [1.], [1.]]

# 3. Building our neural network/ layers of functions
neural_net = tflearn.input_data(shape=[None, 2])
neural_net = tflearn.full

(neural_net, optimizer='sgd', learning_rate=0.01)

# 4. Train the model
model.fit(OR, Y_truth, n_epochs=2000, validation_data=(OR, Y_truth))

# 5. Testing final predictions
print("0 or 0:")
print("0 or 1:")
print("1 or 0:")
print("1 or 1:")

flearn_example.py hosted with GitHub Pages
import tflearn
OR = [[0., 0.], [0., 1.], [1., 0.], [1., 1.]]
neural_net = tflearn.input_data(shape=[None, 2])
neural_net, optimizer='sgd', learning_rate=0.01)

the neural network model = tflearn
model.fit(OR, Y_truth, n_epochs=2000, validation_data=(OR, Y_truth))

# 5. Testing final predictions
print("0 or 0:")
print("0 or 1:")
print("1 or 0:")
print("1 or 1:")

view raw flearn_example.py hosted with GitHub Pages
print("0 or 1:", model.predict([[0., 1.]])
print("1 or 0:", model.predict([[1., 0.]])
print("1 or 1:", model.predict([[1., 1.]])

view raw flearn_example.py hosted with GitHub Pages
import tflearn# 2. Logical OR operator / the data
OR = [[0., 0.], [0., 1.], [1., 0.], [1., 1.]]
Y_truth = [[0.], [1.], [1.], [1.]]

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neural_net = tflearn.input_data(shape=[None, 2])
neural_net = tflearn.full
```



What are children's rights?

The Convention on the Rights of the Child (CRC) is the most comprehensive legal framework that protects children--defined as human beings 18 years old and under--as rights bearers.⁴ The CRC aims to ensure children's equality of treatment by States.⁵ More than a binding international document, the Convention is an ethical and legal framework for assessing states' progress or regress on issues of particular interest to children.⁶ Because of the exponential advancement of artificial intelligence-based technologies over the past few years, the current international framework that protects children's rights does not explicitly address many of the issues raised by the development and use of artificial intelligence.⁷ However, it does identify several rights that may be implicated by these technologies, and thus provides an important starting place for any analysis of how children's rights may be positively or negatively affected by new technologies, such as rights to privacy, to education, to play, and to non-discrimination.⁸



CASE STUDY ONE

Children's Rights at Home: YouTube

Social media platforms that rely on streaming technologies are revolutionizing how adults and children consume media content. Platforms are working hard to ensure consumers maximize their time on these sites. YouTube⁹ stands out as the dominant player in this space, especially when it comes to today's youth. In 2017, 80% of U.S. children ages 6 to 12 used YouTube on a daily basis.¹⁰ YouTube was the 2016 and 2017 "top kids brand" according to Brand Love studies.¹¹ In the 2017 study, 96% of children ages 6 to 12 were found to be "aware of YouTube," and 94% of children ages 6 to 12 said they "either loved or liked" YouTube.¹² The YouTube phenomenon isn't just occurring in the United States as YouTube has massive user bases in India, Moscow, across Europe, and beyond.¹³

In 2015, YouTube decided to launch a dedicated platform called YouTube Kids as a means to provide safe, age appropriate content for children.¹⁴ On both YouTube and YouTube Kids, machine learning algorithms are used to both recommend and mediate the appropriateness of content.¹⁵ YouTube representatives, however, have been opaque about differences in the input data and reward functions underlying YouTube Kids and YouTube.¹⁶ Lack of transparency about the input data used in algorithms makes it difficult for concerned parties to understand the distinction.¹⁷ More generally, the issue of algorithmic opacity is of concern with *both* YouTube and YouTube Kids, since YouTube, and not YouTube Kids, continues to account for the overwhelming majority of viewership of children's programming within the YouTube brand.¹⁸

The machine learning algorithms – primarily the recommendation engine employed by YouTube and YouTube Kids – are optimized to ensure that children view as many videos on the platform as possible.¹⁹ Children do not need to enter any information or affirm any acquired permissions to watch thousands of videos on YouTube and YouTube Kids.²⁰ Touchscreen technology and the design of the platforms allow even young children substantial ease of access.²¹ Unfortunately, neither recommendation system appears to optimize for the quality or educational value of the content.²² Because companies developing children's programming are similarly concerned about maximizing viewers and viewer hours, their posts are often designed around YouTube's privileging of quantity with little consideration for quality, including educational value.²³ There is particular concern that with YouTube and YouTube Kids' algorithm-derived "related-videos" recommendations children can become easily trapped in "filter bubbles" of poor-quality content.²⁴

Filtering algorithms also raise other problems, especially when a significant number of external entities are able to co-opt YouTube and YouTube Kids' algorithmic discovery processes to maximize viewer time with sometimes startling consequences for children.²⁵ For example, anyone over the age of 18 can create and upload content onto YouTube and their creations are not regulated by professional protocols. YouTube and YouTube Kids' algorithmic discovery processes can be manipulated to push content that the pusher expects will perform well on the platform's "related-videos" engine,

incentivizing sensational content.²⁶ Prioritizing such content is one of the critical impacts of YouTube's use of machine learning algorithms.²⁷ Kids are particularly susceptible to content recommendations, so shocking "related videos" can grab children's attention and divert them away from more child-friendly programming.²⁸

Another challenge is children's potential exposure to YouTube and YouTube Kids-related advertising.²⁹ YouTube's business model relies on tracking the IP addresses, search history, device identifiers, location and personal data of consumers so that it can categorize consumers by their interests, in order to deliver "effective" advertising.³⁰ Some of the top advertising companies pay Google vast sums to guarantee that their ads are placed on YouTube channels with popular children's programs.³¹ Advertisers also routinely employ keywords such as "kid," "child," "toddler," "baby" or "toy" in order to better target children on YouTube.³² Although YouTube Kids claims to prohibit "interest-based advertising" and ads with "tracking pixels," advertising disguised as programming is ubiquitous on the YouTube Kids application.³³ Although YouTube restricts paid advertising of food and beverages on YouTube Kids, for example, food companies may use their own branded channels to spotlight particular food and beverages that they produce, burying what are essentially ads within programs, and thereby target children with their products.³⁴ Thus, corporations are finding ways to target minors in ways that uphold the letter but not the spirit of the rules and in ways that may be opaque to parents and other concerned parties.³⁵



CASE STUDY TWO

Children's Rights at Play: Smart Toys³⁶

Children’s leisure activities have changed significantly over the last two decades, from engaging with toys with little interactive capacity to smart toys that are capable of responding back.³⁷ Through the use of weak artificial intelligence, these toys incorporate a set of techniques that allow computers to mimic the logic and interactions of humans.³⁸ Such toys raise a host of human rights-related concerns. These include potential violations of a child’s right to privacy, and whether corporations have (or should have) a duty to report sensitive information that is shared with a toy and stored online—such as indications that a child might be being abused or otherwise harmed.³⁹

There are three nodes involved in smart toy processes, each of which comes with a set of challenges and vulnerabilities: the toy (which interfaces with the child), the mobile application, which acts as an access point for Wi-Fi connection, and the toy’s/consumer’s personalized online account, where data is stored. Such toys communicate with cloud-based servers that store and process data provided by the children who interact with the toy.⁴⁰

Privacy concerns arising from this model can be illustrated by the Cloud Pets case, in which more than 800,000 toy accounts were hacked, exposing customers’ (including children’s) private information.⁴¹ Another example is that of the Hello Barbie doll, which raised civil society concerns around the interception of sensitive information and whether the doll allowed for pervasive surveillance in ways that were not transparent to users.⁴² In that case, the toy’s manufacturer, Mattel – in

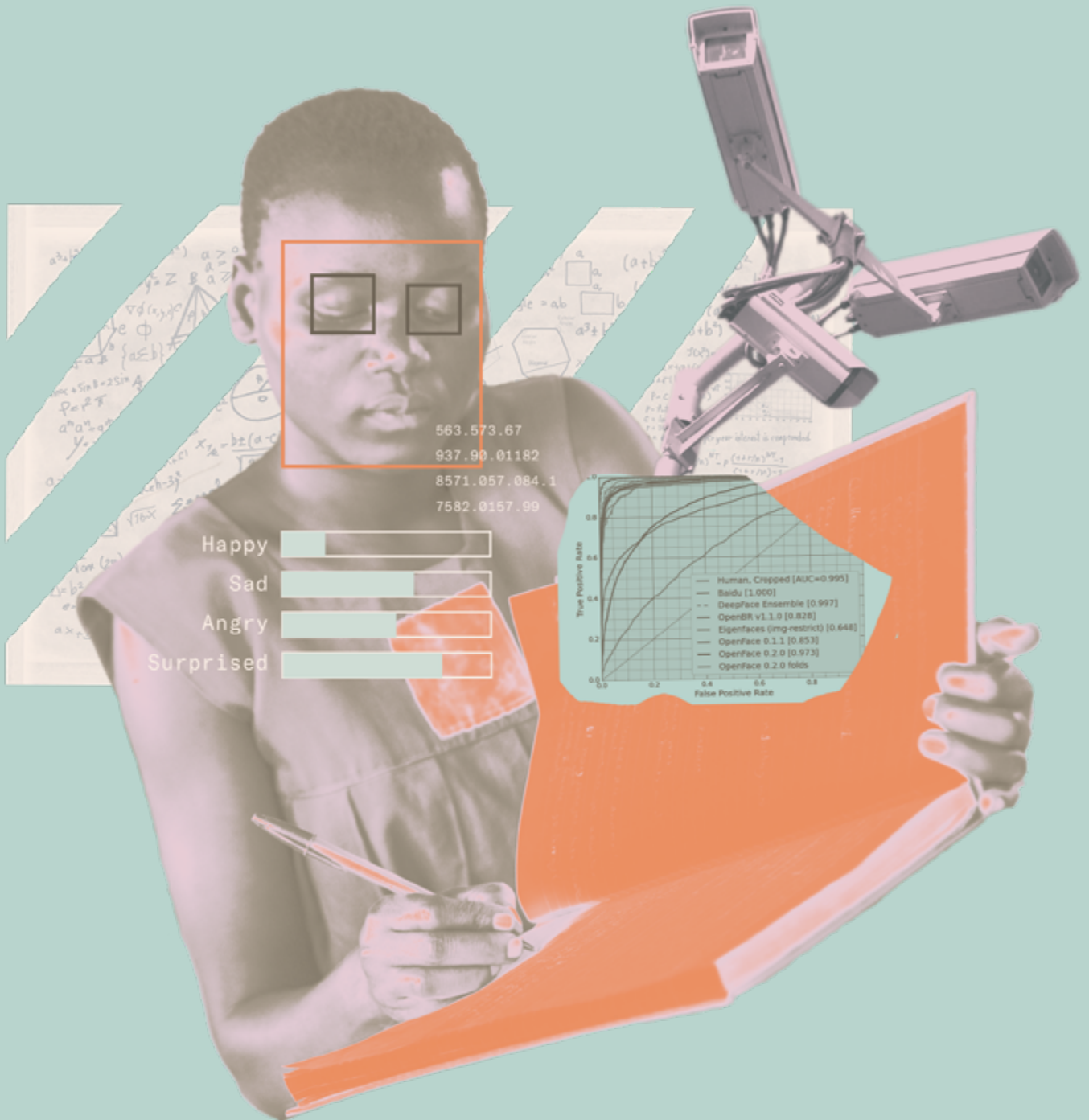
collaboration with Toy Talk, Inc. – released an FAQ to try to address these pressing questions.⁴³ First, the document states that the conversations between the doll and the child cannot be intercepted via Bluetooth technology because the conversation takes place over a secured TLS (HTTPS) network, making it impossible to connect the doll via Bluetooth.⁴⁴ The document does advise against connecting the doll to third party Wi-Fi, which may be especially vulnerable to interception.⁴⁵ Further, the document claims that the Hello Barbie doll is not always listening but becomes inactive when not expressly engaged.⁴⁶ According to the document released by Mattel, the doll has similar recognition technology to Siri and is activated only when the user pushes down the doll’s belt buckle.⁴⁷ Finally, the company states that the doll does not ask questions that are intended to elicit personal information, in order to minimize the circumstances in which a child might divulge sensitive information during his/her conversation with the doll.⁴⁸

Notably, parents can access their child’s Toy Talk cloud account and listen to what their child has said, deleting any personal information.⁴⁹ As a safeguard, Toy Talk also participates in the FTC’s KidSafe Seal Program, a compliance program for websites and online services targeted towards children.⁵⁰ There are two types of certificates that a website or online service can obtain: the KidSafe certificate and the KidSafe+ certificate.⁵¹ The KidSafe+ certificate requires additional requirements and compliance with COPPA.⁵² Because Hello Barbie targets children in the age range protected by COPPA, Toy Talk makes sure to

comply with not only the basic Kid-Safe requirements but the additional requirements for KidSafe+. ⁵³ For example, the communications between Hello Barbie and a child are encrypted and stored on a trusted network.⁵⁴

One emergent concern, despite these safeguards, is whether a company has a duty to report or otherwise “red flag” sensitive information shared through their toys—for example, children who reveal they are being abused, or children who share suicidal thoughts or other self-harm related behavior.⁵⁵ Existing privacy laws and common law tort duties fall short of providing directly relevant protection.⁵⁶ For example, while COPPA protects the privacy rights of minors under the age of thirteen, requiring companies to obtain parental consent and to disclose what information is being collected about a minor, it does not impose any reporting requirements regarding suspected child abuse and neglect.⁵⁷

Ultimately, most mechanisms for tackling these challenges have been designed by the corporations themselves.⁵⁸ In the case of Hello Barbie, Toy Talk has created automatic responses for serious conversations such as bullying or abuse. Such responses include “*that sounds like something you should talk to a grown-up about.*”⁵⁹ While an important step towards addressing this issue, this approach potentially pushes any responsibility for acting to the parents or to the child herself. It is unclear how many children would act on this response to report problems to a grown-up or what it means for children if an adult in their household is the one perpetrating the harm.



CASE STUDY THREE

Children's Rights at School: AI in Education

AI-based tools have three general orientations in terms of their use in schools: learner-facing, teacher-facing and system-facing.⁶⁰ Adaptive learning systems that are learner-facing employ algorithms, assessments, student feedback and various media to deliver material tailored to each student's needs and progress.⁶¹ For example, AI may be used to enhance social skills, especially for children with special needs. One company that employs AI for this purpose is Brain Power, which addresses the issue of autism through a wearable computer.⁶² Another example would be the deployment of AI to help high school students build career skills by using GPA calculators and language learning applications. Duolingo is one such language learning application which gives students personalized feedback in over 300,000 classrooms around the globe.⁶³ Under the teacher-facing category, AI helps teachers in administrative tasks such as grading papers and detecting plagiarism. For example, Carnegie Learning is working on a startup called Lumilo, building an AI augmented reality assistant that will keep teachers in the loop as students work on assignments.⁶⁴

In addition to the software and tools touched on above, AI-incorporating robots are increasingly transforming educational methods and practices. Robots are being brought to classrooms in a way that alters how students learn, calling attention to a wide variety of applications. Even though educational robots promise great benefits to children—such as personalized learning, helping kids develop social skills, enabling distance education for children in remote regions, etc.—they also pose risks.⁶⁵ Human rights that may be positively or negatively affected by their use include the right to education, as well as the right to protection from exploitation and abuse, and the protection of children with disabilities.

Surveillance of children is another use case that is booming due to advanced machine learning and deep learning techniques.⁶⁶ Although some degree of surveillance promises advanced security, surveillance may also leave children more vulnerable than previously.⁶⁷ On the positive side, police in New Delhi recently trialed facial recognition technology and identified almost 3,000 missing children in four days.⁶⁸ However, surveillance can also create privacy, safety and security

risks and limit children's ability and willingness to take risks and otherwise express themselves, especially in educational contexts.⁶⁹ Always-on surveillance practices that continuously monitor everything from children's engagement in the classroom to their emotional states throughout the day threaten the creativity, freedom of choice and self-determination of children by potentially fostering an overabundance of self-censorship and social control.⁷⁰ Once automated surveillance technologies are deployed at schools and in classrooms, children's rights such as the right to privacy, the right not to be subjected to discrimination, the right to flourish, and freedom of expression may be compromised due to the panopticon environment in which children are confined.⁷¹ The risks vary depending on who does the surveilling (governments, teachers, parents etc.) and for what purposes.⁷² However, the potentially chilling effect of having cameras constantly trained on children is undeniable.⁷³ It is important to consider and evaluate the actors involved, their purposes, the tools and methods they'll use, and the safeguards they'll put in place, so that the emerging trend of classroom surveillance—and surveillance more generally—helps children more than it hurts.⁷⁴

How Corporations and Governments Can Help Mitigate Harmful Impacts of AI on Children

Microsoft and Google have both established principles for the ethical use of AI.⁷⁵ However, neither has public-facing policies specific to AI and children.⁷⁶ Several technology centers, trade associations, and computer science groups have also drafted ethical principles with regards to AI.⁷⁷ However, most have excluded explicit reference to child rights, or discussion of the risks to children on AI-incorporating technologies more generally.⁷⁸

Like corporations, governments around the world have adopted strategies for becoming leaders in the development and use of AI, fostering environments congenial to innovators and corporations.⁷⁹ However, in most cases, policymakers have not directly addressed how the rights of children fit into their national strategy.⁸⁰ While France's strategy deals with the AI-related issues of achieving gender equality and implementing digital literacy

through education, the broader scope of impact on children is missing.⁸¹ An example of a country that has taken a more proactive look at the potential benefits of AI for children is India, whose AI initiative focuses on using AI in education, such as creating adaptive learning tools for customized learning, integrating intelligent and interactive tutoring systems, adding predictive tools to inform pre-emptive action for students predicted to drop out of school, and developing automated rationalization of teachers and customized professional development courses.⁸²

Ultimately, both corporations and governments would be well advised to think through how their AI strategies can be strengthened to maximize the benefits and minimize the harms of AI for children today, and in the future.

Recommendations

*A thorough set of recommendations is beyond the scope of this memo.
However, some initial suggestions are touched on below:*

Corporations

- Incorporate an inclusive design approach when developing child-facing products, which maximizes gender, geographic and cultural diversity, and includes a broad range of stakeholders, such as parents, teachers, child psychologists, and—where appropriate—children themselves.
 - Adopt a multi-disciplinary approach when developing technologies that affect children, and consult with civil society, including academia, to identify the potential impacts of these technologies on the rights of a diverse range of potential end-users.
 - Implement safety by design and privacy by design for products and services addressed to or commonly used by children.
 - Develop plans for handling especially sensitive data, including revelations of abuse or other harm that may be shared with the company through its products.
- Avoid the overuse of facial and behavioral recognition technologies, including for security purposes, in ways that may constrain learning and appropriate risk taking.

Governments

- Set up awareness campaigns that help parents understand the importance of privacy for their children. Parents should be aware of how their children’s data is being used and processed for diverse purposes, including for targeted ad campaigns or non-educative social media recommendations. They should also be aware of the impacts of posting pictures or other information about their children to social media, and the ways that what they post can have a dramatic impact on their children’s future.
- Adopt a clear, comprehensive framework for corporations that imposes a duty of care connected to the handling of children’s data, and provides an effective remedy (judicial, administrative or other) for breach. This framework should incorporate human rights principles.
- Establish a comprehensive national approach to the development of artificial intelligence that pays specific attention to the needs of children as rights-bearers and integrates children into national policy plans.

Parents

- Carefully review and consider avoiding the purchase and use of products that do not have clear policies on data protection, security, and other issues that impact children.
- Incorporate children into the decision-making process about how their data will be used, including whether to post their information to social media sites and whether to engage smart toys, helping children understand the potential short and long-term impacts of that use.
- Identify how schools might be using artificial intelligence-based technologies to assist or surveil children, and raise concerns if some of the policies or procedures are unclear or seem inappropriate—for example, by disincentivizing creativity and exploration. Encourage the use of artificial intelligence-based technologies when they seem likely to enhance learning and that positive benefit has been confirmed by peer-reviewed research.

Educators

- Be aware of and consider using artificial intelligence-based tools that may enhance learning for students, such as specialized products that can assist non-traditional learners and children with special needs.

Conclusion

The role of artificial intelligence in children’s lives—from how children play, to how they are educated, to how they consume information and learn about the world—is expected to increase exponentially over the coming years. Thus, it’s imperative that stakeholders come together now to evaluate the risks of using such technologies and assess opportunities to use artificial intelligence to maximize children’s

wellbeing in a thoughtful and systematic manner. As part of this assessment, stakeholders should work together to map the potential positive and negative uses of AI on children’s lives, and develop a child rights-based framework for artificial intelligence that delineates rights and corresponding duties for developers, corporations, parents, and children around the world.

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