

TO: Artificial Intelligence and Child Rights Working Group  
FROM: UC Berkeley Human Rights Center Research Team  
RE: Memorandum on Artificial Intelligence and Child Rights  
DATE: April 30, 2019

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 and Spring 2019 semesters researching how artificial intelligence technologies are being used in ways that impact children at home, at school, and at play. We also reviewed and identified the disparate human rights that might be disproportionately impacted, both positively and negatively, by its use. 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.

As Artificial Intelligence-based technologies become increasingly integrated into modern life, the onus is on companies, governments, researchers, and caregivers to consider the ways in which such technologies impact children's 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 rights and related interests.

In this memo, we provide a series of case studies to illustrate the various ways that artificial intelligence-based technologies are beginning to positively and negatively impact children's

rights, and to spotlight critical questions that researchers, corporations, governments, educators and parents should be asking now in order to better promote children's rights and 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.

This memo is structured as follows: Section I highlights terminologies and concepts related to artificial intelligence, machine learning, and deep learning. Section II provides an overview of international laws designed to identify and safeguard child rights. Section III offers three case studies: the first focuses on privacy concerns raised by the use of AI in entertainment, through the examples of YouTube Kids and smart toys, the second spotlights the issue of surveillance used in settings that involve children, and the third concerns the impact of educational robots that incorporate machine learning processes on children's lives. Section IV discusses corporate and government approaches to artificial intelligence and rights. Finally, Section V offers recommendations for governments and corporations.

## 1. TERMINOLOGIES AND CONCEPTS

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 incorporating intelligent behavior into machines. Aggregating these terms is problematic because they each have different meanings, considerations and consequences. We define these terms below to enhance the clarity of this memorandum.

1. **Artificial Intelligence:** Created as a term in 1956, artificial intelligence is a subfield of computer science focused on building machines and software that can mimic "intelligent" behavior. Artificial Intelligence permits software to learn from patterns in the data through the combination of large amounts of data with intelligent algorithms.<sup>1</sup>

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<sup>1</sup> SAS Institute, "Artificial Intelligence – What It Is and Why It Matters," *SAS: The Power to Know*, accessed April 10, 2019, [https://www.sas.com/en\\_us/insights/analytics/what-is-artificial-intelligence.html](https://www.sas.com/en_us/insights/analytics/what-is-artificial-intelligence.html).

2. **Machine Learning:** A subfield of artificial intelligence, machine learning automates analytical model building as it is focused on giving computer systems the ability to learn from data without being explicitly programmed. Through the use of methods derived from neural networking, statistics, operations research and physics, machine learning identifies hidden insights in data. The addition of data as an element that contributes to this system's ability to detect patterns introduces numerous considerations around the collection, processing and evaluation of that data.<sup>2</sup>
  
3. **Deep Learning:** A subcategory of machine learning, deep learning uses neural networks to "learn" a representation of a dataset. In recent years, deep learning technologies have provided breakthroughs in a number of tasks that cannot be explicitly coded, including image classification, speech translation, image generation and more, eventually beating human accuracies. Deep Learning tends to add additional layers of complexity to an algorithmic model, which further obfuscates the transparency of the model's inner-workings and has thus resulted in a lack of interpretability.<sup>3</sup>

In this memo, we focus on the ways that machine learning and deep learning processes impact children's lives and ultimately, their human rights. In machine learning, the creation of relationships between data is often touted as happening in a "black box" because the mathematical functions that describe these relationships are not easily comprehensible.<sup>4</sup> These issues are even more pervasive for deep learning based algorithms where an input goes through many layers of uninterpretable transformations before generating an output.<sup>5</sup> Even intimate understanding of the mathematical foundation behind deep learning provides little insight into how these networks make decisions. Nonetheless, it is important to take extra consideration to deep learning approaches as they continue to revolutionize the field.

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<sup>2</sup> SAS Institute, "Artificial Intelligence – What It Is and Why It Matters," *SAS: The Power to Know*, accessed April 10, 2019, [https://www.sas.com/en\\_us/insights/analytics/what-is-artificial-intelligence.html](https://www.sas.com/en_us/insights/analytics/what-is-artificial-intelligence.html).

<sup>3</sup> SAS Institute, "Artificial Intelligence – What It Is and Why It Matters," 2019.

<sup>4</sup> Stanford University, "A Peek Inside the 'Black Box' of Machine Learning Systems," *Artificial Intelligence Research*, May 15, 2017, accessed November 20, 2018, <https://www.onartificialintelligence.com/articles/10978/a-peek-inside-the-black-box-of-machine-learning-systems>.

<sup>5</sup> Erica Kochi, "How to Prevent Discriminatory Outcomes in Machine Learning," *Medium*, March 22, 2018, accessed November 7, 2018, <https://medium.com/@ericakochi/how-to-prevent-discriminatory-outcomes-in-machine-learning-3380ffb4f8b3>.

While machine learning has the potential to increase the predictive power of models that rely on this technology, it also brings additional issues surrounding the collection and use of particular datasets. These datasets are used to create a model that represents relationships between an arbitrary input and a particular output.<sup>6</sup>

The computer science community has still not developed a precise definition of interpretability for machine learning models, but the general sentiment is that a user should be able to understand the process an intelligent agent took to arrive at a particular decision. This does not necessitate knowing the mathematical weights used within a particular neural network, but it does mean that a user can gain a higher level understanding of the decision-making flow that an intelligent agent would take. This requires that these intelligent agents are developed in a way that allows them to provide the information necessary to explain their decisions.<sup>7</sup>

### **Components of Machine Learning**

The two major components that constitute any machine learning workflow are the dataset and the model. Two issues that stem from the model are interpretability and generalizability. A model's lack of generalizability to new data occurs when the model is not complex enough to account for edge cases, or the data that a model learns from does not accurately represent the real world.<sup>8</sup> Whether a particular action will occur in the real world usually follows a probability distribution of potential actions. When the training data does not accurately portray the ground truth probability distribution, the model will be trained on data that is skewed in a particular direction, which does not allow it to adequately respond to unforeseen data. Datasets need to not only portray reality, but also account for inherent social biases. If those biases are not accounted for during development, machine learning systems may perpetuate those biases, leading to unanticipated harms.<sup>9</sup>

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<sup>6</sup> Suraj Acharya, "Tackling Bias in Machine Learning," *Medium: Insight*, March 18, 2019, <https://blog.insightdatascience.com/tackling-discrimination-in-machine-learning-5c95fde95e95>.

<sup>7</sup> Leilani H. Gilpin et al. "Explaining Explanations: An Overview of Interpretability of Machine Learning," *2018 IEEE 5th International Conference on Data Science and Advanced Analytics (DSAA)*, (February 3, 2019): 1-10, accessed April 12, 2019, doi:10.1109/dsaa.2018.00018.

<sup>8</sup> Christoph Molnar, *Interpretable Machine Learning A Guide for Making Black Box Models Explainable*, April 12, 2019, accessed April 20, 2019, <https://christophm.github.io/interpretable-ml-book/index.html>.

<sup>9</sup> Christoph Molnar, *Interpretable Machine Learning A Guide for Making Black Box Models Explainable*.

Overcoming biases is especially important when machines interact with children because the age, gender, ethnicity, or geography of those children could be undersampled in a model's training, which could lead to inaccurate assumptions and conclusions, which in turn result in problematic interactions.<sup>10</sup> Even isolated incidents that are unpleasant to children can have a lasting negative impact, and may even lead to a transgression of children's rights.

## 2. METHODOLOGY

Over the course of a semester, and under the supervision of Human Rights Center faculty, eight students from UC Berkeley combed the social science and computer science literatures, as well as mass media and international human rights documents, to identify the known potential positive and negative impacts of artificial-intelligence related technologies on rights and the lives of children. The research revealed that there is little systematic research into how emerging technologies are affecting children – particularly on a global scale. As a result, the research team looked for examples to illustrate potential impacts as a starting place for future analysis. This memo summarizes our research and conclusions.

Importantly, we exempted two acute issues in order to focus our research: first, we exempted discussion of technologies that are aimed at adults. Such technologies will almost always also affect the human rights of children—for example, when adults' jobs are replaced by automation, the lack of income will be detrimental to both parents and children. Instead, we prioritized the ways that artificial intelligence-based technologies impact the express human rights of children *themselves*. Second, we do not address the equally important issue of who has the authority to exercise children's rights. For example, parents may have the authority to waive children's rights to privacy, negatively impacting the protection of those rights. Any guidance that is ultimately provided to safeguard the rights of children should incorporate both of those considerations.

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<sup>10</sup> Ayanna Howard, Cha Zhang, and Eric Horvitz, "Addressing Bias in Machine Learning Algorithms: A Pilot Study on Emotion Recognition for Intelligent Systems," *2017 IEEE Workshop on Advanced Robotics and Its Social Impacts (ARSO)*, (2017): 1-7, doi:10.1109/arso.2017.8025197.

We made sure to collect diverse case studies that reflect different parts of a child’s typical day, such as when they play and go to school. We also selected case studies that potentially infringe or foster the rights of children as embedded in the Convention for the Rights of the Child, such as the right to leisure, the right to privacy, the right to equality, the right to be protected against abuses, and the right to education.

Additionally, this memorandum addresses how different countries or regions tackle the human rights issues and challenges generated by AI technologies. This geographical diversity aims to represent and expose how children are going to live with the rise of AI in different parts of the world, as a function of their governments’ responses.

As explained above, AI is a broad term and our research time was limited, so the case studies outlined in this memorandum aim to address a few of the most prominent manifestations of artificial intelligence: robotics, machine learning and deep learning.

### **3. CURRENT LEGAL FRAMEWORK ON CHILDREN’S RIGHTS**

#### **Convention on the Rights of the Child**<sup>11</sup>

The Convention on the Rights of the Child (CRC), the most ratified treaty ever, was unanimously adopted by the United Nations on November 1989.<sup>12</sup> The aim of the international community was to recognize children as subjects of their own rights and accordingly, to set standards for health, education, legal, civil, and social rights.<sup>13</sup>

The Convention protects children, defined as human beings of 18 years old and under. It aims to ensure equality of treatment by States for children around the world.<sup>14</sup> Although the CRC has been ratified broadly, the United States government has never ratified the treaty and is today the

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<sup>11</sup> United Nations, “Convention on the Rights of the Child,” *United Nations Office of the High Commissioner for Human Rights*, Vol. 1, New York: New York City, 1989.

<sup>12</sup> UNICEF, “Understanding the Convention on the Rights of the Child,” *UNICEF*, May 19, 2014, accessed April 18, 2019, [https://www.unicef.org/crc/index\\_understanding.html](https://www.unicef.org/crc/index_understanding.html).

<sup>13</sup> Office of Legal Affairs, “Historic Archives: Convention on the Right of the Child,” *United Nations*, accessed April 12, 2019, <http://legal.un.org/avl/ha/crc/crc.html>.

<sup>14</sup> United Nations, “Convention on the Rights of the Child.”

only state that is not party to the Convention.<sup>15</sup> Nonetheless, the CRC remains a persuasive guide to good practices for both corporations and states. More than an international binding document, the Convention is nowadays considered an ethical and legal framework for assessing states' progress or regress.<sup>16</sup>

The aim of the CRC is to safeguard and advance what is referred to as the “four P’s”: participation by children in decisions affecting them; protection of children against discrimination and all forms of neglect and exploitation; prevention of harm to children; and provision of assistance to children for their basic needs.<sup>17</sup> In sum, the CRC sets forth a broad legal framework to protect children living in different cultures, as well as minorities and those who may be subjected to discrimination and other harms.

Additional protocols to the CRC were drafted and adopted in order to supplement the CRC by addressing specific issues in more detail, for example by addressing an emergent issue or by adopting a complementary procedure.<sup>18</sup> These optional protocols are treaties of their own and are also open to signature and ratification by States.<sup>19</sup> To this day, three additional protocols concerning children are in force, including the Additional Protocol on the Sale of Children, Child Prostitution and Child Pornography.<sup>20</sup> Such protocol has been ratified by 175 States, including the United States.<sup>21</sup> Furthermore, the Additional Protocol on Children in Armed Conflicts, to which the United States is also part, has been ratified by 168 States.<sup>22</sup> The third optional protocol – which entered into force in 2014 – the Optional Protocol to the Convention on the Rights of the Child, provides a communication procedure, allowing children to submit complaints regarding

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<sup>15</sup> "UN Lauds Somalia as Country Ratifies Landmark Children's Rights Treaty," *United Nations News*, January 20, 2015, accessed April 22, 2019, <https://news.un.org/en/story/2015/01/488692-un-lauds-somalia-country-ratifies-landmark-childrens-rights-treaty>.

<sup>16</sup> UNICEF, "Understanding the Convention on the Rights of the Child."

<sup>17</sup> Geraldine Van Bueren, "The International Law on the Rights of the Child," in *International Studies in Human Rights*, (Dordrecht/Boston/London: Martinus Nijhoff Publishers, 1995), 10-15.

<sup>18</sup> UNICEF, "Advancing the CRC," *UNICEF Convention on the Rights of the Child*, May 19, 2014, accessed April 20, 2019, [https://www.unicef.org/crc/index\\_protocols.html](https://www.unicef.org/crc/index_protocols.html).

<sup>19</sup> UNICEF, "Advancing the CRC."

<sup>20</sup> "Optional Protocol to the Convention on the Rights of the Child," *United Nations Human Rights: Office of the High Commissioner*, May 25, 2000, accessed April 10, 2019, <https://www.ohchr.org/en/professionalinterest/pages/opsccrc.aspx>.

<sup>21</sup> United Nations General Assembly, "Status of Ratification: Interactive Dashboard," *United Nations Human Rights: Office of the High Commissioner*, accessed April 10, 2019, <http://indicators.ohchr.org/>.

<sup>22</sup> "Status of Ratification: Interactive Dashboard." *United Nations Human Rights: Office of the High Commissioner*.

specific violations of their rights under the Convention and the additional protocols.<sup>23</sup> This has been ratified by 40 States only.<sup>24</sup>

The main UN body mandated to enforce and monitor the implementation of the Convention on the Rights of the Child is the Committee on the Rights of the Child (the Committee).<sup>21</sup> It consists of an independent United Nations body established by Article 43 of the CRC and regroups 18 independent experts elected by member parties. The States have a duty to report to the Committee every five years on the measures they have adopted to give effect to the Convention.<sup>23</sup> The Committee examines these reports and provides recommendations and concerns to the member States. It also has the duty to “encourage international co-operation in the field covered by the Convention” such as with the various UN specialized agencies to assist or advise a State party.<sup>25</sup> Moreover, it makes recommendations or suggestions to the General Assembly based on information received pursuant to articles 44 and 45 of the CRC, which must then be transmitted to any State party concerned.<sup>26</sup>

### **United Nations Guiding Principles on Business and Human Rights**

While governments have the primary duty to protect human rights under international law, it has become widely accepted that businesses also have a responsibility to respect human rights. The United Nations Guiding Principles on Business and Human Rights (Guiding Principles) articulates the standards and scope of businesses’ social responsibilities.<sup>25</sup> John Gerard Ruggie, who oversaw the Guiding Principles’ development, states that the principles “are far from constituting a comprehensive and integrated global regime, but ... demonstrate that it is possible to achieve a significant degree of convergence of norms, policies and practices even in a highly controversial issue area.”<sup>26</sup> Since businesses are at the forefront of the development of artificial intelligence, these principles are particularly useful for assessing how they should develop

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<sup>23</sup> United Nations General Assembly, "Optional Protocol to the Convention on a Communications Procedure," *United Nations Human Rights: Office of the High Commissioner*, December 19, 2011, accessed April 20, 2019, <https://www.ohchr.org/EN/ProfessionalInterest/Pages/OPICCRC.aspx>.

<sup>24</sup> United Nations General Assembly, “Status of Ratification: Interactive Dashboard.”

<sup>25</sup> United Nations Human Rights Council, "Promotion and Protection of All Human Rights, Civil, Political, Economic, Social and Cultural Rights, Including the Right to Development," *Human Rights Council Documents Online*, April 7, 2008, 1-28, accessed April 10, 2019, doi:10.1163/2210-7975\_hrd-9970-2016149.

<sup>26</sup> John Gerard Ruggie, "Global Governance and “New Governance Theory: Lessons from Business and Human Rights,” *Global Governance: A Review of Multilateralism and International Organizations* 20, no. 1 (2014): 5-17, accessed April 19, 2019, doi:10.1163/19426720-02001002.



technology following a human rights approach and with a particular emphasis on children's rights, especially since children are entitled to additional protection specific to their vulnerability. Accordingly, the UN Special Rapporteur on the right to privacy duly noted that "an increasing number of corporations today already gather much more personal data than most governments ever can or will."<sup>27</sup>

The Information Technology Industry Council has joined the conversation around children's rights with a focus on emerging technologies, publishing a list of principles to guide the ethical development of artificial intelligence (AI) systems.<sup>28</sup> These include:

- **Responsible Design and Deployment:** "Recognize potentials for use and misuse, the implications of such actions, and the responsibility and opportunity to take steps to avoid the reasonably predictable misuse of this technology by committing to ethics by design."
- **Robust and Representative Data:** "Understand the parameters and characteristics of the data, to demonstrate the recognition of potentially harmful bias and to test for potential bias before and throughout the deployment of AI systems."
- **Interpretability:** "Mitigate bias, inequity and other potential harms in automated decision-making systems."<sup>29</sup>

### **The Child Rights Most Likely to be Affected by Advances in AI**

As mentioned earlier in this memorandum, machine learning technologies are expected to increasingly impact people's daily lives.<sup>30</sup> The next generation of children will be most affected by this technology, as they will be born and raised in an era of big data and machine systems that will make decisions related to everything from their education, to access to credit, to

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<sup>27</sup> United Nations General Assembly, "Statement by Mr. Joseph A. Cannataci, Special Rapporteur on the Right to Privacy, at the 31st session of the Human Rights Council," *United Nations Human Rights: Office of the High Commissioner*, March 9, 2016, accessed April 20, 2019.

<https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=21248&LangID=E>.

<sup>28</sup> Frida Polli, "AI And Corporate Responsibility: Not Just For The Tech Giants," *Forbes*, November 09, 2017, accessed April 21, 2019, <https://www.forbes.com/sites/fridapolli/2017/11/08/ai-and-corporate-responsibility-not-just-for-the-tech-giants/#26e659a75d4b>.

<sup>29</sup> Frida Polli, "AI And Corporate Responsibility: Not Just For The Tech Giants."

<sup>30</sup> "Generation AI," *World Economic Forum*, accessed April 19, 2019, <https://www.weforum.org/projects/generation-ai>.

employment opportunities, and much more.<sup>31</sup> Because of the exponential advancement of these technologies over the past few years, the current international framework that protects children’s rights does not explicitly address most of the issues raised by the development and use of artificial intelligence.<sup>32</sup> The impact and intersection with human rights and particularly children’s rights – especially regarding the rights to privacy, to education, to play, and to nondiscrimination – raise pressing issues that principal stakeholders, including corporations and States, should address.

### ***The Right to Privacy***

The right to privacy is central to various regional treaties and conventions.<sup>33</sup> It includes protection against unlawful interference with an individual’s privacy, family, home or correspondence, and to unlawful attacks against his or her honor or reputation.<sup>34</sup> In its general comment no. 16 of the ICCPR, the Human Rights Committee specifies that “the gathering and holding of personal information on computers, data banks and other devices, whether by public authorities or private individuals or bodies, must be regulated by law. Effective measures have to be taken by States to ensure that information concerning a person’s private life does not reach the hands of persons who are not authorized by law to receive, process and use it, and is never used for purposes incompatible with the Covenant.”<sup>35</sup> Additionally, the committee mentions that “every individual should have the right to ascertain in an intelligible form, whether, and if so, what personal data is stored in automatic data files, and for what purposes.”<sup>36</sup> Although this general comment was intended to interpret the ICCPR article on privacy, and not specifically the CRC’s, this interpretation of the right to privacy is likely applicable to both, as article 17 of the ICCPR and article 16 of the CRC incorporate the same text.<sup>37</sup> In a previous report, UNICEF stressed the fact that children could compromise their right to privacy when online in many

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<sup>31</sup> "Generation AI," *World Economic Forum*.

<sup>32</sup> United Nations, “Convention on the Rights of the Child.”

<sup>33</sup> United Nations, “Convention on the Rights of the Child.”

<sup>34</sup> United Nations, “Convention on the Rights of the Child.”

<sup>35</sup> United Nations Office of the High Commissioner for Human Rights, *CCPR General Comment No. 16: Article 17 (Right to Privacy) The Right to Respect of Privacy, Family, Home and Correspondence, and Protection of Honour and Reputation*, UN Human Rights Committee (HRC), April 8, 1988, accessed April 19, 2019.

<sup>36</sup> UNHCR, *CCPR The Right to Respect of Privacy, Family, Home and Correspondence, and Protection of Honour and Reputation*.

<sup>37</sup> Rachel Hodgkin and Peter Newell, *Implementation Handbook for the Convention on the Rights of the Child*, New York: United Nations Childrens Fund, 2002.

ways: “Public authorities may follow children’s digital footsteps; businesses may collect and monetize children’s data; and parents may publish children’s images and information.”<sup>38</sup>

With the increased use of digital technologies, these interpretations of the right to privacy should be embedded in formal provisions, as potential violations of this right are likely.<sup>39</sup> This concern is underscored by the fact that “children are also more vulnerable to intrusions into their privacy as their capacity to understand the long-term impacts of sharing personal data is still developing.”<sup>40</sup> Additionally, parents have a role to play in protecting their children’s right to privacy. As explained by Kay Firth-Butterfield, “[i]t is difficult (for children) to exercise that right, once you have sufficient mental capacity to do so, if your parents—by having devices that listen and record in your home from your birth—have given away your childhood privacy.”<sup>41</sup>

### ***The Right to Rest and Leisure***

The CRC also notes children’s right to rest and leisure, including to engage in recreational activities.<sup>42</sup> The Human Rights Committee recognizes this right as essential to children’s health and well-being.<sup>43</sup> This right has many components and the duty of the State consists in both recognizing the right of the child to rest, leisure, play and recreational activities, but also to respect and protect the participation of children in such activities, as well as encourage the provision of appropriate opportunities because “children can only realize their rights if the necessary legislative, policy, budgetary, environmental and service frameworks are in place.”<sup>44</sup> These provisions should be taken in consideration with article 3 of the CRC, which

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<sup>38</sup> Carly Nyst, Amaya Gorostiaga and Patrick Geary, "Industry ToolKit: Children’s Online Privacy and Freedom of Expression," May 3, 2018, accessed April 21, 2019, 4.

[https://www.unicef.org/csr/files/UNICEF\\_Childrens\\_Online\\_Privacy\\_and\\_Freedom\\_of\\_Expression\(1\).pdf](https://www.unicef.org/csr/files/UNICEF_Childrens_Online_Privacy_and_Freedom_of_Expression(1).pdf), 4.

<sup>39</sup> Nyst, Gorostiaga, and Geary, “Industry Toolkit,” 4.

<sup>40</sup> Nyst, Gorostiaga, and Geary, “Industry Toolkit,” 4.

<sup>41</sup> Kay Firth-Butterfield, "Artificial Intelligence and the Law: More Questions Than Answers?" *American Bar Association*, 2017, accessed April 22, 2019,

[http://www.americanbar.org/groups/science\\_technology/publications/scitech\\_lawyer/2017/fall/artificial-intelligence-and-law.html](http://www.americanbar.org/groups/science_technology/publications/scitech_lawyer/2017/fall/artificial-intelligence-and-law.html).

<sup>42</sup> United Nations General Assembly, “Convention on the Rights of the Child”, p. 3.

<sup>43</sup> UN Committee on the Rights of the Child, *General Comment No. 17 (2013) on the Right of the Child to Rest, Leisure, Play, Recreational Activities, Cultural Life and the Arts (Art. 31)*, UN Committee on the Rights of the Child (CRC), April 17, 2013, 9.

<sup>44</sup> UN Committee on the Rights of the Child, *General Comment on the Right of the Child to Rest, Leisure, Play, Recreational Activities*, 15.

provides that under the CRC, all actions should be taken with the best interests of the child in mind. This would thus apply to regulation or legislation governing privacy.<sup>45</sup>

### ***The Right to Education***

Additionally, the right to education embedded in articles 28 and 29 of the CRC requires States to provide primary education to children equally, along with fair access to higher education. Article 28 focuses primarily on access to education and article 29 on the content and quality of education. As explained by the Human Rights Committee, the “aims (of article 29) are: the holistic development of the full potential of the child (29(1)(a)), including development of respect for human rights (29(1)(b)), an enhanced sense of identity and affiliation (29(1)(c)), and his or her socialization and interaction with others (29(1)(d)) and with the environment (29(1)(e)).”<sup>46</sup> The HRC reiterates in its general comments about education that “education must also be aimed at ensuring that essential life skills are learnt by every child and that no child leaves school without being equipped to face the challenges that he or she can expect to be confronted with in life.”<sup>47</sup>

One of the most important and basic skills that must be learnt at school by children is how to write. It is considered a key competency that is “not only an important factor in the job market, but also an important ability for achieving the full development of the human rights personality.”<sup>48</sup> Artificial Intelligence can have a positive impact on attaining that skill, for example, through the use of automated grading systems to provide feedback that is essential to improving writing in places where there is a lack of quality education.<sup>49</sup> Nonetheless, these technologies will also impact access to education, as biased and discriminatory machine learning

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<sup>45</sup> UN Committee on the Rights of the Child, *General Comment on the Right of the Child to Rest, Leisure, Play, Recreational Activities*, 17.

<sup>46</sup> UNICEF Innocenti Research Centre, *General Comments of the Committee on the Rights of the Child: Including CD with Observations*, Firenze: United Nations Children’s Fund (UNICEF), 2006, 1.

<sup>47</sup> UN Committee on the Rights of the Child, *General Comment No. 1 (2001), Article 29 (1), The Aims of Education*, UN Committee on the Rights of the Child (CRC), April 17 2001.

<sup>48</sup> Filippo Raso et al. “Artificial Intelligence and Human Rights: Opportunities and Risks,” *Berkman Klein Center: For Internet and Society at Harvard University*, September 25, 2018, accessed April 18, 2019, [https://cyber.harvard.edu/sites/default/files/2018-09/2018-09\\_AIHumanRightsSmall.pdf](https://cyber.harvard.edu/sites/default/files/2018-09/2018-09_AIHumanRightsSmall.pdf), 47.

<sup>49</sup> Filippo Raso et al. “Artificial Intelligence and Human Rights: Opportunities and Risks,” 49.

devices may determine who is admitted, as well as who is granted scholarships.<sup>50</sup> There are several possible positive and negative impacts on the use of AI in the education sector, but the rights set forth by the Convention should be taken into consideration when businesses develop new educational tools, in order to ensure that they respect and advance children's rights.

### ***The Right to Freedom from Discrimination***

One of the most preoccupying aspects of artificial intelligence is how it will exacerbate local and global economic inequality. According to the World Economic Forum, seventy percent of the global economic impact of AI by 2030 will be gained by North America and China, while developing countries in Asia, Latin America and Africa will see less than six percent of the overall gain.<sup>51</sup> Artificial intelligence systems will further be used to determine who has access to credit; this may negatively affect the lives of families around the world as “there is a significant risk that the information used to generate credit scores is systematically biased against minority communities.”<sup>52</sup> These two examples illustrate the direct potential economic impact of new applications of artificial intelligence on people's lives, which is on a track to broaden economic inequalities and thus may disparately and negatively affect the lives of children who are born in already-difficult economic and social conditions.

## **4. CASE STUDIES**

### **AI and Education**

The right to education is one of the basic human rights foundational to child development, and artificial intelligence is being used to promote the same. In education, AI has begun producing new teaching and learning solutions that are now undergoing testing in different contexts.<sup>53</sup>

Artificial Intelligence in the education market is projected to surpass USD 6 billion by 2024 due

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<sup>50</sup> United States, Executive Office of the President, *Big Data: A Report on Algorithmic Systems, Opportunity, and Civil Rights*, By Cecilia Muñoz, Megan Smith, and DJ Patil, 2016, 1-29, accessed April 15, 2019, [https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/2016\\_0504\\_data\\_discrimination.pdf](https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/2016_0504_data_discrimination.pdf).

<sup>51</sup> Ross Chainey, "The Global Economy Will Be \$16 Trillion Bigger by 2030 Thanks to AI," *The World Economic Forum*, June 27, 2017, accessed April 19, 2019, <https://www.weforum.org/agenda/2017/06/the-global-economy-will-be-14-bigger-in-2030-because-of-ai/>.

<sup>52</sup> Filippo Raso et al. "Artificial Intelligence and Human Rights: Opportunities and Risks," 28.

<sup>53</sup> Bora Ronak, "Artificial Intelligence in Education Market in APAC to Register a Phenomenal CAGR of 51% Over 2018-2024." *Fractovia Market Trending News*, April 08, 2019, accessed April 20, 2019, <https://www.fractovia.org/news/artificial-intelligence-in-education-market-share-trend/1984>.

to the growing demand for Intelligent Tutoring System (ITS) by educational institutions.<sup>54</sup> With AI, every aspect of the traditional learning environment is up for reimagining.<sup>55</sup> Increasing investments in EdTech Companies to develop digital content and provide e-learning services to students has fostered a demand for AI in the educational market.<sup>56</sup>

### ***AI in a School Setting***

In schools, AI tools fall into three categories: learner-facing, teacher-facing and system-facing.<sup>57</sup> At the learner-facing level, adaptive learning systems employ algorithms, assessments, student feedback and various media to deliver material tailored to each student needs and progress.<sup>58</sup> Under the teacher-facing category, AI technology can be used to automate routine academic tasks such as grading assignments and managing documentation.<sup>59</sup> This allows instructors to concentrate their energy on tasks that cannot be completed with AI, such as those that require human attention.<sup>60</sup> Artificial Intelligence can serve as the teacher's assistant in the classroom, patiently working with students as they relearn concepts. AI can also help teachers manage day-to-day operations.<sup>61</sup> Analyzing student progress can be done effectively and quickly. By employing AI, teachers can identify children's weaknesses and strengths and better personalize their education.<sup>62</sup> This can help to address the issue of achievement gaps between students who perform well in school to children versus those who struggle.

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<sup>54</sup> Ronak, "Artificial Intelligence in Education Market in APAC to Register a Phenomenal CAGR of 51% over 2018-2024."

<sup>55</sup> John R Allen, "Why We Need to Rethink Education in the Artificial Intelligence Age," *Brookings Institute*, January 31, 2019, accessed April 14, 2019, <https://www.brookings.edu/research/why-we-need-to-rethink-education-in-the-artificial-intelligence-age/>.

<sup>56</sup> Ronak, "Artificial Intelligence in Education Market in APAC to Register a Phenomenal CAGR of 51% over 2018-2024."

<sup>57</sup> Toby Baker, Laurie Smith, and Nandra Anissa, "Educ-AI-tion Rebooted? Exploring the Future of Artificial Intelligence in Schools and Colleges" *Nesta*, February 25, 2019, accessed April 13, 2019, [https://media.nesta.org.uk/documents/Future\\_of\\_AI\\_and\\_education\\_v5\\_WEB.pdf](https://media.nesta.org.uk/documents/Future_of_AI_and_education_v5_WEB.pdf).

<sup>58</sup> Baker, Smith, and Nandra Anissa, "Educ-AI-tion Rebooted? Exploring the Future of Artificial Intelligence in Schools and Colleges."

<sup>59</sup> Matthew Lynch, "What Will AI Mean for Higher Education?" *The Advocate*, January 12, 2019, accessed April 13, 2019, <https://www.theadvocate.org/what-will-ai-mean-for-higher-education/>.

<sup>60</sup> Lynch, "What will AI mean for Higher Education?" 2019.

<sup>61</sup> Lynch, "What will AI mean for Higher Education?" 2019.

<sup>62</sup> Ibid.

System-facing platforms help to inform decision-making by those managing and administrating schools.<sup>63</sup> System-facing tools require sharing of data between schools and colleges (rather than within a single organization).<sup>64</sup> System-facing tools are used for a wider range of tasks than educator or learner facing tools, with application ranging from organizing timetables to predicting school inspections.<sup>65</sup>

### ***AI to Enhance Social Skills***

AI is also being used to enhance social skills, especially those of children with special needs. For example, Brainpower is addressing the issue of autism through the use of computerized glasses, which a child or adult wears and through which he or she can hear feedback tailored to the situation.<sup>66</sup> That feedback may include digital coaching on facial expressions, when to look at people, feedback on the user's own state of stress or anxiety, and much more.<sup>67</sup>

### ***AI in Building Career Skills***

In addition, AI is helping high school students build career skills through the use of GPA calculators and language learning applications. Building AI expertise through higher education and research is one of the main approaches used by governments to address respective skill gaps.<sup>68</sup> Duolingo is one such language learning application, powered by artificial intelligence, that has the ability to adapt to thousands of possible answers, catering to individual learner's needs and learning styles.<sup>69</sup>

### ***Potential Challenges***

Although AI in education may be streamlining the work that teachers once laboriously undertook by hand, AI may also be used for nefarious purposes, which could result in human rights challenges. One of the most significant concerns among educators is the likelihood that students

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<sup>63</sup> Baker, Smith, and Nandra Anissa, "Educ-AI-tion Rebooted? Exploring the Future of Artificial Intelligence in Schools and Colleges."

<sup>64</sup> Baker, Smith, and Nandra Anissa, "Educ-AI-tion Rebooted? Exploring the Future of Artificial Intelligence in Schools and Colleges."

<sup>65</sup> Ibid.

<sup>66</sup> Sahin, Ned, "Autism Product Suite," *Brain Power*, April 04, 2019, accessed April 19, 2019, <http://www.brainpower.com/autism/>.

<sup>67</sup> Sahin, Ned. "Autism Product Suite," 2019.

<sup>68</sup> "The Challenges and Opportunities of Artificial Intelligence in Education," *UNESCO*, March 7, 2019, accessed April 22, 2019, <https://en.unesco.org/news/challenges-and-opportunities-artificial-intelligence-education>.

<sup>69</sup> "Duolingo Bots: Learn a Language with Conversational Bots," *Duolingo Bots*, accessed April 13, 2019, <http://bots.duolingo.com/>.

will use AI to game educational systems, and ultimately to cheat. For instance, today, turning to Google for answers has become more natural than figuring out an answer without the aid of a search engine.

Machine learning data, algorithms and other design choices that shape AI systems may also reflect and amplify existing cultural prejudices and inequalities.<sup>70</sup> For example, AI-based tools may affiliate the words ‘female’ and ‘woman’ with arts and humanities occupations and with homemaking, while ‘male’ and ‘man’ may be correlated with math and engineering professions, skewing the job opportunities or classroom opportunities provided to various applicants.<sup>71</sup>

Privacy may also be implicated. Many AI-based applications record voices, storing them on the technology provider's server.<sup>72</sup> Audio recordings that include a child’s voice are defined as personal information under COPPA, though there is a narrowly defined exception, and thus should be subject to heightened protection.<sup>73</sup> School districts’ legal counsel can provide guidance on the application of federal and state laws and regulations regarding student data privacy.<sup>74</sup>

There is also a possibility that some of these technologies will only be available in relatively wealthier societies, or to relatively elite children. As most AI-enabled devices come at a price, there is a high risk of exacerbating a geographic and income-based educational divide.

### ***The Path Forward***

With great progress comes immense responsibility.<sup>75</sup> Integrating machine learning and AI in education requires both foresight and reflection in overcoming potential problems.<sup>76</sup> While

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<sup>70</sup> Alex Fefegha, "Racial Bias and Gender Bias Examples in AI Systems," *Medium*, September 02, 2018, accessed April 13, 2019, <https://medium.com/thoughts-and-reflections/racial-bias-and-gender-bias-examples-in-ai-systems-7211e4c166a1>.

<sup>71</sup> Hannah Devlin, "AI Programs Exhibit Racial and Gender Biases, Research Reveals," *The Guardian*, April 13, 2017, accessed April 13, 2019, <https://www.theguardian.com/technology/2017/apr/13/ai-programs-exhibit-racist-and-sexist-biases-research-reveals>.

<sup>72</sup> Patience Wait, "AI in Classrooms Can Raise Red Flags on Privacy," *EdScoop*, November 12, 2018, accessed April 13, 2019, <https://edscoop.com/artificial-intelligence-classrooms-privacy-issues-cosn/>.

<sup>73</sup> Patience, "AI in Classrooms Can Raise Red Flags on Privacy."

<sup>74</sup> Patience, "AI in Classrooms Can Raise Red Flags on Privacy."

<sup>75</sup> Lynch, Matthew, "3 Ways That AI Brings Out the Worst in Education," *The Tech Advocate*, March 15, 2019, accessed April 13, 2019, <https://www.thetechadvocate.org/3-ways-that-ai-brings-out-the-worst-in-education/>.

<sup>76</sup> Lynch, Matthew, "3 Ways That AI Brings Out the Worst in Education."



educators' use of AI strives to improve the lives of children, there must also be efforts to protect against unintended harmful effects, such as reinforcing existing biases or misappropriating data.

Access to AI literacy will also be key. Children need to be trained in how to understand the risks and opportunities that come with AI-driven technologies. To do this, children can be taught coding and statistics, as well as ethical principles and human rights law. Numeracy and literacy, including data literacy, can be incorporated as part of the education system. Problem solving provides powerful ways to help students understand their relationship to knowledge and to hone their ability to challenge and question.

People must also be taught to use AI safely and effectively. For example, Finland has introduced AI to its citizens in an effort to help them better understand the potential of artificial intelligence and what future implications AI has for the choices they make today.<sup>77</sup>

### **Robots in Education**

Another area where the right to education is at issue is the use of deep learning robots, which introduce various benefits for children, such as personalized learning and remote learning. It is estimated that the global educational robot market will reach USD 6.05 bn by 2020.<sup>78</sup> Robots' use in education has already started transforming traditional methods and practices in education, therefore development in this field requires urgent attention from various stakeholders such as governments, academia, teachers, NGOs and parents.<sup>79</sup> Educational robots are being brought to various settings such as school and home in a way that alters how children learn, interact and develop their personalities.<sup>80</sup> Robotics, as its own field, is having transformative effect due to the AI features that are embedded.<sup>81</sup>

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<sup>77</sup> Lynch, Matthew, "Education Needs AI as a Mind Multiplier," *The Tech Advocate*, April 09, 2019, accessed April 13, 2019, <https://www.thetechadvocate.org/education-needs-ai-as-a-mind-multiplier/>.

<sup>78</sup> "Global Research and Analytics Firm," *Aranca*. July 20, 2017, accessed April 15, 2019, <https://www.aranca.com/knowledge-library/blogs-and-opinions/investment-research/robots-in-the-global-education-industry>.

<sup>79</sup> Toh et al. *A Review on the Use of Robots in Education and Young Children*, No.2 ed, Vol. 19, *International Forum of Educational Technology and Society*, 148–63.

<sup>80</sup> Andri Ioannou, Maria Christofi, and Emily Andreou, "Pre-schoolers' Interest and Caring Behaviour Around a Humanoid Robot," *SpringerLink*, January 28, 2015, Accessed April 13, 2019, <https://link.springer.com/article/10.1007/s11528-015-0835-0>.

<sup>81</sup> Andri Ioannou, Maria Christofi, and Emily Andreou, "Pre-schoolers' Interest and Caring Behaviour Around a Humanoid Robot."

While it may seem like robots with AI features have been around for a while, up until recently largely, robotics largely used classical control theory, which hard codes the steps that a robot takes to perform certain actions.<sup>82</sup> Huge advancements in deep learning areas such as computer vision, natural language processing and reinforcement learning, are now being applied to robots, changing the field. Deep learning allows for an element of “human-like” interaction that was previously impossible. Further, computer vision can be used for a robot to understand the world around it, natural language processing can be used to converse with others, and reinforcement learning can be used to perform tasks without hard coding. While there is still a huge amount of work to be done to realize the full potential of deep learning and robotics, the field is quickly transforming.<sup>83</sup>

### ***Impacts of Educational Robots on Children***

Much of the current literature focuses on the positive effects of educational robots. The most commonly cited positive effects on children’s behavior and development are (i) enhancement of academic skills, (ii) improvement of social skills, especially for children with disabilities, and (iii) enabling remote education.<sup>84</sup>

However, along with positive impacts, educational robots may pose negative impacts. For example, they may foster (i) lack of human interaction and (ii) manipulation and abuse, and may negatively impact children through (iii) lack of efficient resources and poor design choices.<sup>85</sup> While these effects are not exhaustive, they are among the most prominent. Ultimately, current literature on educational robots falls short in comprehensively addressing both positive and negative effects— suggesting that more social science research is needed in this area.<sup>86</sup>

### **Positive Impacts on Children’s Rights**

Toh et al. (2016) propose a helpful taxonomy of the positive implications of the use of educational robots in academia, grouping them into four themes.<sup>87</sup> The first theme is ‘problem-

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<sup>82</sup> Ibid.

<sup>83</sup> Ibid.

<sup>84</sup> Toh et al. *A Review on the Use of Robots in Education and Young Children*, 148–63.

<sup>85</sup> Toh et al. *A Review on the Use of Robots in Education and Young Children*, 148–63.

<sup>86</sup> Toh et al. *A Review on the Use of Robots in Education and Young Children*, 148–63.

<sup>87</sup> Ibid, 148–63.

solving abilities, team skills and collaboration,’ where robots are used as a tool to advance education. Researchers believe that the use of robots in various teaching activities encourages children to become team members and helps them improve problem solving skills.<sup>88</sup> The second theme Toh et al. set forth is ‘achievement scores, science concepts and sequencing skills,’ where robots are used as a tool to help student become more familiar with science<sup>89</sup> as well as improve their analytic skills.<sup>90</sup> The third theme is ‘language skills development,’ where robots are used as a tool, tutor and friend to teach children foreign language, which is especially important in countries where qualified teachers are scarce.<sup>91</sup> Further, Moriguchia et al. (2011) found that children can learn words from robots easily, which lifts the barriers that are created by the lack of qualified teachers.<sup>92</sup> The last theme Toh et al. (2016) introduce is the active ‘participation’ of children in education through the use of robots, which discusses that robots can grab children’s attention easier than traditional means due to children becoming more willing to carefully listen to what the robot has to teach.<sup>93</sup> In addition, various studies have shown that children become more motivated to learn and tend to be more social when educated via robots.<sup>94</sup> Tanaka and Matsuzoe also found that robots can promote learning by encouraging children to teach the

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<sup>88</sup> Jon-Chao Hong, Kuang-Chao Yu, and Mei-Yung Chen, "Collaborative Learning in Technological Project Design," *International Journal of Technology and Design Education* 21, no. 3 (May 22, 2010): 335-347, doi:10.1007/s10798-010-9123-7; Elvis Mazzoni and Martina Benvenuti, "A Robot-Partner for Preschool Children Learning English Using Socio-Cognitive Conflict," February 13, 2015, accessed November 4, 2018, [https://www.researchgate.net/publication/272091261\\_A\\_Robot-Partner\\_for\\_Preschool\\_Children\\_Learning\\_English\\_using\\_Socio-Cognitive\\_Conflict](https://www.researchgate.net/publication/272091261_A_Robot-Partner_for_Preschool_Children_Learning_English_using_Socio-Cognitive_Conflict): 474–485; Moshe Barak and Yair Zadok, "Robotics Projects and Learning Concepts in Science, Technology and Problem Solving," *International Journal of Technology and Design Education* 19, no. 3 (November 20, 2007): 289-307. doi:10.1007/s10798-007-9043-3; Michael W. Varney, Abed Janoudi, Dean M. Aslam, and Diane Graham, "Building Young Engineers: TASEM for Third Graders in Woodcreek Magnet Elementary School," *IEEE Transactions on Education* 55, no. 1 (February 2012): 78-82. doi:10.1109/te.2011.2131143; Chih-Wei Chang, Jih-Hsien Lee, Po-Yao Chao, Chin-Yeh Wang, and Gwo-Dong Chen, "Exploring the Possibility of Using Humanoid Robots as Instructional Tools for Teaching a Second Language in Primary School," *Exploring the Possibility of Using Humanoid Robots as Instructional Tools for Teaching a Second Language in Primary School*, 2010, 13-24.

<sup>89</sup> Bradley S. Barker and John Ansorge, "Robotics as a Means to Increase Achievement Scores in an Informal Learning Environment," *Journal of Research on Technology in Education*: 229-43, accessed November 15, 2018, <https://files.eric.ed.gov/fulltext/EJ768878.pdf>: 229-243.

<sup>90</sup> Kate Highfield, "Robotic Toys as a Catalyst for Mathematical Problem Solving," 2010, accessed October 15, 2018, <https://eric.ed.gov/?id=EJ891802>: 22-27.

<sup>91</sup> Toh et al. "A Review on the Use of Robots in Education and Young Children," 2016.

<sup>92</sup> Moriguchi et al. "Can Young Children Learn Words From a Robot?" *Interaction Studies*, January 2011, accessed December 12, 2018, doi:10.1075/is.12.1.04mor.

<sup>93</sup> Toh et al. "A Review on the Use of Robots in Education and Young Children," 2016.

<sup>94</sup> Chang et al. "Exploring the Possibility of Using Humanoid Robots as Instructional Tools for Teaching a Second Language in Primary School."

robot, which introduces a new learning model.<sup>95</sup> Finally, tutor robots that employ deep learning make it easy to personalize education according to children's specific needs, including enabling children to learn at their own speed.<sup>96</sup> Even though the current literature does not specifically address the positive effects of educational robots on children's rights, the right to education may be seamlessly advanced by this technology if applied with a proper sensitivity.

### ***Social skills***

The second area where the use of robots in children's education can have positive effects is the development of social skills. As mentioned above, robots easily capture children's attention, which motivates them to develop personal relations with robots in various ways.<sup>97</sup> The quality of those interactions varies due to certain factors. One of the factors is how children situate the robots because, as Chernyak and Gary discuss, how technologies are presented to children matters in forming their social behavior.<sup>98</sup> For example, autonomous dogs and remote-controlled robot dogs create different effects on children.<sup>99</sup> Ioannou also shows that children often demonstrate caring behavior to robots, such as kissing and hugging, loving behaviors innate to humans.<sup>100</sup> It is important to acknowledge that this propensity could be used to educate children how to act appropriately in disparate contexts.

How robots are being used to develop social skills is especially important for children with autism spectrum disorders (ASD) who struggle to develop social skills.<sup>101</sup> Kim et al. (2013) found that children with ASD are tend to speak to a robot more than they do with an adult and

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<sup>95</sup> Fumihide Tanaka and Shizuko Matsuzoe, "Children Teach a Care-Receiving Robot to Promote Their Learning: Field Experiments in a Classroom for Vocabulary Learning," *Journal of Human-Robot Interaction*1, no. 1 (2012): 78-95, doi:10.5898/jhri.1.1.tanaka.

<sup>96</sup> Daniel Leyzberg et al., "Personalizing Robot Tutors to Individuals Learning Differences," *Proceedings of the 2014 ACM/IEEE International Conference on Human-robot Interaction - HRI 14*, March 6, 2014, 423-30, accessed April 15, 2019, doi:10.1145/2559636.2559671.

<sup>97</sup> Andri Ioannou, Maria Christofi, and Emily Andreou, "Pre-schoolers' Interest and Caring Behaviour Around a Humanoid Robot."

<sup>98</sup> Nadia Chernyak and Heather E. Gary, "Children's Cognitive and Behavioral Reactions to an Autonomous Versus Controlled Social Robot Dog." *Early Education and Development*27, no. 8 (2016): 1175-189, doi:10.1080/10409289.2016.1158611.

<sup>99</sup> Chernyak and Gary, "Children's Cognitive and Behavioral Reactions to an Autonomous Versus Controlled Social Robot Dog."

<sup>100</sup> Ioannou, Christofi, and Andreou, "Pre-schoolers' Interest and Caring Behaviour Around a Humanoid Robot."

<sup>101</sup> Christena Blauvelt Harper, Jennifer B. G. Symon, and William D. Frea, "Recess Is Time-in: Using Peers to Improve Social Skills of Children with Autism," *Journal of Autism and Developmental Disorders*, no. 5 (September 14, 2007): 815-26, accessed April 15, 2019, doi:10.1007/s10803-007-0449-2.

that the robots gather children's attention more easily.<sup>102</sup> Further, a study has shown that robots can be used to produce positive outcomes in individual therapy of children with severe disabilities through using play methods.<sup>103</sup> The study concludes that through the use of robots in rehabilitation of children with severe disabilities, there have been improvements in movement and motor skills, social skills, and in movement functions, and in interpersonal interactions and relationship development.<sup>104</sup> From the children's rights perspective, the right to education, the right to special treatment, and the right to flourish may be advanced by this technology.<sup>105</sup>

### ***Remote education***

Remote education makes education more accessible to children who cannot go to school because of an illness, due to the lack of necessary means, or otherwise.<sup>106</sup> Children who miss school or are otherwise segregated often suffer from academic failure, isolation from peers, or become depressed.<sup>107</sup> Remote education through the use of educational robots minimizes these adversarial outcomes. For instance, telepresence robots help children engage with school and foster inclusive education by bringing education to children's feet.<sup>108</sup> From the children's rights perspective, again, remote education capabilities can improve the right to education.

## **Negative Impacts on Children's Rights**

### ***Lack of human interaction***

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<sup>102</sup>Elizabeth S. Kim et al. "Social Robots as Embedded Reinforcers of Social Behavior in Children with Autism," *Journal of Autism and Developmental Disorders*43, no. 5 (October 31, 2012): 1038-049, accessed April 19, 2019, doi:10.1007/s10803-012-1645-2.

<sup>103</sup> Gernot Kronreif et al. "PlayROB - Robot-Assisted Playing for Children with Severe Physical Handicaps," *9th International Conference on Rehabilitation Robotics, 2005 ICORR 2005*, July 1, 2005, accessed June 28, 2005, doi:10.1109/icorr.2005.1501082.

<sup>104</sup> Renée J.F. Van Den Heuvel, Monique A. Lexis, and Luc P. De Witte, "Robot ZORA in Rehabilitation and Special Education for Children with Severe Physical Disabilities," *International Journal of Rehabilitation Research*40, no. 4 (December 01, 2017): 353-59, doi:10.1097/mrr.0000000000000248.

<sup>105</sup> Van Den Heuvel, Lexis, and De Witte, "Robot ZORA in Rehabilitation and Special Education for Children with Severe Physical Disabilities."

<sup>106</sup> Veronica Newhart, Mark Warschauer, and Leonard Sender, "Virtual Inclusion via Telepresence Robots in the Classroom: An Exploratory Case Study," *The International Journal of Technologies in Learning*23, no. 4 (2016): 9-25. doi:10.18848/2327-0144/cgp/v23i04/9-25; 9-25.

<sup>107</sup> Kieron Sheehy and Ashley A. Green, "Beaming Children Where They Cannot Go: Telepresence Robots and Inclusive Education: An Exploratory Study," *Ubiquitous Learning: An International Journal*3, no. 1 (2011): 135-46, doi:10.18848/1835-9795/cgp/v03i01/40261.

<sup>108</sup> Newhart et al., 2016; Sheehy and Green, 2011.

Human interaction is an important element in children's education because children learn through physical and emotional contact. Through such interactions, children learn how to act in various situations, discover the moral dimensions of relations, and develop their own morality. However, when children learn from robots, which lack human characteristics, they might not learn how to act properly around other human beings, or even to act like a human. Serholt states that even though robots may have humanoid appearances, they lack advanced social skills and cooperation, which can create frustration and disrupt interactions when children realize that robots cannot properly interpret their intentions.<sup>109</sup> Furthermore, robots do not embody human compassion, understanding and patience.<sup>110</sup> These elements are critical to the learning-teaching process because children make mistakes and it is important to have someone on hand who can understand the mistake thoroughly and approach the child with care and in a nuanced way. Children's educational processes are likely to require exceptions and negotiation; however, educational robots may not be in a position to comprehend exceptions, leading to unwanted outcomes. Therefore, from a child's rights perspective, the right to flourish and the right to education might be negatively impacted.

### ***Manipulation and abuse***

The right to be protected from exploitation and abuse may also be negatively impacted by educational robots. Studies show that children develop human-like feelings towards robots.<sup>111</sup> MIT's deep learning therapy robot NAO looks like a humanoid robot but children with ASD felt strongly connected and even told the robot 'I love you!'<sup>112</sup>. Becky Ham from MIT Media Lab states that children with ASD perceived the robot as a human rather than a toy, which made them act respectfully towards NAO.<sup>113</sup> Given how vulnerable children are, any mistake—or even a break—in this sensitive relation could be disruptive. Therefore, relation dynamics between children and robots should be closely supervised and analyzed.

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<sup>109</sup> Sofia Serholt, "Breakdowns in Childrens Interactions with a Robotic Tutor: A Longitudinal Study," *Computers in Human Behavior*, April 2018: 250-64, doi:10.1016/j.chb.2017.12.030.

<sup>110</sup> Sofia Serholt, "Breakdowns in Children's Interactions with a Robotic Tutor: A Longitudinal Study."

<sup>111</sup> Nadia Chernyak and Heather E. Gary, "Children's Cognitive and Behavioral Reactions to an Autonomous Versus Controlled Social Robot Dog," *Early Education and Development* 27, no. 8 (2016): 1175-189, doi:10.1080/10409289.2016.1158611.

<sup>112</sup> Becky Ham, "Personalized "Deep Learning" Equips Robots for Autism Therapy," *MIT News*, June 27, 2018, accessed April 20, 2019, <http://news.mit.edu/2018/personalized-deep-learning-equips-robots-autism-therapy-0627>.

<sup>113</sup> Ham, "Personalized "Deep Learning" Equips Robots for Autism Therapy."

Lemaignan et al. conducted a study in which children were explicitly manipulated by educational robots, to observe how children interpreted the manipulative acts.<sup>114</sup> Some children were able to interpret that the robot was misbehaving by disobeying or making explicit mistakes, whereas other children believed the misbehavior was due to the robots being tired or angry.<sup>115</sup> When children find robots interesting, cute and fun, or are otherwise drawn to them, they may be likely to start copying them, as they do their parents or other proximate people. This might become especially problematic when human rights values are not properly embedded into robots' design. Hacking attempts by adversaries could also lead to manipulation and abuse. In such cases, the potential harms to children are limited only by the hacker's imagination and capabilities.

### ***Lack of efficient resources and poor design choices***

Lack of efficient resources, such as having all the relative stakeholders contribute to the design and implementation process of educational robots, and lack of efficiently diverse datasets for the deep learning algorithms used for educational robots might pose adversarial effects on children's rights. For instance, the protection of children with disabilities may be impacted negatively if a lack of resources is not eliminated. Most of the studies we examined lay out the positive impacts on children with ASD or children with severe physical disabilities, however, they fall short in discussing the possible negative outcomes. When relevant stakeholders are not included in the software and hardware design process, unwanted outcomes are likely. This is because children with special needs might encounter detrimental results that were not envisioned if the necessary expertise was not brought to the design and implementation process.

Another resource issue is the potential lack of efficient datasets. Becky Ham from MIT Media Lab states that each child with ASD differs from others, so there is no one-size-fits all therapy.<sup>116</sup> She further stresses the importance of applying deep learning technologies to robots and points out that there is not enough data to adequately feed the deep learning robot NAO.<sup>117</sup> Engineers who do not acknowledge this fact will likely develop a one-size-fits all approach that may have

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<sup>114</sup>Séverin Lemaignan et al. "You're Doing It Wrong! Studying Unexpected Behaviors in Child-Robot Interaction," *Social Robotics Lecture Notes in Computer Science*, 2015, 390-400, doi:10.1007/978-3-319-25554-5-39.

<sup>115</sup>Lemaignan et al. "You're Doing It Wrong! Studying Unexpected Behaviors in Child-Robot Interaction."

<sup>116</sup>Becky Ham, "Personalized "Deep Learning" Equips Robots for Autism Therapy," *MIT News*, June 27, 2018, accessed April 20, 2019, <http://news.mit.edu/2018/personalized-deep-learning-equips-robots-autism-therapy-0627>.

<sup>117</sup>Becky Ham, "Personalized "Deep Learning" Equips Robots for Autism Therapy."

destructive impacts. This is because, as discussed above, although deep learning can produce personalized education for a child, in a majority of cases the technical capabilities are quite limited.<sup>118</sup>

Appropriate and nonbiased design is crucial for beneficial outcomes. As discussed above, software design should include all relevant stakeholders, otherwise, non-inclusive design processes could create bigger problems than they are trying to solve. In the context of educational robots, for example, this can include poor learning outcomes, worsened academic skills, discrimination, and bias. In the research we reviewed, engineers and designers tended to exclude teachers, health care professionals, and parents from their design process, yet all of these stakeholders have critical and relevant expertise. For instance, while families may have the most protective approach towards the design process, teachers may have more technical expertise in teaching methodologies. Taking these different approaches into account is likely to create a value embedded design that increases the likelihood of positively benefitting children's education and development.

In addition, hardware design choices can also affect the quality and usability of the product. As Toh et al. state, design frequently comes last in the development process and there is often not enough importance allocated to it.<sup>119</sup> Woods,<sup>120</sup> and Sullivan & Bers<sup>121</sup> studies state that design choices determine how robots are perceived and how children interact with them. For instance, as Chernyak and Gary have stated, even autonomous and remote-controlled robot dogs create different responses from children.<sup>122</sup> This is likely because autonomous robots are more likely perceived as "real" dogs. Finally, when robots are designed to appeal to children of one gender, this may exclude or diminish interest by children of other genders. Thus, inclusive design can be key to preventing negative effects, such as gender discrimination.

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<sup>118</sup> Ibid.

<sup>119</sup> Toh et al.

<sup>120</sup> Sarah Wood, "Exploring the Design Space of Robots: Children's Perspectives," *Interacting with Computers* 18, no. 6 (2006): 1390-418, doi:10.1016/j.intcom.2006.05.001.

<sup>121</sup> Amanda Sullivan and Marina Umaschi Bers, "Dancing Robots: Integrating Art, Music, and Robotics in Singapore's Early Childhood Centers," *International Journal of Technology and Design Education* 28, no. 2 (2017): 325-46, doi: 10.1007/s10798-017-9397-0.

<sup>122</sup> Nadia Chernyak and Heather E. Gary, "Children's Cognitive and Behavioral Reactions to an Autonomous Versus Controlled Social Robot Dog," *Early Education and Development* 27, no. 8 (2016): 1175-189, doi:10.1080/10409289.2016.1158611.



## **AI and Surveillance**

Automated surveillance technologies are being deployed with various purposes, from developed countries to developing countries. Automated surveillance is especially booming due to the advance of machine learning and deep learning techniques. These techniques are being used for real-time facial recognition, which seems to promise a lot of benefits to those actors who have access to the data gathered. Along with private entities, law enforcement and other government agencies are among the first actors to deploy automated surveillance systems. However, even though automated surveillance systems promise to bring various benefits like enhanced security, when in wrong hands, these systems can violate civil liberties.<sup>123</sup> These concerns become even more worrisome when automated surveillance is directed at children, not just because biometric information collected through cameras falls under the sensitive data category, but also because of children's heightened vulnerability.<sup>124</sup> Further, emerging technologies like those used for automated surveillance are likely to affect children more than adults because children are in the process of forming their lives and personalities, unlike adults who have already built their lives and may be more resistant to changing behavior due to external sources.<sup>125</sup> Automated surveillance directed at children may negatively effect their experiences, in turn impacting their personalities.<sup>126</sup> Surveillance applications are not just likely to violate children's rights, but also raise ethical and regulatory concerns. Within the scope of this case study, we look into automated surveillance systems' effects on children's rights.<sup>127</sup>

Automated surveillance of children might be of interest to and use by various actors like teachers, family members, schools, and governments. It is important to differentiate *surveillance by whom*, because all of these actors are likely to have different purposes, leading to different

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<sup>123</sup> "Pressure Mounts on Amazon, Microsoft, and Google Against Selling Facial Recognition to Government," *American Civil Liberties Union*, accessed April 15, 2019, <https://www.aclu.org/news/pressure-mounts-amazon-microsoft-and-google-against-selling-facial-recognition-government>.

<sup>124</sup> Chad Marlow, "Student Surveillance Versus Gun Control: The School Safety Discussion We Aren't Having," *American Civil Liberties Union*, March 4, 2019, accessed April 15, 2019, <https://www.aclu.org/blog/privacy-technology/surveillance-technologies/student-surveillance-versus-gun-control-school>.

<sup>125</sup> Marlow, "Student Surveillance Versus Gun Control: The School Safety Discussion We Aren't Having."

<sup>126</sup> Ibid.

<sup>127</sup> Ibid.

effects on children. For instance, surveillance by family members is likely to be less intrusive for children due to its childcare orientation, whereas surveillance by schools or governments may be focused on keeping order or enforcing rules. These practices are not necessarily evil; however, restrictive environments may negatively impact beneficial risk-taking. Below, we spotlight examples of the use of facial recognition systems directed at children from around the globe. Then we analyze the current literature to set forth the possible negative and positive effects of automated surveillance on children's rights.

### **Current Applications of Automated Surveillance Systems**

Traditional child-oriented surveillance applications have become seamlessly advanced with the advent of facial recognition, which allows children to be tracked, categorized and analyzed in many ways. Facial recognition systems, through automated facial image analysis,<sup>128</sup> are capable of detecting,<sup>129</sup> classifying,<sup>130</sup> and recognizing<sup>131</sup> faces, and more. As Buolamwini & Gebru<sup>132</sup> state, some works have been advanced so that they can now identify emotions from face images,<sup>133</sup> determine men's sexuality,<sup>134</sup> and determine individual characteristics.<sup>135</sup> These improvements have helped make facial recognition systems ubiquitous.

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<sup>128</sup>Joy Buolamwini and Timnit Gebru, "Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification," *Proceedings of Machine Learning Research*, 2018, 1-15, accessed April 10, 2019, <http://proceedings.mlr.press/v81/buolamwini18a/buolamwini18a.pdf>.

<sup>129</sup>Stefanos Zafeiriou, Cha Zhang, and Zhengyou Zhang, "A Survey on Face Detection in the Wild: Past, Present and Future," *Computer Vision and Image Understanding* 138 (September 2015): 1-24, doi:10.1016/j.cviu.2015.03.015; Markus Mathias, Rodrigo Benenson, Marco Pedersoli, and Luc Van Gool, "Face Detection without Bells and Whistles," *European Conference on Computer Vision*, 2014, 720-35, doi:10.1007/978-3-319-10593-2\_47: 720-735

<sup>130</sup>Daniel Reid et al. "Soft Biometrics for Surveillance: An Overview," *Handbook of Statistics - Machine Learning: Theory and Applications Handbook of Statistics*, 2013, 327-52, doi:10.1016/b978-0-444-53859-8.00013-8; Rasmus Rothe, Radu Timofte, and Luc Van Gool, "Deep Expectation of Real and Apparent Age from a Single Image Without Facial Landmarks," *International Journal of Computer Vision* 126, no. 2-4 (August 10, 2016): 144-57. doi:10.1007/s11263-016-0940-3.

<sup>131</sup>Omkar M Parkhi, Andrea Vedaldi, and Andrew Zisserman, "Deep Face Recognition - University of Oxford," accessed November 20, 2018, <http://www.robots.ox.ac.uk/~vgg/publications/2015/Parkhi15/parkhi15.pdf>; Yandong Wen, Kaipeng Zhang, Zhifeng Li, and Yu Qiao, "A Discriminative Feature Learning Approach for Deep Face ..." *Shenzhen Institutes of Advanced Technology*, accessed December 16, 2018, <http://ydwen.github.io/papers/WenECCV16.pdf>: 499-515

<sup>132</sup>Joy Buolamwini and Timnit Gebru, "Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification," 2018.

<sup>133</sup>Afshin Dehghan et al. "Dager: Deep Age, Gender and Emotion Recognition Using ..." February 14, 2017, accessed November 20, 2018, <https://arxiv.org/pdf/1702.04280.pdf>; Ramprakash Srinivasan et al. "A Neural Basis of Facial Action Recognition in Humans ..." April 20, 2016, accessed January 18, 2018, <http://www.jneurosci.org/content/36/16/4434>.

Whereas in the past, traditional surveillance methods were labor intensive and yielded limited information about children, advances in automation has enabled the introduction of always-on, real time mass surveillance. Especially in those countries that are prone to suppress their citizens, facial recognition offers vast varieties of intrusive surveillance capabilities. Some actors provide positive feedback from society as to the application of these technologies. This section lays out examples of current uses of facial recognition with children, as performed by various actors such as governments, schools, private entities and families. Some of the underlying technologies have been fully deployed, while some are prototypes.

- **Record special moments:** In 2017 Google introduced Google Clips, which is a digital camera that can learn faces and tag memorable moments that play out in geographic space through its machine learning capabilities. The product is advertised to families with the promise of not missing a moment of their children's lives. The product automatically chooses which moments to capture and keep, so parents do not have to worry about being behind a camera. Further, whoever pairs their mobile phone can activate Google Clips any time, and start recording. When the product is recording, a white little light appears to indicate that it is active. Google states that the motion photos captured by Google Clips are stored locally, so only the device and mobile phone paired with the device has access to the data.<sup>136</sup>
- **Detect abnormal behaviors in kindergartens:** In 2017 in China, a research team designed a prototype facial recognition system to detect acts of child abuse in kindergartens in real time.<sup>137</sup> A Chinese team alleged that their algorithms would be able to analyze a live video stream to detect abnormal behaviors like punching or slapping. The Chinese team further stated that the

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<sup>134</sup> Yilun Wang and Michal Kosinski, "Deep Neural Networks Are More Accurate Than Humans at Detecting Sexual Orientation from Facial Images," *Stanford University*, February 15, 2017, accessed December 3, 2018, <https://osf.io/zn79k/>.

<sup>135</sup> Xiaolin Wu and Xi Zhang, "Automated Inference on Criminality Using Face Images," November 13, 2016, accessed January 16, 2019, <https://arxiv.org/pdf/1611.04135v1.pdf>.

<sup>136</sup> Ben Popper, "Google's New Clips Camera Is Invasive, Creepy, and Perfect for a Parent like Me," *The Verge*, October 05, 2017, accessed April 10, 2019, <https://www.theverge.com/2017/10/5/16428708/google-clips-camera-privacy-parents-children>.

<sup>137</sup> Stephen Chen, "Will This AI System Keep Your Kindergarten Toddlers Safe?" *South China Morning Post*, November 30, 2017, accessed April 12, 2019, <https://www.scmp.com/news/china/society/article/2122137/scientists-work-ai-child-minder-system-keep-eye-preschools>.

system required more data analysis and algorithm training before it went live.<sup>138</sup> As a response to this technology, a senior police officer said, “artificial intelligence has a pair of eyes that never blinks and a head that never gets tired,” demonstrating their eagerness to deploy these technologies for detection of possible abnormal activities.<sup>139</sup> However, the police officer added the caveat that, even though automated surveillance cameras might eliminate some of the negative effects of a lack of monitoring by the dedicated staff, facial recognition still cannot solve the problem of child abuse problem by itself.<sup>140</sup>

- ***Find missing children:*** In 2018 in India, Delhi police were able to identify nearly 3000 missing children in four days with the help of their new facial recognition system.<sup>141</sup> This system was able to compare the posted photos of missing children on a nationwide online data base with a database in which police, child welfare agencies and citizens posted photos or videos.<sup>142</sup> Through the use of the facial recognition system, thousands of children were allegedly located.
- ***Detect abnormal activities in schools:*** In 2018 in New York, Lockport schools invested in facial recognition technologies with the promise of unprecedented levels of security.<sup>143</sup> The main motivation was the idea of schools always needing to be on their guard because of school violence. The system can alert officials if a person whose photo has been uploaded into the system (criminal, offender etc.) enters the school.<sup>144</sup> It can also detect guns that are visible to the cameras, and alert officials to their presence. Further, if a disruptive student’s photo is uploaded into the system, school officials can track the student back sixty days. Lockport school officials

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<sup>138</sup> Chen, “Will This Artificial Intelligence System Keep Your Kindergarten Toddlers Safe?”

<sup>139</sup> Chen, “Will This Artificial Intelligence System Keep Your Kindergarten Toddlers Safe?”

<sup>140</sup> Ibid.

<sup>141</sup> Anthony Cuthbertson, "Police Trace 3,000 Missing Children in Just Four Days Using Facial Recognition Technology," *The Independent*, April 24, 2018, accessed April 17, 2019, <https://www.independent.co.uk/life-style/gadgets-and-tech/news/india-police-missing-children-facial-recognition-tech-trace-find-reunite-a8320406.html>.

<sup>142</sup> "How Delhi Police Tracked 3,000 Missing Children in Only Four Days with Facial Recognition System," *India Today*, April 28, 2018, accessed April 20, 2019, <https://www.indiatoday.in/education-today/gk-current-affairs/story/facial-recognition-how-delhi-police-tracked-3-000-missing-children-in-only-four-days-1222341-2018-04-28>.

<sup>143</sup> Thomas Prohaska, "Lockport Schools Turn to State-of-the-art Technology to Beef up Security," *The Buffalo News*, May 20, 2018, accessed April 19, 2019, <https://buffalonews.com/2018/05/20/lockport-schools-turn-to-state-of-the-art-technology-to-beef-up-security/>.

<sup>144</sup> Prohaska, “Lockport Schools Turn to State-of-the-Art Technology to Beef up Security.”

stated that they will be interested in uploading the photo of students who violate codes of conduct in order to enhance school discipline.<sup>145</sup>

- **Analyze engagement of students in a classroom:** In 2018 in China, a high school announced that it was using facial recognition technology to analyze student's behaviors in the classroom, and to track their attendance.<sup>146</sup> This real-time facial recognition system scans the classroom every 30 minutes to analyze engagement based on six types of behaviors: "reading, writing, hand raising, standing up, listening to the teacher, and leaning on the desk."<sup>147</sup> The system can also identify seven moods, including happy, sad, afraid and angry, by simply analyzing a student's face. Then the system logs both the behavior and the facial expressions. The school's vice principal stated that even though the goal of the system is not yet clearly identified, currently it helps in "tracking student attendance and assisting teachers in refining their teaching methods."<sup>148</sup> While this technology can be used to benefit children and teachers, the system has the potential to be used to "surveil students and penalize those slacking off."<sup>149</sup>

### **Children's Rights at Stake**

Children are especially vulnerable to the potential negative effects of complex emerging technologies due to not being in a position to fully comprehend the implications of those technologies. Thus, automated child-oriented surveillance systems, which have vast capabilities with unclear purposes, raise many concerns regarding childrens' rights. Based on the examples above, following are the rights of the children that are most likely to be at risk due to the use of automated surveillance systems: the right to privacy, the right not to be subjected to discrimination, the right to flourish, and freedom of expression. As stated above, each of these rights may be affected at different levels, in accordance with the actor who has control over the automated surveillance system. Under this section, we lay out the concerns that are raised

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<sup>145</sup> Ibid.

<sup>146</sup> Liang Jun, "Facial Recognition Used to Analyze Students' Classroom Behaviors - People's Daily Online," *Facial Recognition Used to Analyze Students' Classroom Behaviors - People's Daily Online*, May 19, 2018, accessed April 14, 2019, <http://en.people.cn/n3/2018/0519/c90000-9461918.html>.

<sup>147</sup> Jun, "Facial Recognition Used to Analyze Students' Classroom Behaviors - People's Daily Online."

<sup>148</sup> Jun, "Facial Recognition Used to Analyze Students' Classroom Behaviors - People's Daily Online."

<sup>149</sup> Rich Haridy, "AI in Schools: China's Massive and Unprecedented Education Experiment," *New Atlas - New Technology & Science News*, May 28, 2018, accessed April 14, 2019, <https://newatlas.com/china-ai-education-schools-facial-recognition/54786/>.

regarding children's rights and examine how these concerns might change as the underlying actors change.

### ***The Right to Privacy***

Mass surveillance technologies like facial recognition can infringe the very essence of the right to privacy. The Privacy and Freedom of Expression in the Age of Artificial Intelligence (2018) report, in article 13, states that mass surveillance is a “disproportionate interference with privacy, while targeted surveillance may only be justified when it is prescribed by law, necessary to achieve a legitimate aim, and proportionate to the aim pursued.”<sup>150</sup> The level of this interference with privacy in the above-mentioned examples depends on factors like the actors involved, the transparency of the underlying system, transparency around use, etc. For instance, adverse effects on the right to privacy is at its lowest ebb when young children's special moments are being recorded by Google Clips with innocuous purposes like immortalizing their cute moments. However, this technology enables parents to constantly surveil their children because they can remotely control Google Clips and watch their children through Google Clips' eye. Especially for children over six, having Google Clips with them wherever they go might be problematically intrusive to their privacy, whereas for younger children the dangers may be less.

When schools deploy face recognition systems either to detect abnormal behaviors or measure student's attention, privacy invasions become more severe.<sup>151</sup> First, most of the privacy laws require opt-in involvement to the data processing, but with face recognition technologies, students and their parents may be deprived of their choices to both opt-in and opt-out, since schools are the ultimate actors to decide whether to deploy or not—further implicating their right to an education if they choose to avoid the system. A news reporter who provides an example from the European privacy law perspective stated that, “Facial recognition systems have no means of following the GDPR rules, so as such, we as society are automatically ‘opted-in’ and thus completely at the mercy of how our faces are being recorded, processed and stored by governmental, corporate or even privately deployed CCTV systems.”<sup>152</sup> Further, by whom these

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<sup>150</sup>Lorna Woods, "User Generated Content: Freedom of Expression and the Role of the Media in a Digital Age," *Privacy and Freedom of Expression In the Age of Artificial Intelligence*, April 11, 2018, 1-29. doi:10.1163/9789004229402\_008, 8.

<sup>151</sup> Marlow, “Student Surveillance Versus Gun Control: The School Safety Discussion We Aren't Having.”

<sup>152</sup> William Michael Carter, "Big Brother Facial Recognition Needs Ethical Regulations," *Phys.org*, July 23, 2018, accessed April 10, 2019, <https://phys.org/news/2018-07-big-brother-facial-recognition-ethical.html>.

technologies are being used, who has access to these technologies and with what purposes these technologies are being used is not most of the times clear, which result in intensifying the privacy invasions.<sup>153</sup> Due to the fact that most of the actors are not clear about their facial recognition data processing, one of the key principles of the GDPR, transparency, is most likely be violated. For instance, in Lockport’s example, it’s unclear whether federal or state agencies and police departments will have access to the database.<sup>154</sup> Also, automated surveillance systems blur the lines of ‘private’ school environments and involve others who are unknown to both parents and children. Knowing that someone who you do not know is constantly watching you, can harm an individual’s understanding of privacy and reasonable privacy expectations in school.<sup>155</sup> To illustrate, students might want to have private conversations at school with their peers or teachers, which might feel less private because of knowing there is an always-on facial recognition system following them.

The American Civil Liberties Union (ACLU), a non-profit organization, stated that schools “should be safe environments for students to learn and play,” where students experiment, test their ideas, freely interact with each other, and safely make their own choices.<sup>156</sup> They further state that pervasive automated monitoring and collecting of children’s sensitive information – such as their biometric data- “can turn students into perpetual suspects” that “exposes every aspect of a child’s life to unfair scrutiny.”<sup>157</sup> Such schools may be sending the message that they view “students as unpredictable, potential criminals who must have their faces scanned wherever they go.”<sup>158</sup> Who or what will children become after feeling that they are suspects or even criminals in the eyes of their school? The ACLU raises another problem of accuracy, which occurs when students are matched with wrong data: “False positives for a student entering school or going about their day can result in traumatic interactions with law enforcement, loss of class time, disciplinary action, and potentially a criminal record.”<sup>159</sup> This poses a high risk because

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<sup>153</sup> Carter, "Big Brother Facial Recognition Needs Ethical Regulations."

<sup>154</sup> Stefanie Coyle and John A. Curr III, "Facial Recognition Cameras Do Not Belong in Schools," *New York Civil Liberties Union*, April 05, 2019, accessed April 01, 2019, <https://www.nyclu.org/en/news/facial-recognition-cameras-do-not-belong-schools>.

<sup>155</sup> Marlow, “Student Surveillance Versus Gun Control: The School Safety Discussion We Aren’t Having.”

<sup>156</sup> Toni Smith-Thompson, "Here's What Happens When We Allow Facial Recognition Technology in Our School," *American Civil Liberties Union*, August 15, 2018, accessed April 23, 2019, <https://www.aclu.org/blog/privacy-technology/surveillance-technologies/heres-what-happens-when-we-allow-facial>.

<sup>157</sup> <sup>157</sup> Smith-Thompson, "Here's What Happens When We Allow Facial Recognition Technology in Our Schools."

<sup>158</sup> Coyle, and Curr, “Facial Recognition Cameras Do Not Belong in Schools.”

<sup>159</sup> Thompson, "Here's What Happens When We Allow Facial Recognition Technology in Our School," 2018.

most of the time students do not have access to their data, therefore they are not in a position to object to false positives. The right to object is one of the key rights of data subjects because it gives them control over their data. Further, actors are likely to process data without the knowledge of students or parents. This also takes control away from the data subjects and leaves them subject to an opaque data processing system.

Lastly, especially from the European privacy law perspective, the right to be forgotten is at stake when automated surveillance systems gather mass amounts of data and categorize students in various ways that are unknown to them—and then holds onto that data. With these practices, false positives might occur because of the biases embedded into datasets. These false positives may be used to profile children, following them into the future. For example, if a child was involved in bullying at school and categorized as a bully through face recognition, that is likely to stay with the student. This process might deprive children from having a second chance to become a better person because once a child performs an unapproved behavior but then changes his attitude, the algorithms and data processing procedures are not transparent enough to comprehend how the behavioral changes of the child will affect his prior categorizations. Trying to understand the character that a child is developing is already hard for teachers and requires many years of experience, yet algorithms are expected to perform better at detecting the individual characteristics and emotions. This may not be an accurate assumption.

### ***The Right Not to be Subjected to Discrimination***

The right not to be subjected to discrimination is at risk both when the datasets are not representative and actors who are using the systems reflect their implicit biases onto decisions those algorithms produce. As for biased datasets, the ACLU has stated, it is well known and well documented that police more often stop, detain, frisk and arrest people of color, which as a result produces a database dominated by people of color for facial recognition system training.<sup>160</sup> The ACLU suspects that in schools, facial recognition systems are likely to target students of color for misbehavior, which in return “reinforce[s] criminalization of Black and brown people.”<sup>161</sup> As documented by many scholars, discrimination based on race remains one of the biggest problems

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<sup>160</sup> Ibid.

<sup>161</sup> Thompson, "Here's What Happens When We Allow Facial Recognition Technology in Our School," 2018.



with biased algorithms.<sup>162</sup> Another source of discrimination raised by poor datasets is gender-based discrimination, because facial recognition is less accurate for females, especially those of color.<sup>163</sup> The National Institute for Standards and Technology (NIST)'s latest report on gender classification showed that algorithms perform worse for female-labeled faces than male faces.<sup>164</sup>

The CEO of an AI startup believes that bias might still exist in fully functioning facial recognition systems and has called for culturally complex solutions.<sup>165</sup> All of the above-given examples about facial recognition systems that are used on children carry the risk of subjecting females or student with color to discrimination. Another source of discrimination that may arise from datasets is that most of the times algorithms are trained with adult data, which is not accurate for children, yet are being used to make decisions about children.

Discrimination might also stem from differences in nationality. To illustrate, in the Lockport example, it is unclear who has access to the database and it is suspected that these databases could also include ones used for immigration enforcement.<sup>166</sup> New York Civil Liberties Union writers allege that parents of immigrant children might be scared to send their children to school to protect them from ICE's radar in contexts where surveillance technologies are being used.<sup>167</sup> They further state that all students have a right to education no matter their immigration status, however, this right might be in danger because families are scared to send their children to schools.<sup>168</sup>

Another source of discrimination is related to the actors who design the decision-making processes. A research scientist at MIT's Center for Civic Media claims that in machine learning the questions that matter are "what is the textbook?" and "who is the teacher?" where the textbook is the datasets and the teacher is the person who tells the algorithms how to make

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<sup>162</sup> Buolamwini and Gebru, "Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification."

<sup>163</sup> Ibid.

<sup>164</sup> Mei Ngan and Patrick Grother, "Face Recognition Vendor Test (FRVT) Performance of Automated Gender Classification Algorithms," *National Institute of Standards and Technology*, 2015, doi:10.6028/nist.ir.8052.

<sup>165</sup> Ibid.

<sup>166</sup> Sidney Fussell, "Can We Make Non-Racist Face Recognition?" *Gizmodo*, July 25, 2018, accessed April 15, 2019, <https://gizmodo.com/can-we-make-non-racist-face-recognition-1827639249>.

<sup>167</sup> Coyle and Curr III, "Facial Recognition Cameras Do Not Belong in Schools."

<sup>168</sup> Ibid.

decisions.<sup>169</sup> He further states that the teacher decides the questions to be asked, therefore, algorithms usually mirror teachers. He uses the term of “machine teaching” rather than “machine learning” to give the responsibility back to the teacher.<sup>170</sup>

Another point to consider is how the decisions that algorithms make are being used. Even with inclusive datasets and the right questions, discrimination based on biases might occur through the use of outcomes. For instance, even though facial recognition systems produce the same results for both students of color and female students as white male students, the school administration is the final decision-making body on the sanctions or awards these students will receive. Therefore, in order to effectively minimize discriminatory applications on facial recognition systems, one should be assessing the dataset, the instructions given to the algorithms, and how the outcomes are being used by decision-making bodies. This is a chain that requires that all links work well.

### ***The Right to Flourish***

Another right that is at stake with the use of pervasive automated surveillance systems is children’s right to flourish. Keyes has defined the right to flourish as "a state in which an individual feels positive emotion toward life and is functioning well psychologically and socially."<sup>171</sup> The right to flourish includes but is not limited to a positive formation of ‘self’ like character, attitudes, spirituality and identity, as well as character strengths visible in thoughts, words and actions.<sup>172</sup> Due to the vast capabilities of opaque facial recognition systems, they are likely to harm self-formation process of children when used without proper scrutiny. These systems might become disruptive enough to affect the person who the children might become. One of the children who studies at a U.S. school that deployed a facial recognition system to detect abnormal behaviors says that he won’t be able to act as he used to after seeing these cameras everywhere.<sup>173</sup> This is worrisome because this it means these technologies may limit

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<sup>169</sup> Rahul Bhargava, "The Algorithms Aren't Biased, We Are," *Medium*, January 03, 2018, accessed April 20, 2019, <https://medium.com/mit-media-lab/the-algorithms-arent-biased-we-are-a691f5f6f6f2>.

<sup>170</sup> Bhargava, “The Algorithms Aren’t Biased, We Are.”

<sup>171</sup> K. W. Brown and T Kasser, *Values, Happiness, and Ecological behavior*, Unpublished manuscript, University of Rochester, (2003). 294

<sup>172</sup> Kristin A. Moore and Laura Lippman, *What Do Children Need to Flourish? Conceptualizing and Measuring Indicators of Positive Development*, Search Institute Series on Developmentally Attentive Community and Society, New York: Springer, 2005.

<sup>173</sup> Prohaska, “Lockport Schools Turn to State-of-the-Art Technology to Beef up Security.”

children's creativity and freedom. To illustrate, a Chinese student commented on the facial recognition system that analyzes engagement as follows, "If I was still at school, I would not be able to concentrate on anything but that watching eye!"<sup>174</sup> Always under supervision, these children might not even be able to discover who they really are as a person.<sup>175</sup>

Acting like someone else under the supervision of cameras might trigger identity crises and social distress, amplify behavioral disorders, and so on. All of these possibilities pose a threat to the right to flourish and are likely to put children in emotional danger. In the wrong hands, these facial recognition systems are likely to be used to mechanize children and force them to act in forced ways. It forces children to be a "perfect" person who follows all the rules but takes away the very human thing of making mistakes and learning from them.<sup>176</sup> The mistakes children make help them learn more effectively, help them form their characteristics, and eventually make them more human and mature. Always being watched with the fear of not making a mistake is likely to create serious psychological problems on children because of suppressing oneself immensely. Therefore, children might not have an adequate opportunity to flourish under mass surveillance.

### ***Freedom of Expression***

Freedom of expression is another right that is at stake with the use of automated surveillance systems.<sup>177</sup> Violations of freedom of expression might not be always visible, unless the harm is tangible.<sup>178</sup> To illustrate, in a classroom setting, children might feel under stress because of cameras and of their mysterious nature, therefore, children might be prone to stressed while in the constant presence of cameras, and might consequently self-sensor their behavior consciously or not from the fear of saying something wrong.<sup>179</sup> Also, omnipresent cameras might alter children's behaviors in more general ways causing them to be less expressive.<sup>180</sup> Both of these examples are a form of freedom of expression violation but because 'not saying something' or

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<sup>174</sup>Neil Connor, "Chinese School Uses Facial Recognition to Monitor Student Attention in Class," *The Telegraph*, May 17, 2018, accessed April 19, 2019, <https://www.telegraph.co.uk/news/2018/05/17/chinese-school-uses-facial-recognition-monitor-student-attention/>.

<sup>175</sup> Marlow, "Student Surveillance Versus Gun Control: The School Safety Discussion We Aren't Having."

<sup>176</sup> Marlow, "Student Surveillance Versus Gun Control: The School Safety Discussion We Aren't Having."

<sup>177</sup> Ibid.

<sup>178</sup> Woods, "User Generated Content: Freedom of Expression and the Role of the Media in a Digital Age," 8.

<sup>179</sup> Marlow, "Student Surveillance Versus Gun Control: The School Safety Discussion We Aren't Having."

<sup>180</sup> Ibid.

‘not doing something’ in these cases may not always be a blatant or visible act, it is hard to determine when a constraint on freedom of expression occurs. Surely, having facial recognition systems at school and classroom settings will affect children at different levels based on their characteristic traits. Where the violation of freedom of expression might be less harmful for more outgoing children, facial recognition cameras likely will have more detrimental effects on more introverted children.

Facial recognition cameras are also likely to leave children feeling intimidated and create a sense that someone is watching them. This creates a panopticon environment, where children may feel they are always under supervision because they are suspects of unapproved behavior. This would change the way children socialize with each other, how they act, where they go in the school, etc. Not being able to express their feelings, ideas or desires would stifle their freedom of expression. On the other hand, Article 19 states that even biased datasets that do not represent the population as a whole can negatively impact freedom of expression. This is illustrated as follows: “[I]f AI content moderation systems are not trained on slang or nonstandard use of certain expression often used by minority groups it can potentially lead these systems to censor legitimate speech.”<sup>181</sup> These examples are only a few among many others in which children’s freedom of expression can be violated by facial recognition systems.

## **AI and Entertainment**

### ***Youtube & YouTube Kids: Introduction***

YouTube engineers are currently implementing an artificial intelligence-based recommendation engine to maximize the time users spend on their platform. A significant and steadily growing number of YouTube users are children.<sup>182</sup> Communities all over the world are beginning to evaluate the amount and quality of the videos that today’s youth are viewing on YouTube, along with the advertising and recommendations that accompany the videos.<sup>183</sup> Examining some of the intended and unintended consequences of YouTube’s machine learning algorithms highlight several key concerns regarding children’s rights including the quantity versus quality of the

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<sup>181</sup> Woods, "User Generated Content: Freedom of Expression and the Role of the Media in a Digital Age,"

<sup>182</sup> Micah Singleton, "YouTube Kids Gets a New Design and Kid Profiles," *The Verge*, November 02, 2017, accessed April 19, 2019, <https://www.theverge.com/2017/11/2/16599990/youtube-kids-new-design-kid-profiles-update>.

<sup>183</sup> Joi Ito, "Optimize Algorithms to Support Kids Online, Not Exploit Them," *Wired*, April 13, 2019, accessed April 19, 2019, <https://www.wired.com/story/optimize-algorithms-support-kids-online-not-exploit-them/>.

content children are viewing, children's exposure to online advertising, the surfacing of harmful content, and possible data privacy violations. These concerns emphasize the necessity of applying a rights-based framework that considers children's rights when developing recommendation systems.<sup>184</sup>

### ***YouTube's Centrality in Modern Childhood***

The youth of today spend a profound amount of time on YouTube. Furthermore, many children below the age of five have replaced television with online viewing platforms – such as YouTube Kids – as their primary means of entertainment.<sup>185</sup> Watching video clips online has become one of the earliest activities for young children, which has been exacerbated by parents' decision to use online platforms as a form of easing their child-raising responsibilities.<sup>186</sup> In regards to popularity among children, YouTube dominates other viewing platforms.<sup>187</sup> In 2017, 80% of U.S. children ages 6 to 12 used YouTube daily.<sup>188</sup> In the same year, the "Brand Love Study" revealed that 96% of children ages 6 to 12 were "aware of YouTube," and 94% of children ages 6 to 12 said they either "loved" or "liked" YouTube.<sup>189</sup> As touch screen and mobile technologies advance, children's access to YouTube will continue to grow. Over 50% of YouTube's total viewing time currently takes place on mobile devices.<sup>190</sup> This percentage will grow in the next coming years as children are increasingly gaining access to mobile devices at a younger age.<sup>191</sup>

### ***Children's Programming***

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<sup>184</sup>Danielle Abril, "Proposed Law Would Require YouTube and Netflix to Do More to Protect Kids Online," *Fortune*, April 4, 2019, accessed April 20, 2019, <http://fortune.com/2019/04/04/proposed-law-would-require-youtube-and-netflix-to-do-more-to-protect-kids-online/>.

<sup>185</sup>Nelly Elias and Sulkin Idit, "YouTube Viewers in Diapers: An Exploration of Factors Associated with Amount of Toddlers' Online Viewing," *Journal of Psychosocial Research on Cyberspace: Cyberpsychology*, November 23, 2017, accessed April 23, 2019, <https://cyberpsychology.eu/article/view/8559/7739>.

<sup>186</sup> Elias and Sulkin, 3.

<sup>187</sup> Elias and Sulkin, 1.

<sup>188</sup> "2017 Brand Love Study: Kid and Family Trend," *Brand Love Study*, 2017, 1-15, [https://daks2k3a4ib2z.cloudfront.net/5435eb4d1e426bb420ac990f/5a316f4f4a2f7d000196532b\\_2017 Kid and Family Trends Report EXCERPT.PDF](https://daks2k3a4ib2z.cloudfront.net/5435eb4d1e426bb420ac990f/5a316f4f4a2f7d000196532b_2017 Kid and Family Trends Report EXCERPT.PDF).

<sup>189</sup> "2017 Brand Love Study: Kid & Family Trends," 7.

<sup>190</sup> "Understanding the YouTube Ecosystem: Think With Google," *Google*, accessed April 20, 2019, <https://www.thinkwithgoogle.com/features/youtube-playbook/topic/ecosystem/>.

<sup>191</sup> Angela Campbell and Chris Laughlin, "Request to Investigate Google's YouTube Online Service and Advertising Practices for Violating the Children's Online Privacy Protection Act," *Institute for Public Representation Georgetown University Law Center*, April 9, 2018, 1-59, <https://www.law.georgetown.edu/wp-content/uploads/2018/08/Filed-Request-to-Investigate-Google's-YouTube-Online-Service-and-Advertising-Practices-for-Violating-COPPA.pdf>.

Children's channels on YouTube are popular, offering relatively simplistic, low-budget animated programming for young children. The videos often feature nursery rhymes or children's songs.<sup>192</sup> Little Baby Bum and ChuChu TV are examples of these children's YouTube channels, and they are extraordinary popular.<sup>193</sup> Both ChuChu TV and Little Baby Bum place in the top 25 most viewed channels on YouTube.<sup>194</sup> Currently, ChuChu TV has over 20 million subscribers and Little Baby Bum has over 16 million subscribers.<sup>195</sup> For comparison, Beyonce Knowles's official YouTube channel has approximately 17 million subscribers.<sup>196</sup>

Toy companies are also noticeably involved in YouTube's most popular children's programming. Children's toys such as Barbie are featured as characters in animated YouTube programming and toy and craft competitions are in vogue.<sup>197</sup> Some of YouTube's most popular children's programming feature "unboxing videos" where children are filmed unwrapping commercial toys, along with constructing and playing with them.<sup>198</sup>

### ***International Nature of the YouTube Phenomenon***

YouTube's children's programming—as a phenomenon—stretches beyond borders. The producers of many of the most popular YouTube channels for children's programming are from diverse regions of the world: ChuChu TV is from India, Little Baby Bum's producers are from London, Animaccord Studios from Moscow, Videogyan from Bangalore, and Billion Surprise Toys from Dubai.<sup>199</sup> Users in the United States and India only account for approximately one third of videos viewed on Youtube every month, which leaves tens of millions of videos viewed by the rest of the world.<sup>200</sup> Studies conducted in several European countries indicate that between

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<sup>192</sup> Campbell and Laughlin, "Request to Investigate Google's YouTube Online Service and Advertising Practices for Violating the Children's Online Privacy Protection Act," 2.

<sup>193</sup> Campbell and Laughlin, 2.

<sup>194</sup> Madrigal, "Raised by Youtube," 74; Bridle, "Something Is Wrong on the Internet."

<sup>195</sup> "Little Baby Bum - Nursery Rhymes & Kids Songs," *YouTube*, accessed November 12, 2018, <https://www.youtube.com/channel/UCKAqou7V9FAWXpZd9xtOg3Q>.

<sup>196</sup> "Beyoncé," *YouTube*, accessed November 12, 2018, <https://www.youtube.com/channel/UCuHzBCaKmtaLcRAOoazhCPA>.

<sup>197</sup> Karen Louise Smith and Leslie Regan Shade, "Children's Digital Playgrounds as Data Assemblages: Problematics of Privacy, Personalization, and Promotional Culture," *Big Data & Society* 5, no. 2 (July 1, 2018): 5, <https://doi.org/10.1177/2053951718805214>.

<sup>198</sup> Smith and Shade, 5.

<sup>199</sup> Alexis Madrigal, "Raised by Youtube," *The Atlantic*, November 2018, <https://www.theatlantic.com/magazine/archive/2018/11/raised-by-youtube/570838/>

<sup>200</sup> Madrigal, "Raised by Youtube."

50% to 70% of children ages 3-6 use the internet on a regular basis and “video sharing sites are among the first that very young children visit.”<sup>201</sup>

### ***Launch of the YouTube Kids Application***

Due to growing public concern over children’s prolific use of YouTube, Google launched its YouTube Kids application in 2015.<sup>202</sup> On their official YouTube Blog, Google dubbed it the “safer version of YouTube” for children.<sup>203</sup> This “family friendly” iteration of the YouTube platform promised to feature popular children’s channels and videos along with a constant stream of new children’s programming.<sup>204</sup> Google also pledged that YouTube Kids prohibits “interest-based advertising” and ads with “tracking pixels.”<sup>205</sup> YouTube Kids currently has over 14 million weekly viewers and over 70 billion views.<sup>206</sup>

### ***Moderation and Regulation on YouTube & YouTube Kids***

The Terms of Service on YouTube requires a viewer to be at least 18 years old or “possess legal parental or guardian consent,” although YouTube does not require secondary affirmation of consent other than checking a box agreeing to the Terms of Service.<sup>207</sup> The Terms of Service also advises: “If you are under 13 years of age, then please do not use the service. There are various of other great websites for you. Talk to your parents about what sites are appropriate for you.”<sup>208</sup> The YouTube Kids application’s Parental Guide states that “Videos in search results are selected by our algorithm without human review. We’ve taken a number of precautions to ensure

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<sup>201</sup> Elias and Sulkin, “YouTube Viewers in Diapers,” 3.

<sup>202</sup> “Introducing the Newest Member of Our Family, the YouTube Kids App Available on Google Play and the App Store,” *Official YouTube Blog* (blog), accessed November 10, 2018, <https://youtube.googleblog.com/2015/02/youtube-kids.html>; “YouTube Kids.” November 12, 2018. Accessed 2019. <https://www.youtube.com/kids/>.

<sup>203</sup> “Introducing the Newest Member of Our Family, the YouTube Kids App Available on Google Play and the App Store.”

<sup>204</sup> Sapna Maheshwari, “On YouTube Kids, Startling Videos Slip Past Filters,” *The New York Times*, November 5, 2017, sec. Business, <https://www.nytimes.com/2017/11/04/business/media/youtube-kids-paw-patrol.html>.

<sup>205</sup> Maheshwari.

<sup>206</sup> Madrigal, “Raised by Youtube,” 80; Maheshwari, “On YouTube Kids, Startling Videos Slip Past Filters.”

<sup>207</sup> Youtube, “Terms of Service - YouTube,” *YouTube*, accessed November 13, 2018, <https://www.youtube.com/static?template=terms>.

<sup>208</sup> Matt O’Brien, “Consumer Groups Say YouTube Violates Children’s Online Privacy,” *Time.Com*, April 10, 2018, 1–1, <https://libproxy.berkeley.edu/login?url=http%3a%2f%2fsearch.ebscohost.com%2flogin.aspx%3fdirect%3dtrue%26db%3dbth%26AN%3d128995404%26site%3deds-live>.

that families searching in YouTube Kids will see results that are appropriate for younger audiences.’’<sup>209</sup>

On YouTube and YouTube Kids, machine learning algorithms are used both to mediate the appropriateness of content and to recommend content for watching or rewatching.<sup>210</sup> YouTube representatives, however, have been unwilling to be transparent about the specific difference in the features used in the algorithms for YouTube Kids versus YouTube.<sup>211</sup>

Most parents feel safe letting their children watch YouTube Kids.<sup>212</sup> However, a Florida mother said she found clips on YouTube and YouTube Kids glorifying not only suicide but sexual exploitation and abuse, human trafficking, gun violence and domestic violence.<sup>213</sup> Another YouTube video starts with a popular British children’s cartoon character, Peppa Pig, introducing herself and her family; however, during the ninth second, Peppa’s mother opens her mouth and shouts, “Smoke weed!”<sup>214</sup> YouTube’s recommendation algorithm, they say, fails to reliably segment content by appropriate age levels, and its default autoplay feature delivers almost-endless streams of videos that confuse, upset and titillate young minds.<sup>215</sup> On the other hand a proposed law, called the Kids Internet Design and Safety Act, aims to update children’s media

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<sup>209</sup> “Search in YouTube Kids - YouTube Kids Parental Guide,” *YouTube Kids Parental Guide*, accessed November 10, 2018, [https://support.google.com/youtubekids/answer/6162907?hl=en&ref\\_topic=6130504](https://support.google.com/youtubekids/answer/6162907?hl=en&ref_topic=6130504).

<sup>210</sup> Smith and Shade, “Children’s Digital Playgrounds as Data Assemblages,” 5. According to YouTube and the YouTube Kids application, YouTube proper does offer certain features that may be used as parental controls. Any viewer is able to “flag” a video as inappropriate. YouTube’s “safety mode” filters out videos flagged as inappropriate. Furthermore, certain videos on YouTube cannot be viewed by users registered as under the age of 18. The YouTube Kids application provides additional parental controls, including the ability for parents to block specific videos and channels, review their children’s search history, turn off search functionality, and apply timing limitation to how long their children can spend on YouTube Kids.

<sup>211</sup> LaFrance, Adrienne. “The Algorithm That Makes Preschoolers Obsessed With YouTube Kids.” *The Atlantic*. July 27, 2017. Accessed November 8, 2018. <https://www.theatlantic.com/technology/archive/2017/07/what-youtube-reveals-about-the-toddler-mind/534765/>.

<sup>212</sup> Doug Criss, “A Mom Found Videos on YouTube Kids That Gave Children Instructions for Suicide,” *CNN*, February 25, 2019, accessed April 19, 2019, <https://www.cnn.com/2019/02/25/tech/youtube-suicide-videos-trnd/index.html>.

<sup>213</sup> Doug Criss, “A Mom Found Videos on YouTube Kids That Gave Children Instructions for Suicide.”

<sup>214</sup> Craig Timberg, “YouTube Says It Bans Preteens From Its Site, but Young Children Still See Troubling Content,” *Los Angeles Times*, March 21, 2019, accessed April 27, 2019, <https://www.latimes.com/business/la-fi-tn-youtube-disturbing-kids-videos-20190321-story.html>.

<sup>215</sup> Craig Timberg, “YouTube Says It Bans Preteens From Its Site, but Young Children Still See Troubling Content.”



regulations, which date back to 1990 and are focused on television broadcast services, to better respond to this new viewing environment.<sup>216</sup>

### ***Viewership: YouTube vs. YouTube Kids***

YouTube, not YouTube Kids, still accounts for the overwhelming majority of viewership of children's programming on YouTube and YouTube Kids.<sup>217</sup> In 2017, YouTube was the most-recognized brand among children aged 6-12 while YouTube Kids was the 48th most recognized brand.<sup>218</sup> Despite the existence of the application, YouTube continues to account for over 30% of kids' online time.<sup>219</sup> A 2017 survey conducted by the Pew Research Center concluded that four out of five U.S. parents with children 11 or younger had given their children permission to watch the "regular" YouTube.<sup>220</sup> In "Raised on YouTube," Madrigal argues:

"The issue of inappropriate videos popping up in YouTube Kids has received a good deal of national press—but society can live with a tiny sliver of bad things slipping through the company's filters. It's a small issue compared with kids watching billions of videos on regular YouTube."<sup>221</sup> It is plainly evident to both consumers and Google/YouTube officials that young children are responsible for billions of views on YouTube.

### ***Concerns for Children's Rights***

The following concerns are raised by YouTube and YouTube Kids' implementation of machine learning algorithms with regards to the rights of children.

### ***Transformations in the Quantity (vs. Quality) of Consumption***

The recommendation systems used by YouTube and the YouTube Kids application strive to ensure that children view as many videos on the platform as possible. Children are not required to enter any information or affirm any acquired permissions to watch thousands of videos on

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<sup>216</sup> Danielle Abril, "Proposed Law Would Require YouTube and Netflix to Do More to Protect Kids Online," *Fortune*, April 4, 2019, accessed April 19, 2019, <http://fortune.com/2019/04/04/proposed-law-would-require-youtube-and-netflix-to-do-more-to-protect-kids-online/>.

<sup>217</sup> Madrigal, "Raised by Youtube," 80.

<sup>218</sup> "2017 Brand Love Study: Kid & Family Trends," 14.

<sup>219</sup> Campbell and Laughlin, "Request to Investigate Google's YouTube Online Service and Advertising Practices for Violating the Children's Online Privacy Protection Act," 21.

<sup>220</sup> Douglas MacMillan, "Why Children's Fondness for YouTube Puts the Company at Risk," *Wall Street Journal*, November 7, 2018, sec. Tech, <https://www.wsj.com/articles/why-childrens-fondness-for-youtube-puts-the-company-at-risk-1541563271>.

<sup>221</sup> Madrigal, "Raised by Youtube," 80.

YouTube.<sup>222</sup> Moreover, touchscreen technology and the design of the platforms allows children substantial ease regarding accessibility.<sup>223</sup> The algorithms for YouTube and YouTube Kids rely on user statistics, including views, times watched and completion ratings to determine personalized recommendations for the viewer.<sup>224</sup> They do not consider the quality or educational value of the content viewed.<sup>225</sup> Since companies developing children’s programming are similarly concerned about these quantitative metrics, their creations are driven by YouTube’s privileging of quantity with little consideration for quality or educational value. As Adrienne LaFrance suggests in the article “The Algorithm That Makes Preschoolers Obsessed with YouTube Kids,” “the youngest generation of app users [are] developing new expectations about narrative structure and informational environments” through the content that they view on YouTube and YouTube Kids.<sup>226</sup> These expectations are informed by the content they watch on a daily basis, which gives these videos an unnatural amount of sway over a child’s development.

There is particular concern that with YouTube and YouTube Kids’ related-videos recommendations, children can easily become trapped in filter bubbles of similar content. Unfortunately, YouTube and Google representatives have not been transparent regarding how their algorithms use past behaviors to feed their “related-videos” system.<sup>227</sup>

### ***Advertising on YouTube and YouTube Kids***

Since children are exposed to a large and steadily increasing amount of YouTube and YouTube Kids content, they are also exposed to YouTube and YouTube Kids-related advertising. Companies are also able to deliver targeted advertising because data about viewers is collected over their time of use.<sup>228</sup>

YouTube’s business model relies on tracking the IP addresses, search history, device identifiers, location, and personal data of consumers so it can categorize consumers by their interests to

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<sup>222</sup> O’Brien, “Consumer Groups Say YouTube Violates Children’s Online Privacy.”

<sup>223</sup> Elias and Sulkin, “YouTube Viewers in Diapers,” 2.

<sup>224</sup> Madrigal, “Raised by Youtube,” 79.

<sup>225</sup> Madrigal, 79.

<sup>226</sup> LaFrance, “The Algorithm That Makes Preschoolers Obsessed With YouTube Kids.”

<sup>227</sup> LaFrance.

<sup>228</sup> Jan Kietzmann, Jeannette Paschen, and Emily Treen, “Artificial Intelligence in Advertising: How Marketers Can Leverage Artificial Intelligence Along the Consumer Journey,” *Journal of Advertising Research* 58, no. 3 (September 2018): 263–67, <https://doi.org/10.2501/JAR-2018-035>.

deliver effective advertising.<sup>229</sup> 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.<sup>230</sup> Advertisers also routinely employ keywords such as “kid,” “child,” “toddler,” “baby” or “toy” in order to target children on YouTube.<sup>231</sup>

Although YouTube Kids claims to prohibit “interest-based advertising” and ads with “tracking pixels,”<sup>232</sup> advertising targeting children is ubiquitous on the YouTube Kids application. It appears that although YouTube restricts paid advertising of food and beverages on YouTube Kids, food companies use their own branded channels to target children with their products.<sup>233</sup>

Commercials for toys, clothes and entertainment are often recommended alongside child-oriented programming.<sup>234</sup> Mattel, Hasbro, Disney, Crayola, Lego, Nintendo, Nerf, and many other large companies targeting children with advertising have dedicated channels on YouTube Kids.<sup>235</sup> These YouTube Kids channels provide companies unfettered access to captivated young children, a population with more limited choice-making capacity and ability to distinguish between truth and propaganda.<sup>236</sup> During Smith and Shade’s research titled “Children’s Digital Playgrounds as Data Assemblages,” the researchers found that on YouTube Kids “typing a connected toy’s name, such as the Fisher-Price Smart Toy, cues up numerous unboxing and toy review videos for a young person to consume.”<sup>237</sup>

In 2017, the Campaign for a Commercial-Free Childhood and the Center for Digital Democracy filed a complaint with the Federal Trade Commission (“F.T.C.”) and several other officials

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<sup>229</sup> O’Brien, “Consumer Groups Say YouTube Violates Children’s Online Privacy.”

<sup>230</sup> Campbell and Laughlin, “Request to Investigate Google’s YouTube Online Service and Advertising Practices for Violating the Children’s Online Privacy Protection Act,” 2.

<sup>231</sup> Campbell and Laughlin, 2.

<sup>232</sup> Sapna Maheshwari, “New Pressure on Google and YouTube Over Children’s Data,” *The New York Times*, September 20, 2018, accessed April 4, 2019, <https://www.nytimes.com/2018/09/20/business/media/google-youtube-children-data.html>.

<sup>233</sup> Cecilia Kang, “YouTube Kids App Faces New Complaints Over Ads for Junk Food,” *The New York Times*, December 21, 2017, sec. Technology, <https://www.nytimes.com/2015/11/25/technology/youtube-kids-app-faces-new-complaints.html>.

<sup>234</sup> O’Brien.

<sup>235</sup> Karen Louise Smith and Leslie Regan Shade, “Children’s Digital Playgrounds as Data Assemblages: Problematics of Privacy, Personalization, and Promotional Culture,” *Big Data & Society* 5, no. 2 (2018): 205395171880521, doi:10.1177/2053951718805214, 5.

<sup>236</sup> Smith and Shade, 5.

<sup>237</sup> Smith and Shade, 5.

regarding the advertising of food companies on the YouTube Kids application.<sup>238</sup> The complaint cited evidence of junk food commercials on YouTube from brands such as Burger King, Coca-Cola, ConAgra Foods and American Licorice.<sup>239</sup> On April 2018, a joint complaint to the FTC regarding YouTube Kids further criticized the application for “overt commercialization and deceptive advertising practices embedded in the site.”<sup>240</sup> The complaint emphasized that YouTube was continuing to deliberately evade “the rules of broadcast and cable television with respect to children’s marketing.”<sup>241</sup>

### ***‘Gaming’ the Algorithms and Surfacing Shocking Content***

A significant number of external entities are able to “game” YouTube and YouTube Kids’ algorithmic discovery processes with startling consequences for children. YouTube and YouTube Kids’ algorithmic discovery processes can be manipulated through pushing content that the pusher expects will perform well on the platform’s “related-videos” system.<sup>242</sup> Through the packaging of content (e.g. use of keywords in descriptions) and increasingly, the creation of the content itself, outside actors and algorithms can manipulate YouTube and YouTube Kids’ “related-videos” system in order to increase the probability of performing well on it.<sup>243</sup>

Anyone over the age of 18 can create and upload content onto YouTube.<sup>244</sup> The surfacing of sensational and shocking content as “related videos” is one of the critical impacts of YouTube’s use of machine learning algorithms designed to maximize consumer consumption of content. Kids are particularly susceptible to content recommendations, so shocking “related videos” have a powerful impact when knowingly or unknowingly deployed on children.<sup>245</sup>

Sometimes the surfacing of shocking content is the platform’s mistake.<sup>246</sup> YouTube or YouTube Kid’s algorithms may choose to surface sensational and shocking content after judging that the content is likely to keep consumers on the platform. A research study by Kaspersky Lab looked

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<sup>238</sup> O’Brien, “Consumer Groups Say YouTube Violates Children’s Online Privacy”; Kang, “YouTube Kids App Faces New Complaints Over Ads for Junk Food.”

<sup>239</sup> Kang, “YouTube Kids App Faces New Complaints Over Ads for Junk Food.”

<sup>240</sup> Smith and Shade, 8.

<sup>241</sup> Smith and Shade, 8.

<sup>242</sup> James Bridle, “Something Is Wrong on the Internet,” *Medium*, November 06, 2017, accessed April 20, 2019, <https://medium.com/@jamesbridle/something-is-wrong-on-the-internet-c39c471271d2>.

<sup>243</sup> Bridle, “Something is Wrong on the Internet.”

<sup>244</sup> Elias and Sulkin, “YouTube Viewers in Diapers,” 2.

<sup>245</sup> Elias and Sulkin, 2.

<sup>246</sup> Maheshwari, “On YouTube Kids, Startling Videos Slip Past Filters.”

at popular children’s programming and the “related videos” that surface alongside the programming. The report from the study explains, “YouTube’s algorithms generally segregate these types of content, but as in a game of telephone, it’s easy to migrate from innocent content to more questionable fare.”<sup>247</sup>

Often, however, adversarial actors are gaming YouTube or YouTube Kids’ own algorithms. James Bridle details this disturbing phenomenon in his piece titled, “Something is Wrong with the Internet.”<sup>248</sup> Along with analyzing examples of strange and shocking content from YouTube and YouTube Kids, Bridle proclaims:

“Someone or something or some combination of people and things is using YouTube to systematically frighten, traumatize, and abuse children, automatically and at scale, and it forces me to question my own beliefs about the internet, at every level.”<sup>249</sup>

According to research, children are worryingly close to shocking content when they are watching children’s programming on YouTube. The Kaspersky Lab’s study found that a child was “an average of three clicks away from potentially disturbing adult content.”<sup>250</sup> For example, according to their research a car accident video was two clicks away from a Sesame Street program, and nudity could be found four clicks from Dora the Explorer programming.<sup>251</sup>

On YouTube Kids, hashtags, titling, and word association are used to manipulate the application’s mediating algorithm. Sapna Maheshwari writes about sensational content surfacing on YouTube Kids in her *New York Times* article “On YouTube Kids, Startling Videos Slip Past Filters.” She explores how outside actors use keyword/hashtag associations, which is “a whole

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<sup>247</sup> Caitlin Dewey, “Kids Are Three Clicks Away from Adult Content on YouTube, Study Says,” *The Washington Post*, February 06, 2013, Accessed April 19, 2019, [https://www.washingtonpost.com/business/technology/kids-are-three-clicks-away-from-adult-content-on-youtube-study-says/2013/02/06/1a11ddf4-6fe5-11e2-a050-b83a7b35c4b5\\_story.html](https://www.washingtonpost.com/business/technology/kids-are-three-clicks-away-from-adult-content-on-youtube-study-says/2013/02/06/1a11ddf4-6fe5-11e2-a050-b83a7b35c4b5_story.html); Kaspersky Lab, “Children at High Risk of Accessing Adult Content on YouTube,” *PR Newswire: Press Release Distribution, Targeting, Monitoring and Marketing*, June 29, 2018, Accessed April 19, 2019, <https://www.prnewswire.com/news-releases/children-at-high-risk-of-accessing-adult-content-on-youtube-189770621.html>.

<sup>248</sup> Bridle, “Something Is Wrong on the Internet.”

<sup>249</sup> Bridle.

<sup>250</sup> Dewey, “Kids Are Three Clicks Away from Adult Content on YouTube, Study Says”; Kaspersky Lab, “Children at High Risk of Accessing Adult Content on YouTube.”

<sup>251</sup> Dewey; Kaspersky Lab.

dark art unto itself.”<sup>252</sup> Shocking content often features popular children’s characters and is tagged with suggestively benign terms such as “education,” “singing” and “colors.”<sup>253</sup>

Some of the shocking content that surfaces is truly disturbing, constituting abuse when forced upon unassuming children. Perverse violence and sex is set to iconic nursery rhymes.<sup>254</sup> Popular cartoon characters are depicted dying in car accidents.<sup>255</sup> Female cartoon characters are portrayed in lewd situations, being sexually harassed, or being sexually assaulted.<sup>256</sup> Not all of the disturbing content is animated. Amateur live action videos featuring violence and/or sexual acts perpetrated by individuals dressed as popular superheroes can slip past the YouTube Kids filters.<sup>257</sup> Videos of individuals abusing children have also surfaced on YouTube Kids.<sup>258</sup>

Young children are especially vulnerable to disturbing content. At that stage of their development, young children lack critical “technical, critical and social skills” leaving them susceptible to sensational online media.<sup>259</sup> Pediatrics professor at Harvard Medical School and the director of the Center on Media and Child Health explains that the frequent use of children’s favorite characters in this disturbing content is particularly upsetting to children because the “characters they thought they knew and trusted are behaving in these ways.”<sup>260</sup>

YouTube and YouTube Kids have faced repeated criticism for their reliance on imperfect and unaccountable machine learning algorithms to mediate recommendations for kid-appropriate content. Josh Golin, executive director of the Campaign for a Commercial-Free Childhood, publicly stated “algorithms are not a substitute for human intervention, and when it comes to creating a safe environment for children, you need humans.”<sup>261</sup> In her *New York Times* article “On YouTube, Startling Videos Slip Past Filters,” Maheshwari described the YouTube Kids application as an “example of the potential for abuse on digital media platforms that rely on computer algorithms, rather than humans, to police the content that appears in front of people —

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<sup>252</sup> Bridle, “Something Is Wrong on the Internet.”

<sup>253</sup> Maheshwari, “On YouTube Kids, Startling Videos Slip Past Filters.”

<sup>254</sup> Maheshwari.

<sup>255</sup> Maheshwari; Bridle.

<sup>256</sup> Maheshwari.

<sup>257</sup> Elias and Sulkin, “YouTube Viewers in Diapers,” 2.

<sup>258</sup> Bridle, “Something Is Wrong on the Internet.”

<sup>259</sup> Elias and Sulkin, “YouTube Viewers in Diapers,” 2.

<sup>260</sup> Maheshwari, “On YouTube Kids, Startling Videos Slip Past Filters.”

<sup>261</sup> Matt O’Brien, “Consumer Groups Say YouTube Violates Children’s Online Privacy.”

in this case, very young people.”<sup>262</sup> YouTube and Google, however, continue to keep even the multilayered machine learning processes that they use for mediation a closely guarded secret.<sup>263</sup>

### ***Possible Violations of the Children’s Online Privacy Protection Act***

Google collects personal data from all YouTube and YouTube Kids users, including children.<sup>264</sup> The consumer data that Google collects and uses includes: searches, videos watched, advertisements clicked or viewed, location, websites visited, and applications, browsers and devices used.<sup>265</sup> While YouTube Kids restricts data collection for disclosure to advertisers, it still collects children’s data for “service provision purposes.”<sup>266</sup> Although Google pledges that they are “dedicated at every level of product development to making privacy a key consideration – from engineering to product management,”<sup>267</sup> a myriad of private citizens, advocacy groups, and public officials have expressed concern regarding the collection practices of YouTube and YouTube Kids as Google subsidiaries. In particular, YouTube’s collection of vast amounts of children’s personal data may not comply with the Children’s Online Privacy Protection Act – otherwise known as “COPPA.”<sup>268</sup>

COPPA is a 1998 federal law that prohibits internet companies from knowingly collecting personal data from children under the age of 13 who do not have parental permission.<sup>269</sup> Thus, COPPA makes it illegal for:

“... any operator of a website or online service or a portion thereof that is directed to children, or that has actual knowledge that it collects information from children, from collecting, using or

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<sup>262</sup> Maheshwari.

<sup>263</sup> Maheshwari; Bridle.

<sup>264</sup> Campbell and Laughlin, “Request to Investigate Google’s YouTube Online Service and Advertising Practices for Violating the Children’s Online Privacy Protection Act,” 21.

<sup>265</sup> Google, “Making It Easy to Understand What Data We Collect and Why,” *Data Transparency: Google Safety Center*, accessed April 5, 2019, <https://safety.google/privacy/data/>.

<sup>266</sup> “Search in YouTube Kids - YouTube Kids Parental Guide.”

<sup>267</sup> Google, “Making It Easy to Understand What Data We Collect and Why.”

<sup>268</sup> Maheshwari, “New Pressure on Google and YouTube Over Children’s Data”; *Federal Trade Commission*. “Children’s Online Privacy Protection Rule (“COPPA”),” *Federal Trade Commission*, October 04, 2018, accessed March 4, 2019, <https://www.ftc.gov/enforcement/rules/rulemaking-regulatory-reform-proceedings/childrens-online-privacy-protection-rule>.

<sup>269</sup> O’Brien, “Consumer Groups Say YouTube Violates Children’s Online Privacy.”

disclosing personal information from a child unless the operator gives parents notice of its data collection practices and obtains verifiable parental consent before collecting the data.”<sup>270</sup>

COPPA Rule §312.5 specifies that YouTube and YouTube Kids must “obtain verifiable parental consent before any collection, use, or disclosure of personal information from children.”<sup>271</sup>

YouTube Kids attempts to be COPPA compliant by requiring a parent to sign in and adhere to relevant portions of the Google Privacy Policy.”<sup>272</sup> Additionally, Family Link, launched by Google in the US in 2017, allows parents to create Google accounts for their children under the age of 13, affirming their consent by authorizing a “small fee” on their credit card.<sup>273</sup>

In April 2018, more than 20 advocacy groups filed a complaint with the U.S. Federal Trade Commission, asking them to investigate and impose billions of dollars worth of penalties on Google for alleged YouTube violations of COPPA.<sup>274</sup> Jeff Chester, Director of the Center for Digital Democracy, a party to the complaint, stated, “Google profits handsomely from selling advertising to kid-directed programs that it packages. They created a successful model monetizing kids’ data.”<sup>275</sup>

The complaint argued that YouTube is subject to and in violation of COPPA because, although their Terms of Service proclaim that YouTube is not appropriate for children under the age of 13, as discussed above, a significant portion of YouTube’s channels are directed at children.<sup>276</sup> For example, the 2018 complaint to the FTC cite to research showing that 243 million items were returned for a search of “children's videos” on YouTube and the second most popular YouTube

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<sup>270</sup> Campbell and Laughlin, “Request to Investigate Google’s YouTube Online Service and Advertising Practices for Violating the Children’s Online Privacy Protection Act,” 1.

<sup>271</sup> Campbell and Laughlin, 25.

<sup>272</sup> Smith and Shade, “Children’s Digital Playgrounds as Data Assemblages,” 5.

<sup>273</sup> Smith and Shade, “Children’s Digital Playgrounds as Data Assemblages,” 5.

<sup>274</sup> O’Brien, “Consumer Groups Say YouTube Violates Children’s Online Privacy.” The complaint to the Federal Trade Commission was filed by the Center for Digital Democracy, Campaign for a Commercial-Free Childhood and the Institute for Public Representation, along with Berkeley Media Studies Group, Center for Media Justice, Common Sense, Consumer Action, Consumer Federation of America, Consumer Federation of California, Consumers Union (the advocacy division of Consumer Reports), Corporate Accountability, Consumer Watchdog, Defending the Early Years, Electronic Privacy Information Center (EPIC), New Dream, Obligation, Inc., Parent Coalition for Student Privacy, Parents Across America, Parents Television Council, Privacy Rights Clearinghouse, Public Citizen, The Story of Stuff Project, TRUCE (Teachers Resisting Unhealthy Childhood Entertainment), and USPIRG.

<sup>275</sup> O’Brien.

<sup>276</sup> Campbell and Laughlin, “Request to Investigate Google’s YouTube Online Service and Advertising Practices for Violating the Children’s Online Privacy Protection Act,” 11.



channel is a toys reviewer.<sup>277</sup> YouTube channels and programming directed at children and general YouTube search functionality are accessible to children without the requisite processes for affirming parental approval.

The FTC has yet to take any public action regarding the April 2018 complaint, but private citizens, advocacy groups and public officials continue to criticize YouTube’s data collection processes for violations of children’s privacy rights. The April 2018 complaint powerfully contends:

“Its illegal collection has been going on for many years and involves tens of millions of U.S. children. The parties request that the FTC enjoin Google from committing further violations of the Children’s Online Privacy Protection Act (“COPPA”), impose effective means for monitoring compliance, and assess civil penalties that demonstrate that the FTC will not permit violations of COPPA.”<sup>278</sup>

### ***Moderating YouTube and YouTube Kids***

The sheer volume of content on YouTube and YouTube Kids is a barrier to moderation. With 400 hours of content uploaded to YouTube every minute, the task of protecting the rights of children on the platform is daunting. Google and YouTube, however, have been all too quick to point to the volume of content uploaded in order to defend their inaction.<sup>279</sup> YouTube’s model for kid-appropriate viewership relies on the notion that modern parents can and do patrol their children’s internet consumption. That is simply not true. The ways in which new technology has become interwoven into kids’ and parents’ daily practices prevents this type of patrolling. The massive viewership of children’s programming on YouTube suggests that even young children continue to have access to YouTube after the 2015 launch of the YouTube Kids application. According to the basic design of the YouTube recommendation-based platform, any child with access to the internet can, without logging in, end up down a YouTube nightmare-video rabbit hole.<sup>280</sup>

### **Smart Toys**

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<sup>277</sup> Campbell and Laughlin, 14.

<sup>278</sup> Campbell and Laughlin, “Request to Investigate Google’s YouTube Online Service and Advertising Practices for Violating the Children’s Online Privacy Protection Act,” 1.

<sup>279</sup> Maheshwari, “On YouTube Kids, Startling Videos Slip Past Filters.”

<sup>280</sup> Maheshwari.

## *Children's Rights at Play*

This section addresses the right of privacy guaranteed by international frameworks for children as that right relates to the development and marketing of smart toys. A smart toy is defined as “*a device consisting of a physical toy component that connects to one or more toy computing services to facilitate gameplay in the cloud through networking and sensory technologies to enhance the functionality of a traditional toy*”<sup>281</sup>

The rise of artificial intelligence—and especially machine learning—and its use in toys and home devices raises concerns that the data collected by these devices and toys may impede on children's right to privacy. Children today are far more receptive to adopting and using new technologies than previous generations and express little to no concern about the privacy implications associated with using new technologies and devices.<sup>282</sup> They seem to be open to trading their privacy in return for gaining access to social media and other online services.<sup>283</sup> Companies may take advantage of this by directly marketing to and targeting children from a young age.<sup>284</sup>

The underlying question that smart toys poses is *whether using smart toys is a step towards leaving your children in the hands of robots?*<sup>285</sup>

There are various laws (already stated in earlier sections) enacted to govern a child's privacy, including updates to accommodate new technologies. The pertinent ones for this section include the FTC's KidSafe Seal Program, a compliance program for websites, products and online services (mobile applications) targeted towards children, and COPPA.<sup>286</sup>

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<sup>281</sup> Laura Rafferty et al., "Towards a Privacy Rule Conceptual Model for Smart Toys," *Proceedings of the 50th Hawaii International Conference on System Sciences (2017)*, August 11, 2017, doi:10.24251/hicss.2017.146.

<sup>282</sup> Chris Nickson, "How a Young Generation Accepts Technology," September 18, 2018, accessed March 2, 2019, <http://www.atechnologysociety.co.uk/how-young-generation-accepts-technology.html>.

<sup>283</sup> Lee Rainie and Maeve Duggan, "Americans' Opinions on Privacy and Information Sharing," *Pew Research Center: Internet, Science & Tech*, January 14, 2016, accessed February 5, 2019, <https://www.pewinternet.org/2016/01/14/privacy-and-information-sharing/>.

<sup>284</sup> Lee Rainie and Maeve Duggan, "Americans' Opinions on Privacy and Information Sharing."

<sup>285</sup> James Vlahos, "Barbie Wants to Get to Know Your Child," *The New York Times*, September 16, 2015, accessed February 2<sup>nd</sup>, 2019, <https://www.nytimes.com/2015/09/20/magazine/barbie-wants-to-get-to-know-your-child.html>.

<sup>286</sup> "About Our Seals," *Kid Safe Seal Program*, accessed April 4, 2019, <https://www.kidsafeseal.com/aboutourseals.html>.

However, even with the laws available, there have been a number of cases where manufacturers of connected toys failed to ensure the security of the information they collected. An example is the 2015 outrage with VTech Electronics North America, LLC (VTech), a company that sold connected tablets to children and suffered a breach that exposed the personal protected data of over 6 million children and 4 million adults, including their names, genders, dates of birth, and photographs.<sup>287</sup>

Another incident occurred in 2017. The German government banned the toy *My Friend Cayla* because the toy could be hacked to record private conversations that were transmitted over the toy's Bluetooth connection.<sup>288</sup> Further, The Electronic Privacy Information Center, known as the "U.S. privacy watchdog," sent a complaint to the Federal Trade Commission regarding the smart toy called *My Friend Cayla* about its security risks.<sup>289</sup> While the doll has not been banned in the United States, the findings of a congressional inquiry were that the toy recorded private conversations of children 12 and under without parental consent and in violation of COPPA.<sup>290</sup> Complicating the risks to children beyond just these shortfalls, children may have limited understanding of the concept of privacy, and may not know how to protect themselves online, especially in a social media and cloud environment. Children may disclose private information to smart toys and not be aware of the possible consequences and liabilities.<sup>291</sup>

Smart toys are built as part of the Internet of Things (IoT) with the capability of providing the following features: Location based services (LBS), Mobile advertisement (MA), Geo-social network applications (GeoSNs), and contextual data collection.<sup>292</sup>

Another exacerbating feature is many smart toys' anthropomorphic design, which has resulted in a greater engagement and trust for users, allowing children to build strong bond with the toys.<sup>293</sup> Anthropomorphic design leads to children unconsciously engaging with these devices as trusted confidants. They may divulge significant personal and family information to the toy, which then

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<sup>287</sup> Sara H Jodka, "The Internet of Toys: Legal and Privacy Issues with Connected Toys," *Lexology*, December 05, 2017, accessed February 4, 2019, <https://www.lexology.com/library/detail.aspx?g=73ff6361-5a5e-4511-9a12-95da0e16bd63>.

<sup>288</sup> Sara H Jodka, "The Internet of Toys: Legal and Privacy Issues with Connected Toys."

<sup>289</sup> Jodka, "The Internet of Toys: Legal and Privacy Issues with Connected Toys."

<sup>290</sup> Jodka.

<sup>291</sup> Laura Rafferty et al., "Towards a Privacy Rule Conceptual Model for Smart Toys."

<sup>292</sup> Rafferty et al., "Towards a Privacy Rule Conceptual Model for Smart Toys."

<sup>293</sup> Rafferty et al., "Towards a Privacy Rule Conceptual Model for Smart Toys."

is synced to other platforms and potentially, companies.<sup>294</sup> Some of the information divulged, if compromised, can inadvertently put a child's safety at risk. Further, a prominent feature is constant connection to the internet; unlike many other connected devices, these toys are always on, blending into the background until needed.<sup>295</sup> As a result, there is serious concern for the security and privacy of a child's data. Threats posed include hacking by a third party who could eavesdrop on children or steal their data for various uses by cybercriminals looking to exploit connected toys, as with any device connected to the internet.<sup>296</sup> Additional challenges posed by these toys with IOT features are:<sup>297</sup>

1. It can be difficult to determine what information should be protected, when to protect it, and to whom access should be granted/restricted;
2. IoT consists of diverse technologies and the integration of these technologies may lead to unknown risks; and
3. The changing nature of the environment plays an important role when dealing with the privacy and security vulnerabilities of the Internet of Things.

### ***Case Study: Hello Barbie***

Hello Barbie is a doll that has been in existence for decades. However, new risks have emerged with a recent collaboration with Toy Talk inc. The doll now leverages AI technologies, including natural language processing, to deliver a life-like interactive experience to its human subject.<sup>298</sup> Hello Barbie is an example of a smart device incorporating weak AI, i.e. a set of techniques that allows computers to mimic or recreate the logic abilities of humans.<sup>299</sup> There are three nodes involved in smart toy processes, each of which comes with a set of challenges and

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<sup>294</sup> Ibid.

<sup>295</sup> Sara H Jodka, "The Internet of Toys: Legal and Privacy Issues with Connected Toys."

<sup>296</sup> Emily McReynolds et al., "Toys That Listen: A Study of Parents, Children, and Internet-Connected Toys," *Tech Policy Lab*, March 2, 2017, [https://techpolicylab.uw.edu/wp-content/uploads/2017/10/Toys-That-Listen\\_CHI-2017.pdf](https://techpolicylab.uw.edu/wp-content/uploads/2017/10/Toys-That-Listen_CHI-2017.pdf).

<sup>297</sup> Israa Alqassem and Davor Svetinovic, "A Taxonomy of Security and Privacy Requirements for the Internet of Things," *IEEE Explore Digital Library*, March 12, 2015, accessed March 4, 2019, <https://ieeexplore.ieee.org/document/7058837>.

<sup>298</sup> Corinne Moini, "Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report," *CUA Law Scholarship Repository*, 2017, accessed March 4, 2019, <https://scholarship.law.edu/jlt/vol25/iss2/4/>.

<sup>299</sup> Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach," *Artificial Intelligence: A Modern Approach*, January 30, 2019, accessed April 2, 2019, <http://aima.cs.berkeley.edu/>.

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.<sup>300</sup> To set up the doll, a parent has to download the Hello Barbie app, which guides the parent in how to set up the doll and connect it to one's personal WIFI.<sup>301</sup> The parent's email address is also required in order to grant permission for the activation of speech recognition. The doll has a microphone concealed inside Barbie's necklace that is activated when the child pushes it down and holds down her belt buckle. Once this process is carried out, whatever the child says to Barbie is recorded and transmitted via WIFI to ToyTalk's servers.<sup>302</sup> The speech recognition software converts the audio signal into a text file, which can then be analyzed.<sup>303</sup> A response is then chosen by the company's writers from thousand lines of script and pushed to the doll for playback in less than a second.<sup>304</sup> Each doll is limited to 8,000 lines of content, which has been written to steer various conversations a child may want to hold. The doll can also answer sensitive questions in a neutral way without showing any bias. For example, on the issue of religion if a child asks the doll whether it believes in God, its response would be *"I think a person's beliefs are very personal to them."*<sup>305</sup>

Watchdogs have raised several privacy concerns about the Hello Barbie doll prompting Mattel to release an FAQ document answering some pressing questions.<sup>306</sup> 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.<sup>307</sup> The document advises against connecting the doll to third party Wi-Fi, however, to ensure the safety and privacy of the child. Contrary to the feature of constant connection, the Hello Barbie doll is not always listening. According to the document

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<sup>300</sup> Corinne Moini, "Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report," 25 *Cath. U. J. L. & Tech* 281, (2017), 4.

<sup>301</sup> Mattel, "Hello Barbie Frequently Asked Questions," 2015, <http://hellobarbiefaq.mattel.com/wp-content/uploads/2015/12/hellobarbie-faq-v3.pdf>.

<sup>302</sup> James Vlahos, "Barbie Wants to Get to Know Your Child," *The New York Times*, September 16, 2015, accessed February 2, 2019, <https://www.nytimes.com/2015/09/20/magazine/barbie-wants-to-get-to-know-your-child.html>.

<sup>303</sup> James, "Barbie Wants to Get to Know Your Child."

<sup>304</sup> Ibid.

<sup>305</sup> James, "Barbie Wants to Get to Know Your Child."

<sup>306</sup> Mattel, "Hello Barbie Frequently Asked Questions."

<sup>307</sup> Mattel, "Hello Barbie Frequently Asked Questions."

released by Mattel, the doll has similar recognition technology to home assistant products like Siri and is activated only when the user pushes down the doll's belt buckle.<sup>308</sup> Concerns over the child divulging personal information to the doll were also addressed; the company stated that the doll does not ask questions that are intended to elicit personal information.<sup>309</sup> Parents have access to the Toy Talk cloud to listen and delete if necessary any personal information divulged.<sup>310</sup> On its company website ToyTalk lists the various information collected by the doll which include; automatically collected information, device information, interest or demographic information (such as the user's favorite games, colors, etc.), login information, internet- based advertising (targeted ads for products and services based on the child's activities), etc.<sup>311</sup> According to its privacy policy, any additional personal information is deleted once the company becomes aware of it, however the policy provides no definition for personal information, and thus it is unclear what additional information ToyTalk will delete. More so, ToyTalks adheres to the FTC's Kid Safe Seal Program, a compliance program for websites and online services targeted towards children. There are two types of certificates that a website or online service can obtain: the KidSafe certificate and the KidSAFE+ certificate. The KidSAFE+ certificate requires additional requirements and compliance with COPPA. Because Hello Barbie targets at the age range COPPA protects, ToyTalk not only satisfies the basic KidSAFE requirements but the additional requirements for KidSAFE+. For example, the communications between Hello Barbie and a child are encrypted and stored on a trusted network on the cloud servers.<sup>312</sup>

### ***Case Study: Cloud Pets***

Another example of smart toys is Cloud Pets, which is a line of soft animal toys with an inbuilt microphone and speaker that lets children record messages and listen to those of friends and family. The recordings can then be stored online via Bluetooth. When Motherboard, a tech security firm, raised potential privacy issues with CloudPets, the company "looked at it and thought [privacy] was a very minimal issue."<sup>313</sup> The CEO of the company (Myers) added that a hacker would only be able to access the sound recordings if they managed to guess the password.

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<sup>308</sup> Corinne Moini, "Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report," 25 *Cath. U. J. L. & Tech* 281, (2017), 4.

<sup>309</sup> "Hello Barbie FAQs," 4.

<sup>310</sup> "Hello Barbie FAQs," 4.

<sup>311</sup> "Hello Barbie FAQs," 5.

<sup>312</sup> "Hello Barbie FAQs," 5.

<sup>313</sup> Troy Hunt, "Data from Connected CloudPets Teddy Bears Leaked and Ransomed, Exposing Kids' Voice Messages," *Troy Hunt*, February 28<sup>th</sup>, 2017, accessed October 14, 2019, <http://tinyurl.com/j56qqx5>.

But the company had extremely lax password requirements (even officially recommending a password of “qwe” in a tutorial video), meaning that a large number of passwords could be “cracked” even given the secure method with which they were stored.<sup>314</sup> As such, it would be relatively easy for an attacker to access the voice recordings for users with simple passwords such as *123456* or *cloudpets*, but those with unique secure passwords could be covered in the case of a remote attack.<sup>315</sup> In February 2017, security researcher Troy Hunt, owner of data breach monitoring service *Have I Been Pwned*, discovered that recordings of the toy were being retrieved by unauthorized users and held for ransom.<sup>316</sup> Attention was drawn to this breach at which point more than half a million records had been traded online. Concerns were made known to CloudPets through its customer support system in late December, but no response.<sup>317</sup> Records show that the toy’s database holds more than 800,000 user records, suggesting that the data dump Hunt received is just a fraction of the full amount of information that was stolen.<sup>318</sup> Amazon and Ebay are among the major retailers who have pulled these smart toys from their sales platforms following warnings about these cybersecurity weaknesses.<sup>319</sup>

### ***Emerging Issue: The Duty to Protect and Report***

Does a company have a duty to “red flag” children who share suicidal thoughts or other self-harming behaviour with their smart toys?<sup>320</sup> What if the child confides in the toy that he or she is being abused—will the company report this to the relevant authorities? And then what will the company do with that information? Existing privacy laws and common law tort duties fall short of providing relevant protection.<sup>321</sup> For example, while COPPA protects the privacy rights of

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<sup>314</sup> Troy Hunt, "Data from Connected CloudPets Teddy Bears Leaked and Ransomed, Exposing Kids' Voice Messages," 2017.

<sup>315</sup> Alex Hern, "CloudPets Stuffed Toys Leak Details of Half a Million Users," *The Guardian*, February 28, 2017, accessed October 16, 2018, <https://www.theguardian.com/technology/2017/feb/28/cloudpets-data-breach-leaks-details-of-500000-children-and-adults>.

<sup>316</sup> Hern, "CloudPets."

<sup>317</sup> Hern, "CloudPets."

<sup>318</sup> Hern, "CloudPets."

<sup>319</sup> Alfred Ng, "Amazon Will Stop Selling Connected Toy Filled with Security Issues," *CNET*, October 20, 2018, accessed April 28, 2019, <https://www.cnet.com/news/amazon-will-stop-selling-connected-toy-cloud-pets-filled-with-security-issues/>.

<sup>320</sup> Kay Firth-Butterfield, "Generation AI: What Happens When Your Child's Invisible Friend Is an AI Toy That Talks Back?" *Medium*, May 23, 2018, accessed October 20, 2018, <https://medium.com/world-economic-forum/generation-ai-what-happens-when-your-childs-invisible-friend-is-an-ai-toy-that-talks-back-1f8d4f043fe5>.

<sup>321</sup> "AI Marketing Platform to Boost Your Marketing Campaigns," *Phrasee*, 2018, accessed November 10, 2018, <https://phrasee.co/>.

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.<sup>322</sup>

Ultimately, most mechanisms for tackling these challenges have been designed by the corporations themselves.<sup>323</sup> In the case of Hello Barbie, ToyTalk 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,*” which pushes the responsibility to the child and the parents.<sup>324</sup> However it is uncertain how many children would act on this response to report the abuse to a grown-up. A common feature in products like Hello Barbie, the Samsung Smart TV, Siri, and Amazon Echo is the capture of a user's speech and/or video, which is stored on a server for analysis.<sup>325</sup> Companies that review this recorded speech and/or video have the potential to obtain significantly more personal information and data about its consumers.<sup>326</sup> Yet there are no obligations placed on companies are to report any suspicious speech or video they may find.<sup>327</sup>

The duty to report arises from United States common law. There are many subsets of the duty to report, which include reporting known or suspected child abuse and neglect.<sup>328</sup> All fifty states and territories "have statutes identifying persons who are required to report suspected child maltreatment to an appropriate agency, such as child protective services, a law enforcement agency, or a State's toll-free child abuse reporting hotline."<sup>329</sup> Some states place specific obligation on “computer technicians.”<sup>330</sup> A computer technician includes any person who works

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<sup>322</sup> "Children's Online Privacy Protection Rule ("COPPA")," *Federal Trade Commission*, October 04, 2018, accessed November 19, 2018, <https://www.ftc.gov/enforcement/rules/rulemaking-regulatory-reform-proceedings/childrens-online-privacy-protection-rule>.

<sup>323</sup> James Vincent, "Google Releases Free AI Tool to Help Companies Identify Child Sexual Abuse Material," *The Verge*, <https://www.theverge.com/2018/9/3/17814188/google-ai-child-sex-abuse-material-moderation-tool-internet-watch-foundation>, September 03, 2018.

<sup>324</sup> "Hello Barbie FAQs," 5.

<sup>325</sup> Corinne Moini, "Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report," *UR Scholarship Repository*, accessed September 3, 2018, <https://scholarship.richmond.edu/law-student-publications/157/>, 12-291.

<sup>326</sup> Corinne Moini, "Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report," 12-291.

<sup>327</sup> Corinne Moini, "Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report," 12-291.

<sup>328</sup> *Ibid*, 12-291.

<sup>329</sup> Administration For Children And Families: Children's Bureau, "Mandatory Reporters of Child Abuse and Neglect - Child Welfare," 2015, accessed November 15, 2018, <https://www.childwelfare.gov/pubPDFs/manda.pdf>.

<sup>330</sup> These States include Alaska, California, Connecticut, Illinois, Missouri, Oklahoma and South Carolina.



in the computer repair or servicing industry, such that the technician may have access to the computer, its memory and any saved or marked files or internet searches.<sup>331</sup> One issue to explore is whether employees like those at ToyTalk whose responsibilities include reviewing the recorded speech of dolls be considered mandatory reporters because of their direct access to such personal and intimate conversations.<sup>332</sup>

### ***Moving Forward***

Unfortunately, common law torts do not apply to these uses of artificial intelligence. Hello Barbie's privacy policy strategically limits any duty ToyTalk may have to notify a parent or guardian about their child's recorded speech. In fact, the Hello Barbie privacy policy makes it so the company may notify the parents or guardians, but it must delete any additional information<sup>333</sup> However, the FAQs acknowledge if there a duty to report it will cooperate “with law enforcement agencies and legal processes as required to do so.”<sup>334</sup> For ToyTalk to be covered under the designation of “mandatory reporters” in California, they must qualify as either a remote computing services or an electronic communication services company.<sup>335</sup>

Suggestions have been made to bridge the gap between tort common law and COPPA. This would include an amendment to COPPA and other laws that protect the rights of children.<sup>336</sup> One option is inclusion in the Act for an affirmative duty for toy companies to monitor and track suspicious recordings like sexual abuse.<sup>337</sup> In addition, the Act could include a duty to report requirement for computer technicians and service providers.

Another suggestion is the creation of software that searches for certain “trigger” words and flags them. A child’s statements may be taken out of context, which would require a human employee to review the flagged speech.<sup>338</sup> After it has been reviewed and the speech is found to pose a potential risk to the child, the employee should record it and have the company report to the

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<sup>331</sup> Administration For Children And Families: Children's Bureau, “Mandatory Reporters Of Child Abuse And Neglect,” 2015.

<sup>332</sup> Corinne Moini, “Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report,” 12-291.

<sup>333</sup> Moini, “Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report,” 12-291.

<sup>334</sup> Susan Linn, "Is Hello Barbie Eavesdropping on Your Kids?" CNN, December 04, 2015, accessed November 28, 2018, <https://www.cnn.com/2015/12/04/opinions/linn-hello-barbie-privacy/index.html>.

<sup>335</sup> Moini, “Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report,” 12-291.

<sup>336</sup> Moini, “Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report,” 12-291.

<sup>337</sup> Moini, “Protecting Privacy in the Era of Smart Toys: Does Hello Barbie Have a Duty to Report,” 12-291.

<sup>338</sup> Ibid, 12-291.

parents and proper authorities.<sup>339</sup> Additional steps should be taken to train the employees on how to detect an abuse and report the incident. This approach may be criticized as an invasion of the child's privacy, which could be countered with the fact that Toy Talk already reviews recorded speech to improve Barbie's natural language capabilities.<sup>340</sup>

## 5. CORPORATE CIVIL SOCIETY AND COUNTRIES' RESPONSES TO ARTIFICIAL INTELLIGENCE AND THEIR IMPACT ON RIGHTS

This section discusses the current status of public-facing corporate policies regarding artificial intelligence and child rights, as well as examples of countries that are developing specific AI plans that aim to ensure that human rights are at the center of the development of these technologies.

### Corporate Responses

Microsoft and Google have both established principles for the ethical use of AI.<sup>341</sup> However, neither has public-facing policies specific to AI and children.<sup>342</sup> Several technology centers, trade associations and computer science groups have also drafted ethical principles with regards to AI.<sup>343</sup> However, most have excluded explicit reference to children's rights, or discussion of the risk to children on AI-incorporating technologies more generally.<sup>344</sup>

### National Responses

#### *France, the new "Start-up Nation"*

At the end of March 2018, France launched a national AI plan with the aim of becoming a world leader in artificial intelligence by offering the best possible environment for the development of

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<sup>339</sup> Ibid, 12-291.

<sup>340</sup> Ibid, 12-291.

<sup>341</sup> "Microsoft Salient Human Rights Issues Report - FY17," *Microsoft*. May 20, 2016, accessed November 13, 2018.

<sup>342</sup> "The Future Computed: Artificial Intelligence and Its Role in Society," *The Official Microsoft Blog*, March 08, 2018, accessed November 16, 2018, <https://blogs.microsoft.com/blog/2018/01/17/future-computed-artificial-intelligence-role-society/>.

<sup>343</sup> Alexa Hern, "The Partnership on AI," *The Partnership on AI*, September 28, 2016, accessed November 15, 2018, <https://www.partnershiponai.org/>.

<sup>344</sup> John Gerad Ruggie, "Global Governance and "New Governance Theory": Lessons from Business and Human Rights," 2014, accessed November 2, 2018, [http://www.hbs.edu/faculty/conferences/2014-business-beyond-the-private-sphere/Documents/Global Governance and 'New Governance Theory'.pdf](http://www.hbs.edu/faculty/conferences/2014-business-beyond-the-private-sphere/Documents/Global%20Governance%20and%20New%20Governance%20Theory.pdf), 5.

AI and attracting start-ups and industry leaders from around the globe. Cedric Villani, mathematician and member of the French parliament,<sup>345</sup> authored a detailed report named “For a Meaningful Artificial Intelligence: Towards a French and European Strategy.”<sup>346</sup> It addresses different issues that France and the world will face in the next years and offers various strategies to tackle the effects emanating from AI systems on the population.<sup>347</sup> However, the national strategy does not specifically address the impacts of AI on children’s rights nor does it address solutions to ensure that these rights are respected. It rather deals with the issues of achieving gender equality in the technology sector, and of the implementation of a digital literacy curriculum in the French school system to ensure that the next generation will be ready to face the changing needs and opportunities of the labor market, as the offers for less traditional jobs will likely increase in the next decades<sup>348</sup>.

### ***Europe’s Broader Response: Recommendations from the Council of Europe on Artificial Intelligence***

The Council of Europe developed and on July 4th, 2018 adopted its *Recommendation CM/Rec (2018)7 on Guidelines to respect, protect and fulfil the rights of the child in the digital environment*<sup>349</sup> as part of The Council of Europe Strategy for the rights of the child (2016-2021). It acknowledges that new technologies will inevitably impact children’s wellbeing and rights and provides recommendations to governments of the member States to adopt different measures to ensure the rights of children in the era of digital technology. The guidelines touch on a broad range of rights, such as the right to freedom of expression, the right to engage in play, the right to assembly and association, the right to privacy and data protection, and the right to education.<sup>350</sup>

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<sup>345</sup> Cédric Villani, "For a Meaningful Artificial Intelligence: Towards a French and European Strategy," March 28, 2018, 1-154, [https://www.aiforhumanity.fr/pdfs/MissionVillani\\_Report\\_ENG-VF.pdf](https://www.aiforhumanity.fr/pdfs/MissionVillani_Report_ENG-VF.pdf).

<sup>346</sup> Cédric Villani, "For a Meaningful Artificial Intelligence: Towards a French and European Strategy," 1-154.

<sup>347</sup> Cédric Villani, "For a Meaningful Artificial Intelligence: Towards a French and European Strategy," 1-154.

<sup>348</sup> France Intelligence Artificielle, "Rapport De Synthèse: France Intelligence Artificielle," 2017, accessed October 20, 2018, [https://www.economie.gouv.fr/files/files/PDF/2017/Rapport\\_synthese\\_France\\_IA\\_.pdf](https://www.economie.gouv.fr/files/files/PDF/2017/Rapport_synthese_France_IA_.pdf), 16.

<sup>349</sup> Council of Europe, “Recommendation CM/REC (2018)7 of the Committee of Ministers to member States on Guidelines to respect, protect and fulfil the rights of the child in the digital environment”, 4 July 2018, 27-50.

<sup>350</sup> Council of Europe, “Recommendation CM/REC (2018)7 of the Committee of Ministers to member States on Guidelines to respect, protect and fulfil the rights of the child in the digital environment,” 27-50.

Notably, the framework echoes France’s strategy on the importance of digital literacy as a component of the right to education embedded in the CRC.<sup>351</sup> However, it goes further and also provides States’ responsibility to ensure that the infrastructures in place benefit “children’s operation in the digital environment and support children’s formal, non-formal and informal education.”<sup>352</sup> The framework includes awareness-raising initiatives as a component of the right to education, so that children learn how to give consent in the digital space.<sup>353</sup>

The guidelines additionally emphasize the right of children to privacy and data protection, and calls on the States to ensure that “all relevant stakeholders, in particular those processing personal data, but also the child’s peers, parents or careers, and educators, are made aware of and respect the child’s right to privacy and data protection.”<sup>354</sup> The guidelines then emit various recommendations such as promoting “child-friendly and age-appropriate information about privacy tools,” making sure that parents are informed about how their children’s data is being processed and incentivizing companies to implement privacy by design.<sup>355</sup> In order to respect this complex and multi-faceted right of privacy, it is essential to bring together all the stakeholders and to educate not only children, but also parents. However, as it will be discussed in the recommendations section of this memorandum, mandatory regulation rather than incentivization for companies would be essential to ensure that children’s right to privacy is respected.

Finally, the guidelines provide specific recommendations that States should include in their national legal framework, such as preventive and protective measures, but also accountability mechanisms and remedies for children whose rights are violated in the digital environment.<sup>356</sup> These guidelines therefore provide an extensive range of measures specific to protecting children from violations of their rights in this technological environment, but also measures to help them thrive in this era of digital revolution.

### ***Kenya’s National AI Taskforce***

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<sup>351</sup> Council of Europe, “Recommendation CM/REC (2018)7 of the Committee of Ministers...” 41-46.

<sup>352</sup> Council of Europe, “Recommendation CM/REC (2018)7 of the Committee of Ministers...” 47.

<sup>353</sup> Council of Europe, “Recommendation CM/REC (2018)7 of the Committee of Ministers...” 48.

<sup>354</sup> Council of Europe, “Recommendation CM/REC (2018)7 of the Committee of Ministers...” 27.

<sup>355</sup> Council of Europe, “Recommendation CM/REC (2018)7 of the Committee of Ministers...” 33,34,50.

<sup>356</sup> Council of Europe, “Recommendation CM/REC (2018)7 of the Committee of Ministers...” 73-74.

At the beginning of 2018, the Kenyan government announced the formation of a national task force comprised of 11 industry and academic specialists, set up “to make recommendations on how the government can leverage on the emerging technologies in the next five years, with other key milestones in 2027 and 2032.”<sup>357</sup> Their objective is to employ AI in key sectors such as public service delivery, cybersecurity, financial inclusion, and election processes.<sup>358</sup> Although the strategy is yet to be defined, it remains a positive initiative that will position the country as a future technology hub and demonstrate a political will to engage in the risks, effects and opportunities of AI for the population. When developing the strategy, it would be necessary to pay particular attention to children’s rights and to include them as relevant stakeholders.

### ***India’s #AIforAll Strategy***

In June 2018, India published a discussion paper about its national strategy for artificial intelligence named #AIforAll.<sup>359</sup> The plan directs India to develop “inclusive technology leadership, where the full potential of AI is realized in pursuance of the country’s unique needs and aspirations. The strategy should strive to leverage AI for economic growth, social development and inclusive growth, and finally as a “Garage” for emerging and developing economies.”<sup>360</sup> According to the plan, the government should develop AI in five key sectors, namely healthcare, agriculture, education, smart cities and infrastructure, and smart mobility and transportation.<sup>361</sup> The report highlights the particular drawbacks and challenges that the country faces towards education and how AI could help solve some of these problems, both in terms of access to education and in terms of content. The plan specifically aims to expand the use of AI in education by 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

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<sup>357</sup> Kenyan Wallstreet, "Kenya Govt Unveils 11 Member Blockchain & AI Taskforce Headed by Bitange Ndemo," *The Kenyan Wall Street*, February 28, 2018, accessed November 6, 2018, <https://kenyanwallstreet.com/kenya-govt-unveils-11-member-blockchain-ai-taskforce-headed-by-bitange-ndemo>.

<sup>358</sup> Future of Life Institute, "AI Policy – Kenya," *Future of Life Institute*, accessed November 16, 2018, <https://futureoflife.org/ai-policy-kenya/>.

<sup>359</sup> National Strategy for Artificial Intelligence, "National Strategy for Artificial Intelligence," *National Strategy for Artificial Intelligence* June 2018, accessed November 20, 2018, [http://niti.gov.in/writereaddata/files/document\\_publication/NationalStrategy-for-AI-Discussion-Paper.pdf](http://niti.gov.in/writereaddata/files/document_publication/NationalStrategy-for-AI-Discussion-Paper.pdf), 7.

<sup>360</sup> National Strategy for Artificial Intelligence, "National Strategy for Artificial Intelligence," 7.

<sup>361</sup> National Strategy for Artificial Intelligence, "National Strategy for Artificial Intelligence," 7.

customized professional development courses.<sup>362</sup> India's strategy concretely grasps the opportunities associated with the use of AI in the education system. However, as the plan develops, it will be essential for the government to engage with children, teachers and parents in order to minimize the risks associated with AI in education, such as potential infringement on the rights to privacy, freedom of expression, and to ultimately ensure that children can develop their full potential.

## **6. CONCLUSION AND RECOMMENDATIONS**

As AI systems continue to be deployed and used in various ways across a child's life, some initial suggestions should be followed by relevant stakeholders, namely corporations, governments, parents and educators, as they all have a role to play in advancing the best interests of the child by ensuring that their rights and their vulnerability are taken into account when developing policy, services, or products.

### **For 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, and refraining from sharing children's personal information without consent.

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<sup>362</sup> National Strategy for Artificial Intelligence, "National Strategy for Artificial Intelligence," 38.

- Develop plans for handling especially sensitive data, including revelations of abuse or other harm that may be shared with the company through its products.
- Seek children’s consent in a clear and unequivocal way by explaining in simple terms how their data will be used, and for which purpose their data is collected.
- Incorporate an internal complaint mechanism for content or data removal available to both parents and children.

**For 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, that integrates children into national policy plans, and that takes into account the evolving capacities of children.

**For 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.

- Avoid the overuse of facial and behavioral recognition technologies, including for security purposes, in ways that may constrain learning and appropriate risk taking.
- Include digital literacy as part of the curriculum to ensure that children grow up understanding the impacts of these technologies on their rights and that they know how to give online unequivocal consent.

**For 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 and to understand the concept of online consent.
- 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.

The role of artificial intelligence in children’s lives—which can affect everything 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 in ways that 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 the rights and corresponding duties of developers, corporations, governments, parents, and children around the world.

**About the Human Rights Center:** The Human Rights Center is an independent research and training center on the University of California, Berkeley campus that applies innovative technologies and scientific methods to investigate war crimes and other serious violations of human rights. The center trains advocates around the world, providing them with the skills and tools necessary to document human rights abuses and turn that information into effective action.

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