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Introduction: Algorithmic Rights and Protections for Children

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One in three Internet users worldwide are children (Livingstone, 2015), and what they see and experience online is increasingly shaped by algorithms. Yet the dominant platforms of the online world have not been constructed with the needs and interests of children in mind. Children represent an especially marginalized and vulnerable population exposed to high levels of poverty and inequality, while being dependent on adults to advocate for their interests and structure their experiences. In 2023, as we are still recovering from a pandemic that has made us even more reliant on digital platforms, society is struggling to rein in the power of big tech and elevate the needs of marginalized groups. This tension is particularly acute when it comes to balancing opportunities and risks for children in online spaces.

Social media, educational technologies, and networked games have been a lifeline to social connection and learning during the pandemic. As schools began to reopen after the first wave of the Covid pandemic, a third of children in the U.S., particularly students of color, said they would prefer to continue to learn online and not return to the classroom (Schwartz et al., 2020). Some parents who once discouraged their children from playing Fortnite and Roblox (Flake, 2021)

now see these platforms as an essential social outlet (Kelly, 2021). In tandem with this growing reliance on digital platforms, concerns over children's digital privacy, safety, rights, and inequality are also mounting (Barassi, 2020; Zuboff, 2020; Livingstone et al., 2018). Whether it is search results (Noble, 2018), video recommendations on YouTube, or assessing student learning (Williamson, 2017), algorithms are beginning to gain influence on young people's wellbeing, learning, and future opportunity. As a uniquely vulnerable group, supporting healthy online engagement for children is the tip of the spear for regulation of digital platforms, and one of the thorniest arenas for balancing protection and rights.

Despite the important role that children's protections and rights play in debates of the social impacts and responsibility of tech platforms, issues unique to children have not been a significant focus of debates over AI and ethics. Some notable exceptions include UNICEF's AI for Children project (UNICEF, n.d.), the work of organizations such as the Family Online Safety Institute (FOSI, n.d.), Common Sense Media (Common Sense Media, n.d.), the 5Rights Foundation (5Rights, n.d.), and the UN Committee on the Rights of the Child's General Comment 25 (United Nations, n.d.), outlining children's rights in digital spaces. A small but growing body of work on digital parenting and children's experiences with algorithms seeks to inform this debate (see for example, Livingstone & Blum-Ross, 2020, Barassi, 2020, Lenhart & Owens, 2021, Livingstone et al., 2018). This collection of essays builds on this momentum, providing perspectives,

frameworks, and research for understanding diverse children’s evolving relationships with algorithms, and how caregivers, educators, policy-makers, and other adult stakeholders might shape these relationships in productive ways. We introduce the collection by outlining three cross-cutting concerns: (1) the relationship between algorithms, culture and society; (2) the unique needs and positionality of children; and (3) inequality in children’s risks and opportunities.

Algorithms, Culture, and Society

Despite the often novel nature of algorithms, big data, and AI, our existing frameworks for understanding the relationship between technology, culture, and society are as relevant as ever. Science and technology studies scholars have insisted that we look at how technologies are *shaped by* our existing cultural biases and institutionalized practices, and also *shape* or “impact” culture and society (see for example Hine, 2016; MacKenzie & Waczman, 1985; Bijker et al., 2012). The time is ripe for critical scrutiny of how algorithms are shaped by and reflect historic inequities, problematic assumptions, and institutionalized power. We also need solution-oriented scholarship and design thinking that considers how these technologies can be shaped to be more equitable and serve the needs and interests of children. This volume includes work that critically analyzes how algorithms reflect existing structures and biases, as well as work centered on designing and reshaping technology to serve children.

Algorithms and their impacts are inseparable from the institutional dynamics that children encounter in schools, community based organizations, families, and with commercial entertainment and communication industries. We need a critical understanding of how technology grows out of the specific social, institutional, and cultural contexts that define and constrain diverse forms of contemporary childhoods. For example, today’s “revolutionary” educational technologies can reflect entrenched interests as well as outdated assumptions about learning and automating instruction (Losh, 2014; Reich, 2020; Watters, 2021). In this collection, Paulo and Izidoro Blikstein describe how today’s technology solutionist rhetoric around automating instruction and assessment has deep roots in early generations of educational technology. Maureen Mauk (this volume) considers a growing burden on parents to manage and monitor media—what she describes as “responsibilization”—that has roots in the nineteenth century.

Even as new technologies grow out of and are shaped by entrenched structures and assumptions, how they are being developed, institutionalized, and taken up in everyday life are very much under negotiation and public debate. The nature of these negotiations differs depending on which stage the technology is at in innovation, spread, and societal adoption and adaptation.

Some technologies, such as relational robots for children (see Boulicault and Phillips-Brown et al., this volume), are just emerging from the research lab.

Others, such as algorithms for monitoring and predicting youth violence (see Patton et al., this volume), are just beginning to be rolled out and encountering resistance from stakeholders. Still other technologies and platforms, such as online video and search, voice assistants, and learning management systems are already “domesticated” (Haddon, 2011) and in widespread use (see O’Bryn et al., Druga & Yip, Manago et al., all in this volume).

Many contributors to this collection have focused on how we might productively shape and reshape emerging technologies to empower and be more responsive to the needs of children. Marion Boulicaut, Milo Phillips-Brown, Jacqueline M. Kory-Westland, Stephanie Nguyen, and Cynthia Breazeal are building and testing relational robots in partnership with young children and educators. Their contribution challenges established assumptions about authenticity and child-robot relationships, suggesting ways of designing relationships that support and honor the unique perspectives of young children who experience robots differently from adults. Drawing from her experiences as a school-based technology integrationist, Michelle Ciccone suggests ways that educators can critically evaluate classroom digital tools as one step towards supporting student digital literacies. Sayamindu Dasgupta and Benjamin Mako Hill surface the ways in which young people themselves are understanding, interrogating, and critiquing algorithmic systems in the context of the Scratch online community. They derive a set of design principles for algorithmic literacy

and engagement from these observations. These and other essays in this volume elevate the voices and agency of varied stakeholders in reshaping and defining algorithmic technologies with which children engage.

These complexities and nuances demand a multi-faceted, interdisciplinary, and international dialog. The diversity of perspectives represented in this collection, though far from comprehensive, offers a sampling of the range of viewpoints and frameworks that need to be at the table during this moment of rupture and debate, when practices and policies are in flux on varied fronts. Contributors represent fields as wide ranging as social work, robotics, educational research, instructional design, design research, and media studies. While the agency and influence of scholars and innovators may be limited in an arena dominated by Big Tech and high stakes global political wrangling, we hope that interdisciplinary coalitions of researchers and innovators can continue to raise issues and offer framings that are grounded in longstanding field and disciplinary wisdom, as suggested by our contributors.

Children's Perspectives and Needs

AI challenges our assumptions, most obviously, about what counts as intelligence, and the boundaries between humans and machines. Perhaps less obviously, AI also challenges us to reconsider assumptions about childhood culture, what is “age appropriate,” and the balance between rights and protections for children.

Negotiations over media and technology have long been a site of intergenerational struggle. Whether it was novels, television, video games, or today's social media, the "new" media of the day have offered an arena for young people to exercise agency and develop new cultural forms, often provoking concern from parents and moral panics writ large (Livingstone and Blum-Ross, 2020; Ito et al., 2019; Jenkins, 1998; Seiter, 1995). The rapid incursion of digital, interactive, mobile, and networked media in young people's lives since the nineties has been a particularly complex and fraught arena for navigating the tension between rights and protections for children. Media and tech companies, and the algorithms that pervade online spaces, are now powerful players in the everyday negotiations over even young children's engagement with knowledge, media, and social networks.

How we protect and empower children in relation to digital technology is made more complex by their changing needs as they grow older. As digital technology moves into the early years, children have the tools to make independent media choices earlier than prior generations. In a 2020 survey, one third of U.S. parents with children under 12 say their child interacts with a voice activated assistant, and the same proportion of parents say their child began engaging with a smartphone before the age of 5 (Auxier et al., 2020). In another 2020 survey, 95% of parents of children aged 5-8 said that their children watch online videos, and that the children themselves are most likely to select what they

watch, rather than the parent (Rideout & Robb, 2020). Developmental science suggests that early adolescence (age 10-14) is a particularly important time for caregivers to support growing independence and range in media choices, and scaffold first steps into social online spaces. Older adolescents' engagements with technology more closely resemble those of adults', peer-to-peer dynamics are more salient, and they chafe at overly restrictive parent monitoring and control (Odgers & Robb, 2020, pp. 35-37).

This growing agency and early access to online communication and content has challenged caregivers' and educators' ability to keep up, monitor, and regulate. As parents fret over screen time, stranger danger, and privacy concerns, childrens' perspectives and interests must also be at the table. Childhood studies scholars have noted how adults tend to view children as "becomings" rather than full "beings," arguing for deferred gratification and preparation for an adult future. They often fail to recognize children's unique social and moral perspectives, rights, and interests in the present (James & Prout, 2014; Qvortrup, 2009; Qvortrup et al., 2009). This divergence of interests manifests in everyday family struggles over screen time, as well as in policy frameworks that focus on rights versus protection of children. Researchers have noted how these power dynamics and conflicts over screen time can be more harmful to adolescents' mental health than screen time itself (Odgers & Robb, 2020; Mauk, this volume). In educational settings, the datification and "personalization" of learning and

outcomes has become a high stakes battlefield over issues of learner agency, privacy, and control (Watters, 2021; Williamson, 2017).

Many of the essays in this volume are centered on children's voices and viewpoints, suggesting ways of shaping our algorithmic futures based on these perspectives. Nicholas Santer, Adriana Manago, Allison Starks, and Stephanie Reich conducted a survey of 11-14 year olds on their views of digital privacy, finding that they are more concerned about privacy from peers and family members than corporate surveillance. Stefania Druga, Jason Yip, Michael Preston, and Devin Dillon involved both children and parents in co-designing an AI literacy framework, informed by their findings that children perceive AI bias differently from adults. Four media literacy scholars, Ian O'Byrne, Kristen Turner, Kathleen A. Paciga, and Elizabeth Y. Stevens, describe conversations with their children about digital technologies, and strategies they developed together to productively shape their engagement with online algorithms. These and other contributions help center our consideration of algorithmic rights and protections on young people and their changing perspectives as they grow older (see also this volume: Boulicault and Phillips-Brown et al., Dasgupta & Hill; Vasuvedan).

Unequal Childhoods

The unequal power dynamics between children and adults are critical factors in considering algorithmic rights and protections for children; inequality between

different populations of children is equally important. Safiya Noble (2020) opens her book, *Algorithms of Oppression*, with her experience of googling “black girls,” in hopes of finding interesting content for her stepdaughter and nieces, only to discover pornography featuring black girls as the first search result.

Algorithmic biases and inequalities that pervade the adult world are doubly damaging for marginalized children. We now have a growing literature on the harm that AI and algorithms can cause when they reproduce the assumptions and structural inequalities of the dominant culture (eg., Brayne, 2020; Benjamin, 2019), but still relatively little work that looks at the impacts on unequal childhoods.

Too often, research and public discourse makes generalizations about the experiences of “kids these days” that ignores the experiences of oppressed and marginalized youth. Essays in this volume build on a budding body of research that examines how social media, digital games, and learning technologies reflect and reinforce unequal childhoods. This includes work on how inequality in children’s experiences with technology differ across national contexts (e.g., Global Kids Online, n.d.), as well as within them. For example, scholars have examined how LGBTQ (Cho, 2017; 2015), neurodiverse (Ringland, 2019; Alper, 2017), and BIPOC (Watkins, 2010; Tanksley, 2019) youth experience and engage with social media in unique ways. Also relevant is research on how educational technologies intersect with longstanding inequities in our education systems

(Rafalow, 2020; Williamson, 2017; Livingstone & Sefton-Green, 2016, Watkins et al., 2018).

These themes of difference and inequality recur throughout the essays in this collection. Desmond Patton, Siva Mathiyazhagan, and Aviv Y. Landau consider differences in children's experiences with technologies and the state in India, Israel, and the United States. Veena Vasuvedan takes a close ethnographic look at the experience of youth of color and personalized educational technologies. Sayamindu Dasgupta and Benjamin Mako Hill describe how young coders debate the potentially discriminatory implications of the code they are writing and deploying online. Too often, public debates over children, teens, and technology fail to fully recognize the diversity of youth experiences, risks, and benefits, leading to one-size-fits-all policies that take White and middle class childhoods in the Global North as the baseline. The essays in this volume seek to nuance this picture through deeper dives into the experiences of diverse children in specific contexts.

This Collection

Understanding children's algorithmic rights and protections requires multidisciplinary and cross-sector viewpoints and synthesis, given the range of institutional settings where children encounter algorithms, and the unique forms of inequality and risks that children encounter throughout their growing up. This

collection of essays represents a variety of viewpoints, fields, and disciplinary voices in two genres. “Perspectives” are shorter conceptual pieces that share a unique viewpoint or apply a framework from a particular field of discipline to the topic at hand. “Research Papers” are longer contributions that report on empirical or design research. The essays offer critical and provocative analysis, frameworks for understanding, as well as practical approaches for how to productively engage with emerging technologies as designers, educators, and parents. We hope that this range of voices and contributions will foster more dialog, creative thinking, and coalition building at this unique but critical nexus of children, algorithms, care, and social justice.

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