

FUTURE OF
CHILDHOOD

Revisiting the Potential Uses of Media in Children's Education

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On November 10, 1969, Big Bird took his first outsized steps down Sesame Street, introducing the world to a character that was endearingly goofy, but always eager to learn. Since then, the friendly neighbors and Muppets have become beloved icons of childhood, sparking a love of learning among generations of young viewers.

In 1966, Joan Ganz Cooney presented her vision for the show in a report to the Carnegie Corporation of New York. Built on a foundation of research and interviews with cognitive psychologists, educators, and media professionals, “The Potential Uses of Television in Preschool Education” proposed to harness the power of television, still a relatively new medium, to key principles of children’s cognitive development and foundational learning.

Cooney’s ambitions went well beyond creating an innovative TV program. She wanted to help remedy the shortfalls of America’s early education system by drafting parents and caregivers to watch the show with their children and to reinforce its lessons with branded workbooks, craft kits, and other products. In 1968, she and Lloyd Morrisett co-founded Children’s Television Workshop (renamed Sesame Workshop in 2000) to close achievement gaps with the help of an

army of paid staff, social workers, and volunteers who would work within lower-income communities to incorporate the new show into classrooms, libraries, and daycare centers.

Five decades later, the many insights about successful educational media that Cooney outlined in her report and made manifest in thousands of episodes of *Sesame Street* are still just as relevant. The needs of developing minds remain the same, as do many of the challenges to meeting those needs fully and equitably.

At the same time, however, our media and education landscapes have changed immensely. We have moved from a handful of television channels airing a limited menu of scheduled programming to ubiquitous, portable devices that can deliver a universe of knowledge, games, and entertainment. These devices are also powerful tools for making and sharing media,

able to connect people around the world instantly to chat, debate, and collaborate. And all of these functions are available 24 hours a day, 7 days a week.

A wave of new educational media products—some intentionally designed for the classroom and some not—has washed over an educational system that is transforming, too, albeit far more slowly. These products offer a myriad of exciting new learning opportunities but also carry real risks of overblown expectations and unexpected perils—from privacy and security breaches to chronic distraction and cyberbullying.

A half-century after *Sesame Street*'s debut is an opportune time to look back on the decades of children's media efforts and to distill the most enduring lessons from that history to inform the next generation of development.

According to Kathryn Ostrofsky, “The people who work on educational media can be so focused on the present and the future that they forget they can learn a lot from their own past.”

To spur a mix of reflection and forward-thinking, we spoke to more than 20 experts and visionaries from a range of fields, including developmental psychologists, educators, media historians, app developers, as well as education nonprofit leaders and funders. We owe an immense thanks to the following people for taking the time to share their thoughts with us: Warren Buckleitner, Linda Burch, Karen Cator, Milton Chen, Michael Cole, Mariana Díaz-Wionczek, Kate Eichhorn, Ellen Galinsky, Mizuko Ito, Björn Jeffery, Henry Jenkins, David Kleeman, Michael Levine, Lloyd Morrisett, Al Race, Kathryn Ostrofsky, Brooke Stafford-Brizard, Sherry Turkle, S. Craig Watkins, Maryanne Wolf, and Ruth Wylie.

We asked these experts to consider the successes and failures of the field's recent past, which areas of learning could benefit from more media products, how to make the most of new technologies, the changing role of families and teachers, and how media can better support the goal of educational equity.

The themes that emerged from these conversations became the organizing structure of this report, which is largely left to their words—interspersed with relevant excerpts from Cooney's 1966 report. The insights are a mix of big ideas and practical next steps. One frequent observation, not new but worthy of repeating, was that new technologies and new media, no matter how clever or well-made, can't transform education by themselves.

“All too often, educators and researchers get distracted by what is new and forget to pay close attention to how existing technologies are already being deployed in the classroom by educators and students,” noted Kate Eichhorn. “I like to remind my students that a lot of classrooms still are equipped with a chalkboard, but most people under 30 have never even heard about CD-ROMs, which not too long ago promised to transform education.”

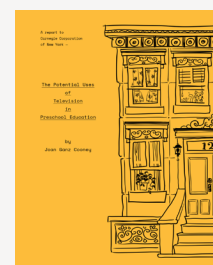
Thus, our biggest hope is for this report to spur larger conversations that include not only media makers, but educators, policymakers, researchers, parents, funders, and children, too, in order to realize the educational potential of a rapidly evolving media reality while avoiding its pitfalls.

1966

In 1966, Joan Ganz Cooney was a documentary producer at Channel 13, New York's first educational television station, when Lloyd Morrisett, then Vice President at the Carnegie Corporation of New York,

offered her an opportunity that would change the landscape of children's media forever. The Carnegie Corporation provided funding for a three-month study during which Joan traveled the country to interview early learning experts and children's television producers and filmmakers.

This report, *The Potential Uses of Television for Preschool Education*, became the blueprint for *Sesame Street* and Children's Television Workshop. Read the full report at joanganzcooneycenter.org/1966report.



Uncharted Territory?

Joan Ganz Cooney's 1966 proposal for *Sesame Street* outlined what this new show should try to teach its young audience. The program would cover "intellectual concepts of all kinds, including language concepts and skills, number concepts and simple science concepts," she wrote, "in addition to teaching such 'soft' subjects as arts and crafts, music and rhythm, singing and so forth."

Still, Cooney stressed that most of the education and cognitive development experts whom she'd consulted "wanted to see the teaching of cognitive habits, [such as] analysis, generating hypotheses and reflection, emphasized over factual information or academic skills." In other words, she concluded, "A television program would be very useful which would teach children how to think, not what to think."

At the same time, recalled Lloyd Morrisett, "Many people questioned whether television could teach anything at all." The need to prove that basic

proposition influenced the initial direction of the program, he said. "The original content that we used [for *Sesame Street*], particularly the recognition of letters and numbers and similar things, was partially chosen because we knew we could measure the results on those things. It's much harder to measure empathy, for example. And unless we could show that we were having a sound educational effect, we knew we had no future."

Many of the same goals and constraints continue to guide educators and media creators today. At the same time, however, if we take the time to reflect upon more than five decades of children's television and digital products, we can glean some important insights about how media fits into the broad spectrum of what we want children to learn. Where have children's television and digital products been effective teaching tools, where have they barely ventured, and what areas of learning—from literacy to empathy to computational

thinking—could benefit most from well-researched media products in the near future?

What's Been Done (Or Overdone)?

Several of the experts interviewed for this report agreed with Linda Burch, who said, “In early learning—early reading and early math—there is almost saturation. There are lots of really good products in those arenas.”

“Generally, for kids over the age of eight, we don’t do much at all in any subject across the curriculum.”

— MILTON CHEN

According to Björn Jeffery, “All the attention, all the innovation, all the investment in the explicitly educational space is heading in the same direction. I think the only things that are perceived to be commercially viable are math, coding, and literacy.”

Maryanne Wolf warned against overdoing early reading on screens, because it primes the brain for skimming rather than “the deeper, more time-consuming reading that tap the cognitive and affective processes to help us to take on the perspective of other people, cultures, and other historical epochs,” she said. “So, when we use all those deep-reading processes that we have developed over centuries, we are really giving our brain a kind of moral laboratory for empathy and compassion.”

Instead, Wolf advocated for what she calls “a bi-literate reading brain” in which pre-literacy, early reading, and the start of deeper reading comprehension are developed predominantly through print. “In parallel, there should be a slower introduction of screens and digital media, with almost nothing before two, and then gradually more until around age five when we start to introduce programming, like ScratchJr.”

Where Are the Gaps?

SOCIAL EMOTIONAL LEARNING

“I think character development as a goal of media education would be amazing. We could help solve some of the online harassment and other issues with various technologies, but the ultimate solutions are not tech solutions. Instead of focusing on building better technology cops, we need to focus on building better people,” said Ruth Wylie.

While the Internet has fostered echo chambers among adults, hindering communication between communities, Wylie believes a new generation could be steered toward a better path. “Young kids are still developing their communities. And so educational media could help encourage children to recognize the value of different perspectives,” she said. “If educational media can give children the language to talk about these really big topics and the imagination to think about how things could be different and better, then that’s powerful, because encouraging communication is a way to cultivate that empathy needed to develop solutions.”

Meanwhile, a number of interviewees stressed that technology and media should be an adjunct to non-mediated human relationships rather than a replacement.

“Now, there’s a whole group of new social-emotional learning kinds of products, too. There are a lot of them around mindfulness. I think the jury’s still out on how useful they can be,” said Linda Burch. “My own bias is that I think there are good tools that are complements to the work that is face to face, interpersonal scenario or dilemma-based learning with kids interacting with other kids scaffolded by a teacher.”

An even more skeptical note was struck by Sherry Turkle, who spoke about the hype surrounding educational products with emotional artificial intelligence. “The next generation of educational software will present virtual tutors that pretend to care about children, so you will have relationships that are based on the deception of computational caring,” she said. *(Continues on page 8)*

LIFE SKILLS

Several sources pointed to the need for more of a focus on the habits of mind that can serve both children and adults across so many domains of learning and life.

“Most educational apps do what Sesame did at the beginning—teach kids numbers, colors, and shapes. All very important, but they are still missing when it comes to promoting learning skills, or life skills, as I call them. They aren’t helping kids pay attention and deal with distraction. They aren’t helping kids have self-control, be better communicators or collaborators,” said Ellen Galinsky.

“We’ve distilled a lot of the science of child development into three principles that we think can help shape policy practice intervention strategies because they are bedrock principles about what we know can support healthy child development—support responsive relationships, strengthen core life skills, and reduce sources of stress. And media can play a role in all of those areas,” said Al Race.

He continued, “When we say core life skills, we’re mainly talking about executive function and self-regulation, but those are all rooted in the kinds of social and emotional skills that *Sesame Street* has been working on for decades. And if all children’s media could ask themselves, how are we in alignment, or out of alignment, with those principles, then I think kids and families would be doing a lot better.”

EMPOWERING MINDSETS

Craig Watkins sees a lot of promise in technology products that allow kids to make their own media and to think of themselves as storytellers, builders, and content creators.

“That is a critical disposition for kids to develop and an important mindset or just a way of being in the world today,” he said. “It will pay dividends over the course of their lives in an economy where you are going to have to be creative, where you’re going to have to be responsive, where you’re going to have to be able to, in some way, find a spark and generate your own opportunities.”

One of the most important goals for the next generation of children’s media, according to Henry Jenkins, should be to foster “civic imagination,” which he defines as “imagining

what a better world would look like and the steps that might get us there.”

“When I think about what that looks like in children’s television, it looks like a modern version of *Mister Rogers’ Neighborhood*. A networked culture enables people to come together and work at a scale of information production and debate and so forth that we could never have done before,” he said. “But right now, education and children’s media tend to emphasize the individual as the problem solver and not a collaborative notion of problem solving. So, to me, getting at those emotional underpinnings of a democratic society and the beginnings of a civic imagination would be [an] important thing for children’s media to do in the 21st century.”

Key Ingredients

What have the past 50 years taught us about the essential elements of successful educational media? In the 1960s, when TV was crowned king, Cooney found a way to tap into the pedagogic strengths of the medium in surprising places.

“If we accept the premise that commercials are effective teachers, it is important to be aware of their characteristics, the most obvious being frequent repetition, clever visual presentation, brevity and clarity. Probably, then, their success is not due to any magic formula,” she wrote. “Instead, television commercials appear to have adopted what have always been effective teaching techniques; unfortunately for our children, many teachers may have forgotten what Madison Avenue, with consummate skill, has cribbed from them.”

Over the years, *Sesame Street* took fewer cues from short snappy ads, but the show’s creators identified

other elements that make television a powerful tool for reaching and teaching kids.

“Children are attracted to television. Now, the question is what are they attracted to there, and how [can that] be put in the service of education rather than simply entertainment?” said Lloyd Morrisett. “We found, as any good teacher would find, that unless the child is paying attention to what you’re trying to teach, they won’t learn anything. And we clearly found very early in the research we were doing that movement, rhythm, and games that played with language were all attractive to children. And if these things were harnessed to educational purposes, then it worked very well.”

Indeed, Cooney pushed for interactivity in her proposal, writing that “children should be encouraged, and provided every opportunity to interact with the program, by singing, dancing, clapping, and answering questions, so viewing would be active, not passive.”

Half a century later, a far broader array of children's media have amassed an impressive toolbox to promote learning of all kinds. Informed by a mix of deep research, media savvy, and experimentation, both the successes and the failures have something to teach the next generation.

Starting Points

"Media makers should start with what we know from decades of studies on child development and how children learn and set touchstones of what they want to be doing," said David Kleeman. "And then throughout the process—whether you're making one season of a television series or a new app, or whether you're in season 50 of your television series—you should keep coming back to those core questions and touchstones that you started out with and making sure that you're still on track."

"In the '90s, characters in children's media started breaking the fourth wall by talking to the audience and leaving some space for the kids to participate. The kids seemed to like that a lot, and it was very efficient and effective for younger kids. But by five, kids start figuring out that no matter what they do, the story is going to continue to happen, and they feel a little bit cheated. But the real shift happened, and this simulated interactivity started fading away, when real interactivity became a feature of digital media products."

— MARIANA DÍAZ-WIONCZEK

BIG DATA

"...For children today.. their data footprints begin from the very moment when their parents proudly upload that first baby photo to social media. On average, by the age of 13, parents have posted 1300 photos and videos of their child to social media. The amount of information explodes when children themselves start engaging on these platforms: on average children post to social media 26 times per day—a total of nearly 70,000 posts by age 18"—from *Who knows what about me?* (Children's Commissioner Office, 2018).

Several of the experts we interviewed discussed new and better ways to handle all the data that today's educational media generate. Kate Eichhorn, for instance, talked about how Gen Z kids¹ are increasingly obsessed with personalized metrics.

"This is a generation that has basically grown up tracking their grades and everything else online since they were very young," she said. "They expect to be able to track their progress and compare themselves to others and to have a sort of visible monitor of where they're at, at all times."

Teachers also crave more personalized data about their students' performances via their learning management and media platforms, noted Brooke Stafford-Brizard.

"This idea that you know you would use data and feedback as a formative tool to shift the design of a lesson is something that I think we're still working to really integrate into our schools and classrooms," she said. "There are many challenges in terms of...how quickly you can get that data and how we use data visualization to actually make it meaningful and accessible to educators. But it's an idea that's transformative for education."

Of course, as useful and exciting as all these data may be, there remains the major challenge of keeping it safe, and Karen Cator suggested three ways that media developers could do more to help protect children's privacy.

"First, they can create subdomains, like these walled gardens online where only the people in that community can be and interact," she said. "Second thing is allowing people to delete things, so can you kind of expunge your record when you turn 18 or can you get rid of things so they actually truly disappear from the Internet. And then the third is to have children interacting online through an avatar or something that protects their actual personal identifiable information."

¹ According to Pew Research Center, Generation Z is loosely defined as those born between 1997 and 2012.

A solid foundation of research in child development and education helped the creators of *Sesame Street* turn their vision into reality. “If anybody that wanted to challenge the idea of *Sesame Street* and ask, why are we using television to teach? Isn’t it just entertainment? How can it be educational? They were met by the strength of that research base,” said Linda Burch. “Joan Ganz Cooney and her partners definitely recognized that children have to be at the center, and that it should be kids constructing their own learning in a way that is scaffolded by adults with a light touch.”

And don’t stop the research with the PhDs. Talk to teachers, said Ruth Wylie, and to kids, too. “It’s important to give more voice to the students themselves by presenting the design problem to them and asking, ‘What should happen here?’ You can essentially bring kids in as co-designers, which is an empowering experience, so they feel like the technology is not just being thrown at them but that they are actively contributing to making it.”

Finally, several interviewees stressed the fundamental power of good stories and well-rounded characters for grabbing and holding the attention of even the youngest children.

“It used to be believed that younger kids could not comprehend a long narrative and could not stay engaged for longer periods of time,” said Mariana Díaz-Wionczeck. “But then in the 2000s, we started trying more formal narratives and were surprised that even three-year-olds were paying attention. And not only were they staying engaged and attentive, but the narrative was helping them learn and understand the content.”

Developing great characters takes time, noted Kathryn Ostrofsky. “For *Sesame Street*, Big Bird is the best character, the most human character out of all of the Muppets. That is because he was conceived of as a stand-in for the viewer,” she said. “And it took a few years for him to really become that, to make the character rounded enough and believable enough and not just have one exaggerated trait.”

Digital Do’s and Don’ts

How can we maximize the potential of today’s technology-infused media landscape while avoiding its pitfalls?

“Stick with the essentials of childhood. The people who think technology first and understanding children second have not been successful,” said David Kleeman. “For example, one thing that drove me crazy was the early iterations of a ball that you controlled with a tablet. And every time I would see someone demoing it, I would think, put down the tablet and pick up the ball!”

“People grossly underestimated the centrality of communication in the use of computers. One of the things that we did that was right was to treat the computer as a medium. Not an object of media, but a medium for creating certain forms of interaction that would have developmental and educational outcomes. And treating a computer as a medium for interaction and communication means that there’s somebody on the other side, even if it only seems like it.”

— MICHAEL COLE

Kleeman contrasted this first example with another new game where the child plays with a ball that sends signals to a tablet that acts as a scorekeeper and coach. “So it may say, ‘throw the ball 30 feet in the air,’ and after you throw the ball, the tablet says, ‘that was 25 feet,’ so you know you’ve got to throw it a little harder. That puts the toy in the child’s hands and the technology is secondary.”

Along the same lines, Warren Buckleitner, the founding editor of *Children’s Technology Review*, stressed the need to balance the concrete and the abstract. “Most technology is abstract and symbolic, so we should always try to ground everything in the real world. Mix digital interactions with real-world, face-to-face interaction. And connect abstract ideas with exposure to things you can manipulate with your hands,” he

said. “You don’t want to just watch a video of the apple orchard—you go to the orchard, pick the apple, and taste the apple. And that’s never going to change.”

Craig Watkins said more efforts should be made to link technology and digital media to curricula. “When we think about media and [their] relationship to education in the classroom, we’ve done a fairly good job of providing access to the hardware and software. But we’ve done a radically poor job at designing the proper and effective curricula that really helps kids use those technologies to develop the skills that will position them to find opportunities in the future,” he said.

Finally, Al Race pointed out that educational app makers could learn a lot from video games in terms of leveraging the “zone of proximal development,” to use a term coined by developmental psychologist Vygotsky (1978), in their young users. “If you look at the most popular video games, they are able to keep kids engaged by ratcheting up the level of participation to one that is right in that proximal zone. So, it’s just hard enough that it’s interesting and they’re continuing to learn but not so hard that they get frustrated,” he said. “They do that in an automated way that is seamless to the user. And I think that educational games and educational media can do a better job of learning from that and trying to make learning games be just as engaging as those that are not focused around learning.”

“American media in particular [have] been so commercialized. We have not been able to fully achieve the potential of what educational media can be because we don’t support it philanthropically or with public funds. Almost all educational media have to earn revenue somehow, and I think we’re entering into a new age. I think this is a really great time with the rise of Amazon, Apple, Netflix, with the rise of a different business model where people are willing to pay directly for media. We’re seeing that we can unleash an incredible spectrum of new television production, for instance. We’ve never seen that before. The Internet and streaming has made that possible. So maybe there is some hope that we can begin to address more areas of education with media.”

— MILTON CHEN

Adults in the Room

Sesame Street wasn't the only program that Cooney proposed in 1966. Citing interviews with educators and child psychologists, she wrote, "Virtually everyone I saw suggested that a weekly, half-hour program for parents was a necessity for the success of a children's series. A few felt a parents' program was even more important than the one for children."

As for what this show should cover, "Most agreed that the parents' program should not only alert parents as to what was coming up for the week on the children's program, but that it should also deal with some of the typical problems of rearing young children."

This second show never materialized. But the Children's Television Workshop organized an all-out effort to encourage adult caregivers to co-view the show with kids and to reinforce its educational objectives through classroom lessons, discussions, and at-home activities. Several experts interviewed for this report

indicated that co-viewing and other adult involvement should continue to guide and grow the educational impact of media, but that the challenge of getting adults to engage with children's media has grown exponentially as parents get busier, technology becomes more personalized, and the programs proliferate.

"When we started out in 1969, most people had just one television set in the house. So if the child was going to watch something you had to produce something that would also be of interest to the parents who were probably going to be watching too," said Lloyd Morrisett. "Now, however, there are more households with multiple television sets, where the parents are not necessarily watching with the child. In addition to which, much of their video content is offered through a personal device such as a smartphone. So the conditions of viewing have changed greatly and not always to the benefit of the child."

Meanwhile, the role of teachers in the classroom is also evolving to support personalized learning, and students are increasingly creating their own media. Given these changes and continuing challenges, what roles can parents, teachers, and other caregivers play to help educational media succeed, and how can we support them?

“In the early days of Sesame Street, the writers would try to produce things that would interest or involve the adult as well as the child. Some of the jokes, for example, surely did not resonate particularly with a child, but did with the adult. We were really trying to play a dual game, having content that would produce the kind of learning we wanted but also in some way interesting enough or funny enough so that adults wanted to watch with the child. I think you can still do that.”

— LLOYD MORRISETT

Encouraging Adults

Children don't interact with media in a vacuum. As Michael Levine, who heads learning and impact at Nick Jr., noted that the programs kids watch and the apps they play with “exist within a larger ecological system, meaning a web of relationships that really have a powerful impact on children's lives.” At the center of that web are parents and guardians.

“Joan Ganz Cooney understood that effective educational media should not only be fun and engaging but also delivered within a context of extending the learning beyond the screen,” Levine continued. “And that web of relationships may be even more important than it was 50 years ago, because the amount and quality of time that adults are spending with young children is, in some respects, under attack by the media forms that we are creating.”

Indeed, as Björn Jeffrey pointed out, “A lot of parents want the iPhone or iPad to have an educational purpose, but they are not willing to put in the time to actually make it educational. Instead, it's quite the opposite.

The iPad is the device you give to your child when you absolutely do not want to participate.”

While motivated parents could fairly easily engage with their children's television viewing in the pre-Internet era, Mizuko Ito noted, “I think now it's becoming much harder for parents and other adult caregivers to keep up with the kids in terms of the new technology. This is creating an intergenerational rift around things like gaming and social media.” She added, “It's not all bad, but it's definitely a new challenge. As a media creator, you can't assume that parents have the ability to master new gaming technologies. So, co-engagement or co-viewing looks different.”

The first step toward bridging that intergenerational rift, Ito suggested, is to encourage parents to understand that their role is more than being a screen time cop. “It's not that [co-engagement] can't happen. It requires active listening and parents taking an interest. Just like a lot of parents aren't particularly interested in ballet or basketball or whatever their kid might be into, but we've learned to support our kids' interests,” she said. “If we can step back and stop stigmatizing some of the new stuff, whether it's gaming or making videos on YouTube, then we can engage with those new interests like we've engaged in other things, and ask our kids questions, and try to draw out the prosocial and positive dimensions of the things that kids are doing for fun.”

According to Al Race, “One strategy that has been at least somewhat effective is the idea of using media to prompt kids to seek specific kinds of interaction with their parents and caregivers.” Time-strapped parents need help and support to find creative ways to engage with their kids around media, he said. “Finding and catalyzing those opportunities is something that media could do more of, I think.” Still, Race acknowledged, “It is counter to the motive of most media outlets where capturing eyeballs for as long as possible is the reason for their existence. They're not likely to tell kids to go off and ask their mom and dad to play hide-and-seek instead of watching the show.”

PARENTAL ED

While the *Sesame Street* program aimed at parents and guardians was never produced, the impetus for it is still valid, noted Milton Chen. “Back when I was working at KQED, we had actual parent workshops on how to use media to help kids learn,” he explained. “Everyone should be doing more parent education. For all the effort to improving schools and early childhood education, why isn’t there more emphasis on equipping parents from the time their child is born and maybe even before that? Smart parents know that they can use educational media as springboards to other kinds of experiences conversations and interactions.”

Digital tools can help provide parenting tips and emotional support too. “I worked with one app myself which was intended to help with emotional support for parents,” said Björn Jeffery. “Being a parent is really hard; it can be very stressful and difficult to navigate. We should do more to acknowledge that and utilize technology to help parents with that process, which would help children as well.”

Desperately Seeking Curation

“Right now, I could go into the Google Play [Store] or Apple’s App Store, and I could fill out a curriculum for every grade with amazing material,” said Warren Buckleitner. “I used to be an elementary school teacher, and some of these materials can make a hard concept just kind of fall into place for a kid, and Montessori and Piaget would be...doing cartwheels with that kind of pedagogy.” The problem, he said, is that all these amazing resources are lost in the clutter of lesser offerings, “and when you go inside a school, you may see [or] you may not see the teachers using these materials because they don’t know about them or they are forced to use something that their district purchased with a contract.”

Common Sense Media saw the need for curation about eight years ago, when they began to review products in the App Store and Google Play Store that claimed to be educational. Their first step was to establish a rubric for evaluating the games and apps.

“We interviewed educators and child development experts, and we ended up with 15 attributes that roll up into a five-point rating,” explained Linda Burch. “These reviews are not crowdsourced. This is an editorial look at these products by reviewers who have been trained in this very rigorous rubric. Then we invite the teachers to review as well. We think you need to lead with something that is grounded in rigorous research and a rubric to guide the field in general, and then you allow the field to innovate and discover new things. We have teachers all the time saying, ‘Hey I discovered what I think is a great new app. Can you guys review it?’”

“Media will always be critical as a place for engagement and participation between parents and children. I think things like the apps where parents can read to their children even when they live someplace else or if they’re on a business trip are really powerful and help to build those connections. That being said, there are also a lot of apps now that will read to the child rather than the parent reading. We need to think about how we build and open up those types of experiences and connections using technology, rather than replace them.”

— RUTH WYLIE

But, Björn Jeffrey pointed out that there is still a huge need to organize the marketplace for educational apps. “All apps are basically sold in the same store, which means there are very limited options to differentiate anything. And that is a huge, huge drawback in terms of discovery and just general availability for anyone to say, ‘How can I find what I’m looking for in educational media?’ The answer is, you probably can’t,” he said.

“Try putting ‘educational games’ as a search term in the App Store. There’s obviously a lot of stuff there. Is the stuff that pops up first good or not? Is it specifically good for my kids, given where they are in life? There are very few trusted authorities in this area.”

Kathryn Ostrofsky suggested that educational media creators could help teachers and other interested adults sort through the glut of offerings by rigorously tagging their digital content with meta-data. “They should think about ways to describe, categorize, and organize their products at the content level, to break it down episode by episode and scene by scene—here is the lesson it teaches, the characters who are in it, and here’s the mood of it (from quiet to fast pace and exciting),” she said. “It would help people find what they were looking for and to find stuff they didn’t know was out there. So, for instance, an elementary school teacher wanting to teach initial letter sounds could combine things that *Sesame Street* did 20 years ago with a brand-new online game.”

Scaffolding

“In an era of social media, the idea that educational media will be produced by experts and distributed to learners and educators is a bit antiquated,” said Kate Eichhorn. Indeed, the increasing ease with which children can become makers of their own media is both exciting and a little confusing in terms of how much guidance adults can or should provide.

It can be easy for teachers to take the hands-off approach too far, said Craig Watkins, who described a high school computer game design class as part of his research. “The teacher just sort of opened the class up for students to pursue their own creative aspirations,” he recalled. “The problem was that there was no curriculum, there was no instruction whatsoever. So, a number of students simply lost interest in the class and kind of fell by the wayside, because they were really left to their own energies, their own devices, and their own interests to make that class into a learning experience.”

Watkin’s conclusion was that “while it’s important to try to leverage what we call interest-driven learning, you still have to provide guidance. You still have to

provide instruction. You still have to provide some degree of teaching and expertise in order to really catalyze that interest-driven learning and motivation into something substantial.”

Indeed, according to Brooke Stafford-Brizard, student-directed learning, including media creation, should not be confused with “just handing the tools over to students to do whatever they want.”

Having adults facilitate and scaffold the experience for the child will always be critical, and that requires a lot of upfront design by experts. In fact, she said, “It’s often the learning experiences that seem to be the most self-directed and unstructured have been the most deeply and rigorously designed to support students where they are developmentally.”

“There’s a wonderful map that I saw of the city of Sheffield in the U.K. that showed over three generations the range that a kid would have had to explore over the course of a day. For the grandparents, it was basically the entire city. You go out in the morning, and you come back in the evening and go explore wherever you want. But, for kids today, it’s basically to the end of the driveway. We are fearful of letting our children out of our sight.”

In some ways, turning to technology is a natural response from kids who can’t physically be out with friends. Look at Fortnite, for example. Remember how would go out in packs and ride their bikes around or run around the neighborhood? Now if you watch carefully how kids are playing Fortnite, they may be on their own home network with friends, and they may start out just talking about the game. But if you listen carefully over the course of an afternoon, they talk about everything. It’s like that pack of friends out riding their bicycles who discuss everything.”

— DAVID KLEEMAN

Fake News!

A toddler's proficiency with a touchscreen and a teenager's constant connectivity make it easy to assume that young people don't need much help navigating the digital world. But we are now in an era of deepfake videos and organized online disinformation campaigns. Educators report that the "digital natives" they teach often fail to think critically about the information they find online, vet the "news" they share on social media, or think seriously about their data privacy.

"Media literacy has never been more important than it is right now, not just for kids but for everyone to be able to use their critical questioning ability to discern what information is reliable, what the source of something is, and what the motivation behind it is," said Al Race. "I think the lack of any sort of systematic education around media literacy is one of the reasons we find the world in the state that it's in right now. Kids are much more technologically literate than ever

before. But that doesn't mean that they are able to be critical consumers or producers of media."

Several interviewees were equally concerned with the lack of awareness and control over the data children generate as they work, explore, socialize, and share information in the digital world. Indeed, data privacy issues are exacerbated because many of the technology platforms that are now so heavily used in schools were not created with kids and education in mind. And, typically, these companies sold access to user data rather than charge users directly.

"All these platforms are collecting data. They're making money off advertising revenues when you're in your classroom showing a video. You're also screening an advertisement for your students, which is incredibly disturbing," said Kate Eichhorn. "And when students are online using some really useful educational tools, they're generating data that is then collected,

mined, sold. Then, as kids get older, and they're constantly online, they're always sort of in public even when they're at home. That blurring of boundaries between public and private is something that's very new and difficult to handle."

"The remarkable innovation economy of this century's first decades was fueled by Silicon Valley's emphasis on access to information, social exchange, worker productivity and practical tools for living. But in retrospect, while the Google's, Amazon's and the Facebook's created enormous value, there wasn't due attention to their innovations' unintended impact on children's healthy development." said Michael Levine. "In 2020, we all can and must be more intentional about planning to avoid technology's pratfalls and to scale-up bigger potential benefits to ensure children's future success."

With this growing awareness of the risks that come with media's benefits, how should we design technology tools and platforms to be safer for kids? And what can educators and media makers do to help improve the media literacy of the next generation?

"Indeed, because of the constant competition presented by entertainment programs on television, educational material must be just as lively, fast-moving, and dramatically presented as standard TV fare, if it hopes to win a sizeable audience. It is an irony of television that, for all its potential to educate, it also provides endless distractions from pursuits of the mind."

— JOAN GANZ COONEY, 1966

Media Literacy

"We need to start early, and we need to think of media literacy across the curriculum," said David Kleeman. "I think one of the other challenges with media literacy has been trying to engage teachers when they are already feeling overwhelmed with the amount that's asked of them. So it would help to show how media literacy fits into the study of history, or into the study of English."

"I suspect that people who are now in their late teens to early 20s will make very different decisions when they start to have their own children over the next decade or so. I'm optimistic that they will be more cautious and generally smarter than today's parents. I don't think they will be interested in censoring their children's access to online content, but based on their own experiences of growing up in a digital era, I suspect they will be more attentive to questions of privacy and to other concerns, including many we haven't yet identified."

— KATE EICHHORN

Such large-scale curricular overhauls are "a tough sell right now," Kleeman admitted. "I think our best hope is probably to start encouraging media literacy as an essential element of teacher training so that we get a generation of teachers who have grown up with digital media and who understand why it's important to embed media literacy in their teaching, and not just deal with it as an add on."

According to Milton Chen, "One of the best ways in which children can become more media literate is to make their own media. At the same time, we should recognize that media production is complicated. It requires knowledge of a lot of different disciplines."

Despite the rapidly evolving media landscape, "the core skills are still the ones that the earliest media literacy advocates were looking at," said Henry Jenkins. "How do you discern the quality of information? How do you read representations against real world experiences? How do you judge the motives of the people who produced the content? But the answers look different in a world of the Internet than in the world of a handful of broadcasters. There are now some collective means of discerning the quality of information rather than putting that entirely on the back of the individual."

It's no longer just about judging the quality of information you consume, he continued. "To me, media literacy boils down to having accountability for the quality of information you produce and what you circulate. Before you pass something along to someone else, you need to verify the quality of the information it contains and think about how it might be harmful. So it's no longer 'What media do I consume?' It's, 'What media do I participate in? What media do I spread? What media do I share with other people?'"

"All cognition is social. A major impact on the development of adolescence is social media. The negative consequences associated with high media use are well-documented, and they're the kind of thing that adults in our society should be concerned about because it's bad health. Kids don't get enough sleep. They're walking around in high anxiety. They're involved in social conflict, and it's 24/7. And bad health is combined with a toxic way of looking at the world from my point of view. The change in social relations is absolutely astounding, and its importance is also inscribed in the brain."

— MICHAEL COLE

Privacy

Whenever we go online, we leak information about ourselves, both voluntarily and inadvertently—whether it's the search terms we Google or the photos we post. Both kinds of disclosures can have major ramifications.

"When I was growing up, you could be pretty selective about what photographs or what documentation of your childhood you brought forward into your adult life. You could afford to take more risks because embarrassing moments disappeared, and you could reinvent your childhood and edit those memories," said Kate Eichhorn. "I think that moving forward, we're losing the ability to do that, and that's going to have profound impact on kids. Their childhood and

adolescence are going to define who they are as adults in a much more profound way. That is a huge difference and not necessarily a good one. I think it's good for people to be able to radically reinvent themselves."

The lines between public and private selves continue to blur, noted Karen Cator. "Children go to school and they have social interactions, and then they go home and they don't have downtime because they get online and these social interactions continue," she said. "We need three things—rules, tools, and schools. We need really good rules at home and at school, like rules of engagement and acceptable use policies. We also need tools: the technology tools that allow us to get rid of something, to lock out screens, to set Do Not Disturb limits, to set limits on time spent in social media. Companies are beginning to build these into devices. And the third need is schools, meaning education. We need to continue to develop curriculum to engage with students about technology use—what's appropriate and what's not healthy."

According to Craig Watkins, one of the problems with introducing kids to technology at a very young age is that not only do they "take these technologies for granted, but the technologies also get so fully and naturally incorporated into kids' everyday lives that there's no real opportunity to think critically about their broader implications."

He continued, "We need to help design educational content or awareness campaigns that empower young people to think more critically about issues of privacy and data rights issues, and about the ways in which algorithms are in some ways designed to collect as much information about you, your behaviors, and your practices or inclinations as possible in order to monetize that information."

Watkins suggested that privacy and personal data should be taught alongside computer science, and that these lessons should start in the early grades. "Who controls your online persona or your Facebook profile or your Instagram profile? How is that information about you being used? What should you have in order to assert some type of influence or authority over how that data is being used? I think

these are critical issues,” he said. “These are issues that now are rendering our democracy at stake. These are issues that are creating a news and information landscape that we find increasingly perilous because we’re not sure what’s true and what’s not true. And the fact is that our schools, generally speaking, are not effectively engaging these issues. I see that as a striking failure.”

“We’re moving in the direction of the quantified self and very personalized learning, lots of influences on personal health management, and lots more data about your own lifelong learning trajectory. I think that we’ll see a bunch more filters and personalized controls that people will develop, but also regulation and public policy. There will be a very different set of regulatory structures, maybe even five to ten years from now, that will have to do with privacy and protecting children.”

— MICHAEL LEVINE

Pursuing Equity

The goal for *Sesame Street* was never simply to teach and entertain kids, but to close achievement and opportunity gaps for America's youth. In her 1966 proposal for the show, Cooney alluded to these gaps as a symptom of a national crisis in education.

“The national need for more and better educated people and the national demand that we give the disadvantaged child a fair chance at the beginning mean that we cannot wait for the final and definitive word from the researchers, or until there are enough teachers and classrooms to accommodate our pre-school population. We must begin to search for new means and techniques to solve our educational problems,” she wrote.

In retrospect, this larger goal was overly optimistic, noted Michael Levine. “When Mrs. Cooney and others came up with the plan for *Sesame Street*, they were testing this possibility that they could close the

achievement gap. But that wasn't going to happen through educational media by itself, without it being part of a very robust set of educational interventions. At best, they could raise everybody's skill level,” he said. “We're still stuck in a framing of media as menace versus media as a magic elixir that can somehow rescue or make huge and important impacts on social equity and educational opportunity.”

“In general, I think that educational technology has had a mixed/negative track record in terms of transforming teaching and learning practices. I think that's still a promise largely unfulfilled.”

— MICHAEL LEVINE

Indeed, for decades, educational media creators have continued to believe that the broad reach and relatively low cost of their products could help close academic achievement gaps between children of different racial, ethnic, and economic backgrounds. Not only has that vision gone largely unfulfilled, but the gaps have arguably widened.

“Left on their own, novel technologies will always increase the equity gap, even when those technologies are free,” Mizuko Ito observed. “The research is really definitive now that it increases the equity gap, because the more tech-savvy and high social capital families will take advantage of those resources at higher rates. What we’re seeing now is that the Internet and all the self-directed learning is giving superpowers to kids who are already in highly educated households with very high access to technology.”

How can we break that cycle and design educational media with equity in mind? There is no simple fix to systemic inequities, but how can the next generation of media be part of a larger effort to close persistent gaps in access, opportunity, and achievement?

“This whole upward mobility thing is the American way, but the American educational system is not organized to create upward mobility. From my point of view, the educational system is just trying to recapitalize the existing order. And when schools get too far ahead, then heads roll. Heads will roll.”

— MICHAEL COLE

Big Picture

“The education and media that Joan Ganz Cooney was invested in plays a role [in children’s learning]. But if it’s not complemented, supported, and expanded by what’s happening in the formal classroom, then its potential for impact is likely diminished,” said Craig Watkins. “What I’m suggesting is that all of the educational media in the world by itself is not enough in terms of sustaining lifelong learning—sustaining

“Data plans are really expensive, and a student who is growing up without a data plan or without Wi-Fi at home is really at a disadvantage compared to a child who doesn’t have to worry about access. Public schools and libraries need to step up to the challenge by providing Wi-Fi and laptops. Then, they need to get out of the way, and get rid of the login hoops. Free public access must be taken to heart.”

— WARREN BUCKLEITNER

the kind of high level academic development that we would like to see with our young people—if our schools are inadequately designed and prepared to help support it.”

“Starting in the mid 1990s, there was this huge effort to put computers and the Internet in schools as a way of bridging the so-called digital divide,” Watkins continued. “But what we’ve learned since then is that what we’ve created are classrooms that are technology or media rich but curriculum poor. We’ve done a fairly good job of providing access to the hardware and software. However, we’ve done a radically poor job at designing the proper and effective curricula and modernizing learning in ways that really help kids to use those technologies to develop the right kinds of skills that position them to find opportunities in the future.”

The challenge is immense, partly because America’s schools are inherently resistant to systemic reforms, noted Milton Chen. “I have said, and it sometimes gets a laugh, that if you wanted to create a system that is perfectly incapable of change, then you would create the American educational system,” he said. “For starters, you would not give anyone any real authority over the educational system to change it. You would create 14,000 school boards with people running for office who would view that job on the school board as a stepping stone to a greater political career.”

Chen suggested that some progress could be made by overhauling teacher education. “Part of the reason why we see so little change in schools is the lack of change and innovation in how teachers are prepared,” he said. “But still, if you were a teacher and you wanted to start off the school year with a blank slate, and there were things that you knew you wanted to teach kids, including making their own media, studying history and literature through media—boy, you’d run up immediately against all sorts of rules and regulations about why you can’t do so.”

“I think one small positive wedge is seeing people who have started text messaging to connect schools and parents, or to connect content outside of school learning and parents. If parents don’t naturally respond or check emails from schools or afterschool clubs, a text message has a certain timeliness and urgency to it to suggest things like: ‘Here are three things you can talk about tonight at the dinner table.’ ‘Here are three free things that you can do in your community that will amplify what your child’s been learning at school.’ I think that’s a much more effective means of communicating.”

— DAVID KLEEMAN

Small Steps

If offering educational resources for free can’t help close achievement gaps, what can? “We need to create more awareness about what it really takes to design educational technology with equity in mind,” said Mizuko Ito. For example, she described a project her lab did to alert low-income families about summer learning opportunities.

“We found that, first of all, text messaging was the only reliable way to communicate with them, even though technically they had Internet access. And second, they really would not take advantage of anything over \$50. So, we designed a simple database of all the summer learning opportunities in our region

that cost less than \$50 and set up a system where families would get texted about these opportunities,” she explained. “That’s not a system that would be attractive to high-income families who are willing to pay hundreds of dollars for summer camps, but it took off like wildfire among lower-income families.”

Mariana Díaz-Wionczek stressed the need for more language and cultural inclusivity in children’s media. “If you don’t see yourself reflected in media, it’s as if you don’t exist. That’s a message kids internalize: ‘I don’t exist. I’m not important, and therefore I’m not represented.’ That’s why I want to see all sorts of kids represented in these media products, so that they themselves see themselves in society,” she said. “I think there’s an opportunity to talk a little bit more about language equality, if you will. I am helping a lot with bilingual content and content in Spanish because one of my missions is to elevate the other languages to the same level as English, because there are all these languages and they’re all beautiful.”

Finally, Karen Cator suggested, “We need a fund for technology for the public good.” Specifically, she said, a coalition of educators, nonprofits, and media makers could create a white label list of educational products. “This would help people be smart consumers. And we could create a free channel with those particular websites or apps that could be accessed for free if you had a device but you didn’t have a data plan. Or, even if you did have a data plan, accessing these things wouldn’t count against your data. If we created that venue, then it seems to me that the Internet service providers might agree to something like that.”

When interviewed for this report, Warren Buckleitner recalled that a few years before the premiere of *Sesame Street*, the late Patrick Suppes, a Stanford Professor and early pioneer of computer-aided learning, suggested, “In a few more years, millions of schoolchildren will have access to what Philip of Macedon’s son Alexander enjoyed as a royal prerogative: the personal services of a tutor as well informed and as responsive as Aristotle.”²

Both Suppe’s prediction and Joan Ganz Cooney’s proposal reflect the optimism and ambition of an era when, as Buckleitner put it, “a lot of people were starting to catch on to the possibility that we might be at the dawn of a golden age when every child could have access to all the riches of knowledge. And it was a very intoxicating idea.”

Most of the contributors to this report would likely agree with Buckleitner’s conclusion that this golden age took much longer than “a few more years,” but may

now finally be upon us, or at least tantalizingly close. “I think, in a way, we are the future,” said Buckleitner.

Still, big challenges remain. The breathtaking pace of educational innovation favors some areas of learning while neglecting many others, lacks curation and quality control, and is far more accessible to children and families who are already advantaged. In addition, the same technologies that offer access into an ever-expanding universe of knowledge, tools, and collaborators can also expose young people to

inappropriate content, privacy violations, cyberbullying, and torrents of misinformation.

The hope of this report is that clear-eyed reflection on this history will enlighten and fortify our aspirations for the future and bring that golden age ever closer. While the focus was on how the lessons we have learned from the past might inform our visions for future media and technology for learning and healthy development, the interviews frequently touched on a larger context—of overburdened teachers, funding limitations, district red tape, and deep structural inequalities—with which any such visions must contend.

“This is the tyranny of the possible, where you say, ‘I’d love to do this, but we can’t because of X, Y, and Z,’” noted Henry Jenkins. “You know, ‘It would be great, but there’s no money and the regulations would never allow it. It would be great, but...’ so on and so forth.”

Without dismissing such obstacles, Jenkins argued that to simply accept them is a self-fulfilling prophecy of defeat. “I’m a great believer in that leap forward to a bigger vision and then figure out how you get there,” he said. “And, yeah, I do think media can be part of the solution to it.”

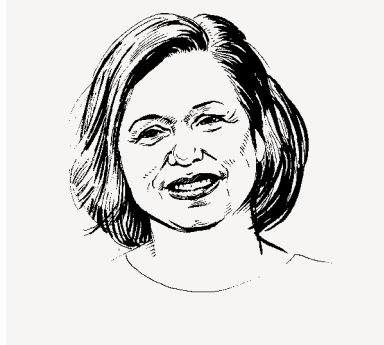
Likewise, the purpose of envisioning the future is not to pretend that we can avoid surprises, but to bolster our ability to meet them. According to Ruth Wylie, “It’s not that we can predict everything. We should expect to be surprised. But imagining lots of situations and scenarios—not just what we want to happen, but what are the unexpected consequences that might result from this new innovation— builds in that flexibility.”

Indeed, in her 1966 proposal, Cooney admitted that she wasn’t certain what impact such a show might have on young people and which of her hypotheses might be proved or disproved. But, she concluded, “There is no substitute for trying it, and evaluating its effects.”

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