A two-part guide for developers and creators

Elizabeth Rood, EdD

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Potential power

Developing quality immersive content for tweens and teens

The Joan Ganz Cooney Center at Sesame Workshop

ABOUT THE AUTHOR

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I was humbled and appreciative to see our research lab's DICE framework used as a driving theme for this report. Simply put, DICE recommends designers and users focus on "epic wins" in VR, experiences that would be dangerous, impossible, counterproductive, or expensive if we did them in the real world (see Bailenson et al., 2025). Typically, we talk about adults in reference to DICE: Training firefighters, rehabilitating stroke victims, flying to the moon all fit squarely in DICE.

But reading this report made me reconsider how DICE applies to tweens and teens. What would my tween self have done in the 1980s in a perceptually realistic, immersive space where I could interact with people from all over the world with no consequences to my behaviors? Dangerous (picking a fight with an avatar that can't hurt me), Impossible (masquerading as an adult in a real business meeting), Counterproductive (doing something that would get me grounded in the real world) and Expensive (traveling all the way to Europe to test out a few classic American curse words) all sound pretty appealing to my mischievous 12-year-old self.

A few years ago, my lab tried to have a serious lab meeting inside a public social VR world as we considered using it for an experiment. We donned our headsets, and found ourselves in a colorful gymnasium filled with people and balls, nets, and games. After about a minute, a group surrounded us, yelled a string of words not appropriate for publication, and pummeled our avatars by throwing all sorts of objects at our heads. It was teenagers being teenagers. We had to flee VR and continue our meeting on Zoom.

DICE has a different meaning when viewed through the lens of a 10-year-old (Quest's minimum age for VR users). At 10 years old, the frontal cortex is not fully developed, and kids are still trying to master impulse control. Resisting basic urges is hard for kids in the real world, where actions have consequences. Physical kids hit back, and parents ground kids who curse at a real dinner table. Parents can't easily see and monitor what is going on inside the headset.

On the day I turned in this foreword, the first three experiences on the "top selling this week" list on the Quest app store were all social games where people play together, rated E for "Everyone," and commonly played by young people: *Gorilla Tag*, *UG*, and *Beat Saber*. For those of us who have been building and testing VR since the early days of the medium, its meteoric rise in popularity among youth may be one of the biggest surprises, even if there were hints from early studies in the late '90s showing positive outcomes for children in assessment scenarios (as reviewed in Rizzo et al., 2006). Applications for children were peripheral use cases.

Empirical study of VR has grown exponentially, from about 300 experimental papers in 1999 to over 20,000 today (Markowitz & Bailenson, 2024). However, research on tweens and teens is rare compared to research on adults, likely less than five percent of all overall studies. Hence, there is extra burden placed on designers, as scholars simply haven't provided the guidance that builders need. This report is a great first step in this direction, and I ask you to think about DICE, from a tween and teen's point of view, as you read. There are no limits to what one can do in VR—that is what makes it appealing! How we design for kids will be critical moving forward.

JEREMY N. BAILENSON, PHD
Founding Director, Stanford University's Virtual Human Interaction Lab

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Meta (n.d.) Browse top-selling this week VR Games on Meta Quest – Meta Store

** NB: Dr. Jeremy Bailenson was not funded by Meta or the Joan Ganz Cooney Center; he volunteered to review this guide.*

A decade ago, virtual reality (VR) was a niche (and expensive!) experience, saved for research labs and tech enthusiasts. Since then, the VR market has seen strong and steady growth.[1] Meanwhile, various "metaverse"[2] platforms and games have exploded in popularity, with titles like Roblox, *Minecraft*, and *Fortnite* leading the way with child and youth end-users.[3]

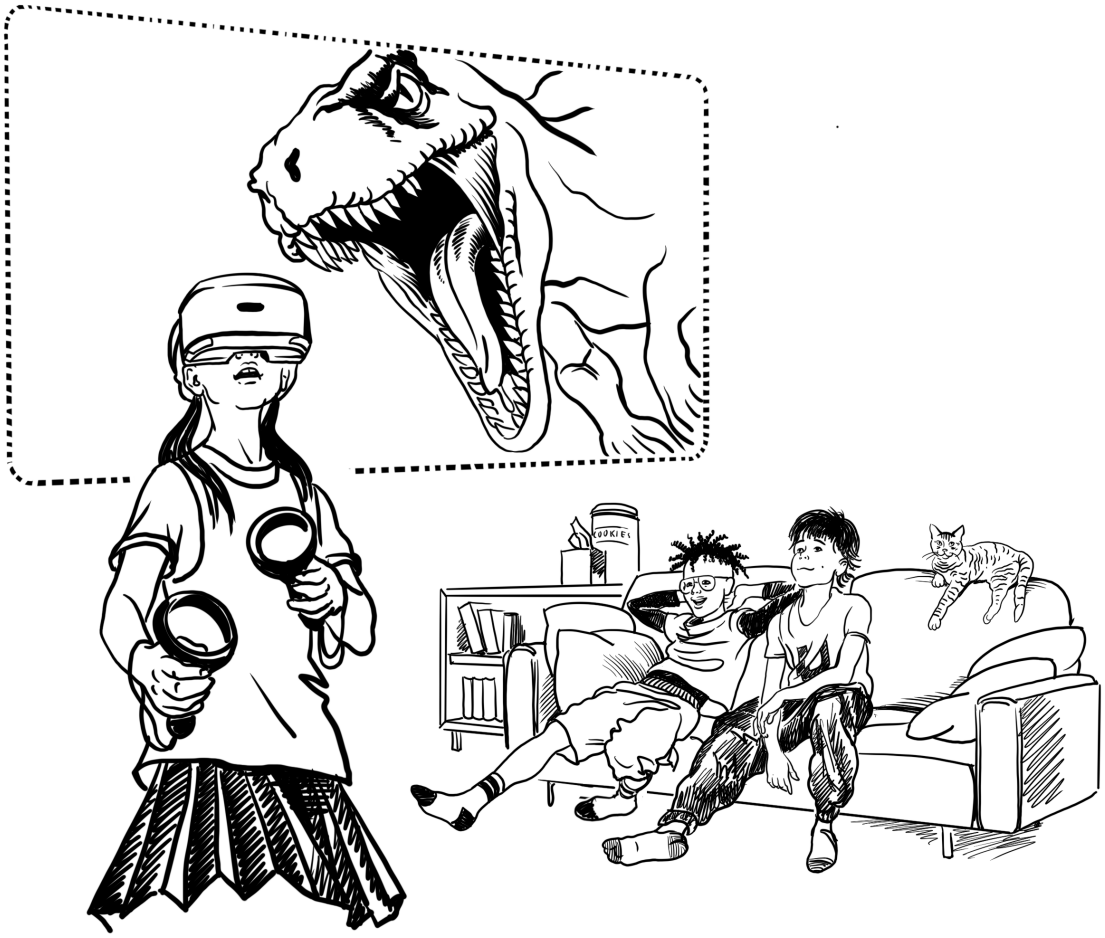
Experts are split on the future of extended reality in the metaverse. According to a Pew Research Center report, roughly half of experts polled believe that by 2040, a billion people will turn to quality immersive media as a meaningful part of daily life.[4] These experts point to advances in mixed and augmented reality (MR and AR)—in which the digital experience is layered onto the real world—as accelerants to adoption; they are bullish about applications from gaming and entertainment to education and industry.

The other half are more skeptical, believing the potential downsides of immersion could thwart adoption. The Pew report notes that "advances in the metaverse technologies will magnify all human activities, including the problems now associated with the current Web 2.0 environment." Success of the metaverse might best be measured by the benefit it brings to those who explore and play in it.

[1] Grand View Research, n.d.
[2] The metaverse is an interactive virtual world people explore by embodying an avatar. Roblox is an example of a metaverse for kids.
[3] Newzoo, 2022.
[4] Anderson & Rainie, 2022.

Leading VR researcher Jeremy Bailenson says that beneficial use of VR hinges on thoughtful applications of the transformative medium. His DICE Framework (see page 17) focuses on particular uses for which VR is uniquely powerful and beneficial.[5] A recent review of three decades of VR scholarship indicates that there are not yet clear findings related to children's use of VR, though research with adults makes clear that embodying avatars can shape both perception and behavior.[6]

As VR headsets reach younger audiences, developers are making design decisions that will shape how immersive media supports—or undermines—youth development for years to come. How might this powerful new technology be used for good? This report, meant for developers and designers of immersive mixed and virtual reality experiences, offers guidance on designing VR and MR experiences that have a positive impact for young people.



[5] Center for Academic Innovation, 2023.
[6] Bailenson et al., 2025.

While research on kids' immersive experiences is limited,[7] we are building upon 50 years of quality research on kids' media and technology. We know that there are some basic first principles of designing for kids: products should be safe; parents should have transparency into what their kids will experience and encounter; and design should intentionally support well-being. With immersive experiences, what are the tensions and trade-offs when designing for kids? How do we give kids what they want in a way that supports learning and positive development?

> First principles of design for kids:
> + Safety
> + Transparency for kids and parents
> + Designed for well-being

To answer these questions, we began by convening a group of about a dozen creators who make VR content for kids. The goal was to better understand both the opportunities and challenges of developing quality, age-appropriate digital immersive experiences for kids. We then engaged a group of young co-designers to imagine new immersive experiences with us. We have quoted their ideas and voices throughout this report, along with the voices of their parents who participated in focus groups.

The focus of this guide is preteens and young teens engaged in immersive virtual or mixed reality experiences.

Since preteens are a new audience for VR headset use (see Meta's parent-managed accounts), we engaged in research and design with children ages 10 to 12 and their parents. Eight kids, recruited with our partners at The GIANT Room, partnered with us over the course of a few days. They playtested a handful of current VR games on the first day. In the subsequent days, kids engaged in co-design to imagine and design new games. During the last co-design session, a parent of each participating kid joined us for a focus group.

Throughout this guide, we use the term preteens or tweens to refer to kids 10–12, and young teens to refer to youth ages 13–15.

[7] Bailey & Bailenson, 2017.

Content matters

In 1961, Federal Communications Commission Chairman Newton Minnow famously described American television as a "vast wasteland" of content. Minnow's challenge to television programmers inspired a visionary television producer, Joan Ganz Cooney, to create *Sesame Street*, demonstrating that quality content could be paired with formats that young people would love.

Fast forward 50-some years, and the Joan Ganz Cooney Center continues to ask how quality media, delivered with emerging technology, can support the well-being of kids. For this project, we talked with parents about the content available to their kids. In their answers, we hear an echo of Minnow's concerns about the wasteland. Parents today lament digital "brainrot"—trivial content drawing kids in without offering substance or enduring value—and ask more from those creating content:

> *"The world's become a little bit lazy going for the dopamine effect—get the kids hooked. It's a bit like, sell cheap plastic goods, and the world will figure out where the trash is going. This has become the digital version of that trash. And parents are trying to figure out, what do I do with this trash? But it doesn't have to be that way."*
>
> **– MOTHER OF A 10-YEAR-OLD**

Parents and kids may be wowed by new technology, but ultimately what makes new technology stick is its ability to offer meaningful media and contribute positively to development.

> *"I would like VR experiences to create purpose-oriented, meaningful content that contributes to society."*
>
> **– MOTHER OF A 12-YEAR-OLD**

Beneficial content, understood broadly

Certainly, developing immersive educational content is one way to benefit young people. Virtual reality is being used as an innovation in teaching and learning for abstract and conceptual subjects like math and physics (see *Prisms*) and to transport young people to far-flung locations in place (see *Apollo 11*) and time (see *HistoryMaker VR*). Augmented and mixed reality are proving useful for engaging young people collaboratively in a range of disciplines, from civic engagement (see *Kinfolk*) to geography to sustainability. (See our 2023 report, *Swimming with Sharks and Walking on Mars* for more details on the use of immersive media in secondary schools.)

But beneficial content doesn't necessarily mean it must be "educational," in the strictest sense. For developers, "beneficial content" is less about genre (e.g., educational vs. entertaining) and more about whether an experience supports an aspect of positive development such as creativity, learning, or social connection.

In fact, *Minecraft* was the game most frequently cited by kids and parents in our sessions as a positive, educationally beneficial example of digital play. Parents love the social aspect of *Minecraft*, while they also recognize that digital play on the platform encourages thinking, problem-solving, and creativity:

> *"Minecraft is the game that I'm most okay with. Both my kids play. What I like is they're building something and they're using their minds. I also like that they play with other kids, they'll have their friends on FaceTime, and they're all playing it together."*
>
> – MOTHER OF A 10-YEAR-OLD AND 12-YEAR-OLD

> *"If it's constructive and helps you with focus and analytical thinking, I think it's a good platform. But if it's addictive, then it's really a big no."*
>
> – MOTHER OF A 12-YEAR-OLD

Other parents in the focus group noted the benefits they saw from kids developing entrepreneurial skills in *Animal Crossing*, engaging in imaginary role-playing with games on Roblox or properties like *The Sims*, and collaboratively strategizing with friends on *Fortnite*.

This guide focuses on the creation of educationally beneficial content intended for preteens and young teens using virtual reality headsets. As we designed with kids, ages 10–12, and talked to their parents, **we came to understand "educational content" as the content that benefits kids to develop competencies and skills relevant to life beyond the digital realm**. VR and MR experiences that promote creativity, foster curiosity and discovery, and build digital savvy emerged as key themes for what makes digital content educational.

Grounding in research to amplify potential power

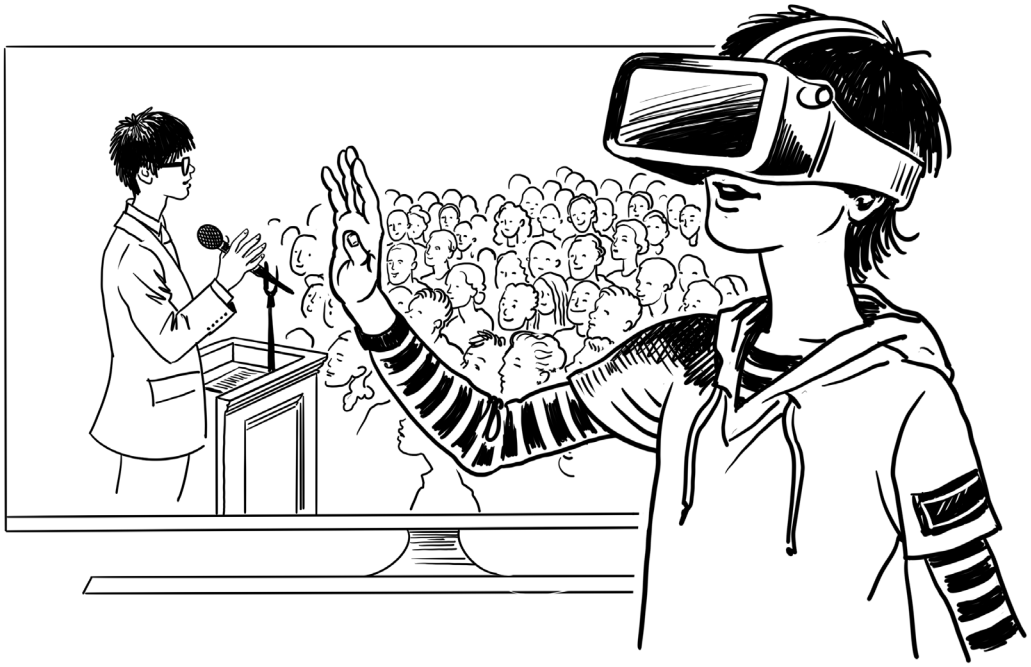
Adolescent development and well-being

Products that preteens and teens use should be designed with their development and well-being in mind. Safety by design and privacy protections are fundamental because adolescents are still developing key decision-making capabilities and, as minors, need and deserve a standard of care. Experiences should seek to give young people a chance to explore, understand, and regulate their emotions and experience autonomy in age-appropriate ways.

Additionally, preteens and young teens are wired for social engagement and learning. At the start of adolescence, kids began to shift attention from their family to their friends. This does not mean that parents are not—or should not be—involved. In fact, research shows a link between healthy developmental growth and positive adult support,[8] which is particularly important as young people navigate technologies that are new to society or new to them.[9]

[8] Svetaz et al., 2014.
[9] American Psychological Association, 2023.

Importantly, adolescence is known as a sensitive period for development, with significant neurological growth and rewiring, particularly related to social interaction and learning how to navigate cultural norms.[10] Social experiences in virtual reality and in the metaverse may strongly resemble in-person interaction and offer opportunities to build social skills. But it is important that these experiences augment and strengthen in-person social lives in order to promote healthy development, rather than displacing or diminishing opportunities for in-person relationships and real-world growth.[11]



RECOMMENDED PRIMERS ON CHILD AND YOUTH DEVELOPMENT RELATED TO MEDIA AND TECHNOLOGY:

Digital Childhood, from 5Rights Foundation, includes a breakdown of key digital usage and needs by age, from early childhood through adolescence.

UNICEF Innocenti's *Responsible Innovation in Technology for Children*, a two-part report, offers a framework with eight aspects of well-being shown through research to be associated with gaming when designed well.

[10] Cheng et al., 2024.
[11] For more on virtual reality games and well-being related to relationships, emotions, and autonomy, see *Immerse, Play, Thrive*

How parents see the intersection of technology and development

Parents see the potential power of digital media, while they also understand that kids' engagement with technology means more time on screens. For parents, what kids gain, in addition to what they give up, matters. Offering educationally beneficial content is one important way to tip the scale toward a net positive in parents' eyes:

> *"What is the opportunity cost of time. The reality is that our kids, while they are digital natives, also have to build buildings, design textiles. They are living in the physical world. We want them to augment, but not be completely immersed in a digital-only world."*
>
> **– MOTHER OF A 10-YEAR-OLD**

> *"When it comes to content for kids, it doesn't have to be negative. My daughter learned coding through Osmo. So there is a way to do tech-based play which is enriching"*
>
> **– FATHER OF A 10-YEAR-OLD**

At the same time, designers should be mindful of parents' concerns with technology, in general, and the ways that VR may amplify already existing worries they have.

> *"My concern about VR is the dopamine fix. The overstimulation can be too much."*
>
> **– MOTHER OF A 10-YEAR-OLD**

Some parents predicted that the detachment afforded by VR headsets might be so compelling for kids that they will be more drawn to frictionless immersive environments than they are to real life, which is often messy, dull, or challenging:

> *"With VR, I'm concerned that prolonged exposure could distort how my child processes the world. I'm also worried that it may be an escape outlet, if she has troubles IRL, instead of meeting her problems head on."*
>
> **– MOTHER OF A 10-YEAR-OLD**

By designing with quality content in mind, content creators can build trust with parents that interaction with technology will benefit their children's development.

Leveraging affordances for most beneficial use

The Virtual Human Interaction Lab at Stanford University has been studying virtual reality for more than 20 years. Its work led to the creation of the DICE framework[12] (see page 17)—standing for dangerous, impossible, counterproductive, and expensive—which provides a guide to the kinds of experiences that most appropriately take advantage of the virtual reality format. This framework is particularly useful for thinking beyond the use-case of gaming: What content and experiences might be paired with virtual reality to benefit kids' development and learning?

Pairing quality content with thoughtful use-cases, VR experiences for kids can augment learning and social development in powerful, beneficial ways. Developers might use DICE as a tool for ideation when pitching new experiences. For example, they might ask, "What does this allow kids to safely experience that would otherwise be impossible, dangerous, or inaccessible?"

[12] Bailenson et al., 2025.

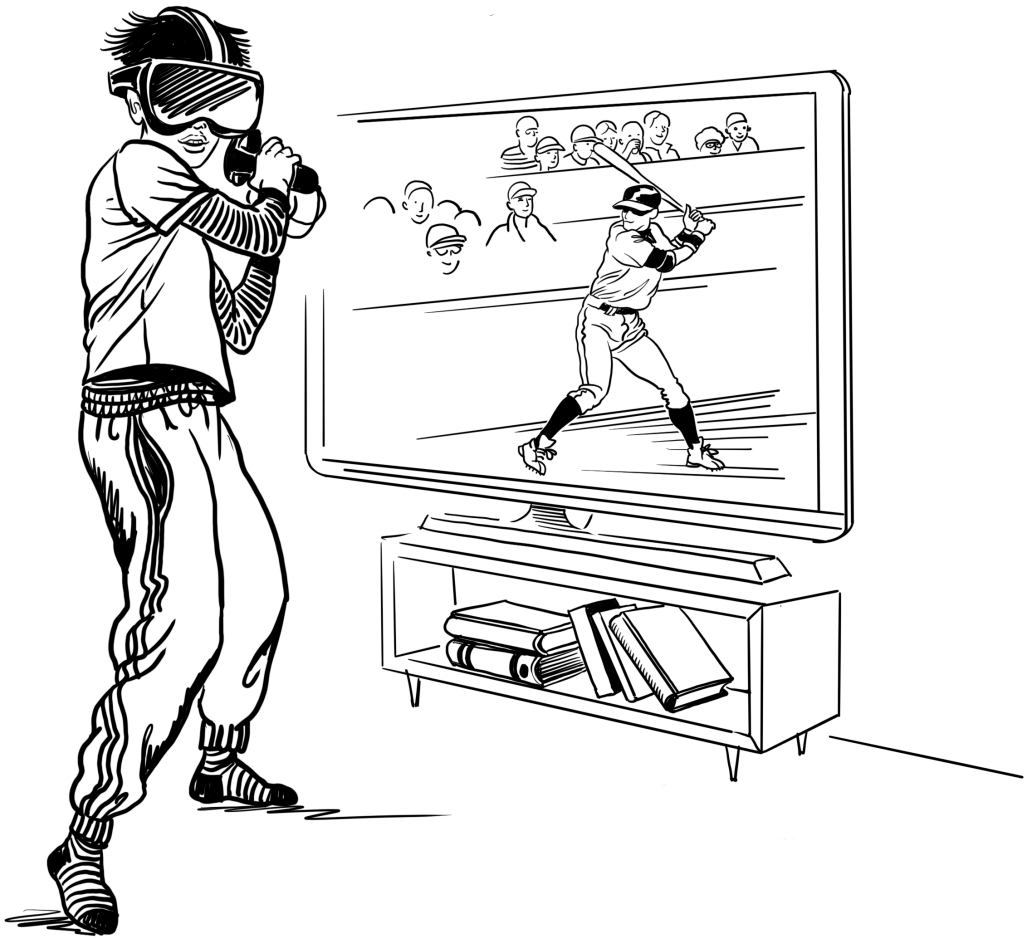
The DICE framework applied to immersive experiences for youth

COMPONENT	POTENTIAL DEVELOPMENTALLY APPROPRIATE VR EXPERIENCES
	→ Test driving a boat you built to see if it will float → Climbing high up in a tree to see from a new perspective → Learning to put out a kitchen fire → Dueling like a knight or samurai → Driving a car (if you're unlicensed)
	→ Embodying a raptor or song bird to study flight or perception → Visiting a forest 30 years in the future to see the impact of global warming on biodiversity → Playing with phenomena like gravity, friction, or light → Visiting an ancient city as it would have been at its peak → Holding a molecule in your hands to see its composition → Experiencing the world as a person of a different gender, race, age, or physical ability
	→ Excavating a park in your city to see what's below → Cutting down a tree to connect purchasing decisions to impact → Engineering a building's destruction → Surviving in the wild, with minimal supplies → Comparing the insides of human, dog, and bird bodies → Experimenting with highly reactive chemical combinations
	→ Watching the sun set from the top of a pyramid → Practicing speech or debate in front of crowds → Visiting town squares in Madrid, Mexico City, and Santiago to practice different dialects of Spanish → Designing and building a house → Training for on-field, game-day decisions for an upcoming match → Experiencing the beauty of wilderness areas → Seeing a sold-out concert or special event

The DICE framework is useful for thinking beyond the use-case of gaming: what content and experiences might be paired with virtual reality to benefit kids' development and learning?

VR as a playground where kids may run wild

As Bailenson points out in the foreword of this report, what makes VR valuable is also what makes it challenging. Immersion can enable opportunities to experiment with what is otherwise impossible or ill-advised, offering a context ripe for testing boundaries, theories, and norms, especially for youth. Experimenting in VR can be pro-social, such as building greater empathy for others or feeling moved to take action on an important issue. But, all too often, VR developers face challenges managing unexpected, unwanted, and even antisocial behavior on their platforms, particularly from kids. These dynamics make sense when seen from a developmental perspective. After all, preteens and young teens are still learning to regulate their own behavior in the social world, and the coupling of anonymity and lack of adult oversight in VR seems to invite some wild, if developmentally expected, behaviors.



In our conversations with Bailenson, he reflected on his own experiences as a parent. He emphasizes the difficulty of relying on parental oversight of VR experiences for children:

> *"As parents we often struggle to monitor our children's use of traditional devices–phones, computers, and tablets. Now we have VR, which has its own set of complications. VR headsets are quite novel and many times parents cannot even turn them on, let alone figure out the layers of account management required to run an application. Parents can peek over a kid's shoulder when they're on a tablet or phone, but with VR, it's harder to know what's going on unless the headset has been set to "casting" mode. Developers should encourage kids to cast to invite family members into their experience—perhaps by offering incentives or designing mechanics to reward casting."*
>
> **– DR. JEREMY BAILENSON,**
> **FOUNDER OF THE VIRTUAL HUMAN INTERACTION LAB**

As we heard in our conversations with developers, preteens and young teens make up a significant audience for VR apps. From a safety and design perspective, minimal parental oversight might be assumed, so designers must carefully consider how to encourage conditions and contexts that nudge toward constructive exploration. We recommend developers and designers look to the Digital Thriving Playbook methods on productive (and disruptive) behavior and prosociality and the insights shared in our accompanying guide, *Immerse, Play, Thrive*.

Creating immersive content that inspires

While the DICE framework provides a useful way to think about what should be built for VR, it doesn't give specific guidance about what kinds of content would be best received by consumers. As we worked with kids and talked to parents, three focal areas for content development emerged. Parents saw these areas as offering important educational benefits to their kids. To strengthen the educational value of the VR content ecosystem, we recommend developing new content aligned with one of these areas: creativity, interest-driven learning, and/or digital citizenship and media literacy.

VR GAMES CAN PROVIDE EDUCATIONAL BENEFITS TO YOUTH BY:

→ enabling creativity

→ supporting interest-driven learning

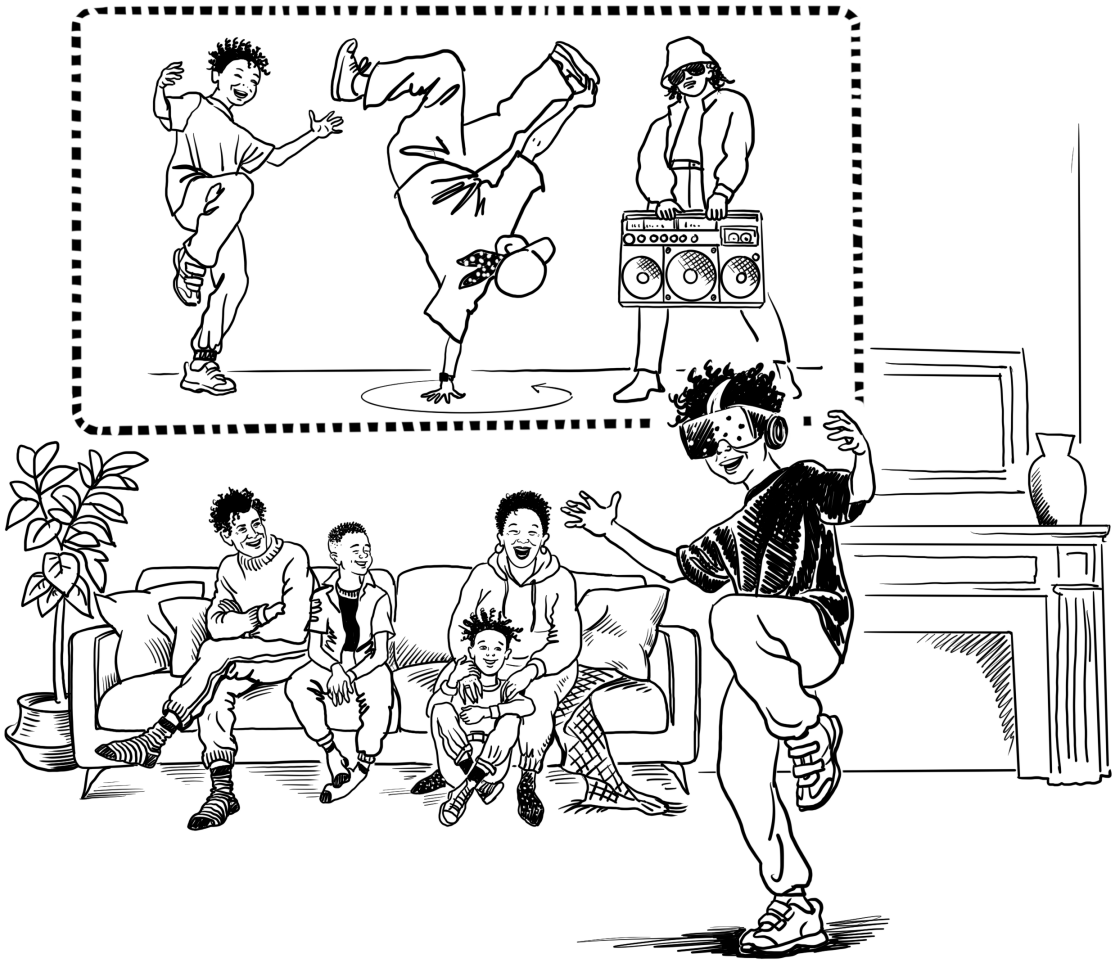
AND/OR

→ embedding digital citizenship and media literacy

With ideas for promising content, developers can then use the DICE framework to consider if and why a digital media experience is optimized and safe for full immersion in virtual reality, or if a less immersive medium might better deliver educational value.

Creativity

Through digital play, kids can build skills and mindsets associated with creativity. They may have the opportunity to practice creative thinking skills, including cognitive flexibility, idea generation, and evaluative selection.[13] They may also learn the social-emotional mindsets needed for creative endeavors, including persisting through challenges, embracing open-ended experiences, and managing ambiguity. Digital engagement can also give young people unique opportunities for creative output. Kids may engage their imaginations, build and design, or express themselves through art and music.



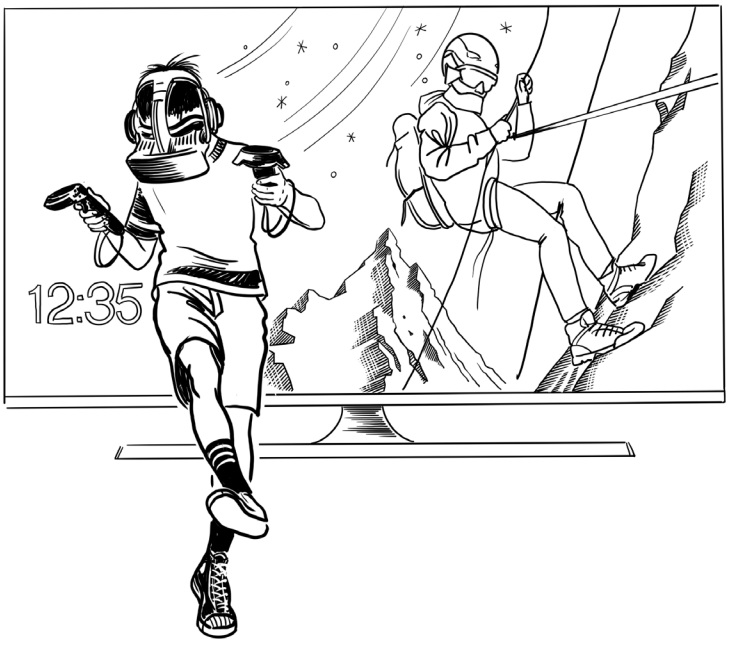
[13] Alonso et al., 2024.

Both the parents and kids we worked with emphasized the importance of unlocking creativity through digital play. For some, customization and self-expression were the focus:

> *"My daughter, she's really into Roblox. She's very creative. And I like that it gives her an outlet to create these dolls or these designs and this fashion stuff, since that's what she really likes."*
>
> **– MOTHER OF A 10-YEAR-OLD AND 12-YEAR-OLD**

Tapping into imagination was also noted as valuable and important. Parents connected the pretend play their kids enjoyed earlier in childhood, which fostered creative imagination and social skills, to simulation games their preteens would play.

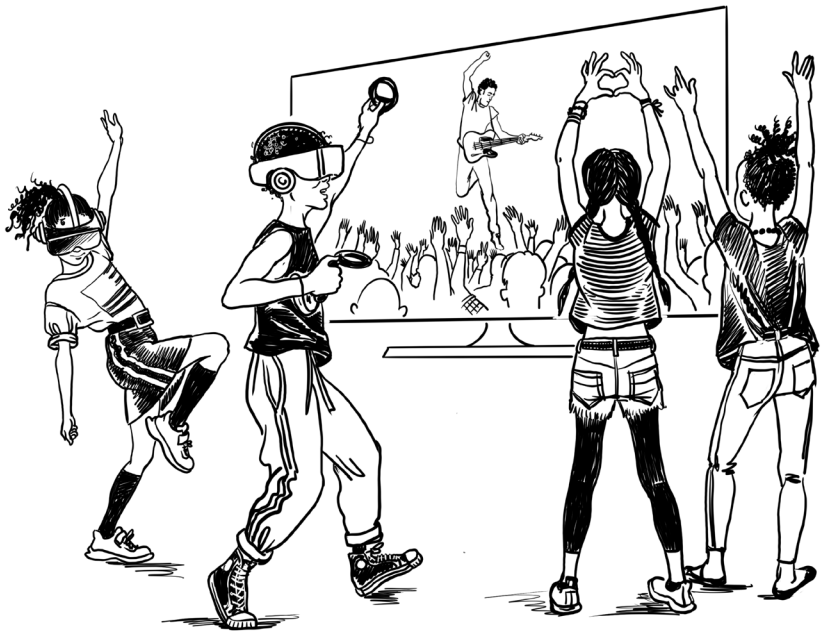
> *"My daughter found this game called* Tomodachi Life*. She created people from real life– her friends, their parents, whatever– and gave them real-life experiences. I see it as, she's playing virtual dolls with actual people."*
>
> **– FATHER OF A 10-YEAR-OLD**



Open-ended, creative sandbox games, particularly Minecraft and Animal Crossing, were cited by parents and kids alike as favorites. These games offer many ways to engage, from small choices like how to customize characters to large choices like what kind of world to build or how to engage in the world:

> *"I second the* Animal Crossing *experience [as a game I'm happy for my kid to play.] My daughter had a couple of years with the game, and in that time, she built an entire empire… I think that for the most part, she likes to create. She spends an exorbitant amount of time customizing figures, designing outfits– the stuff that is adjacent to the game. Yeah, that's her enjoyment. Their enjoyment is with the customization, the creation, it's an outlet I don't mind."*
>
> **– MOTHER OF A 10-YEAR-OLD**

What we heard from parents and kids aligns with research from UNICEF Innocenti showing that **digital play promotes creativity when it encourages kids to customize and design, explore multiple paths to a solution, and experiment with game mechanics.**[14]



[14] UNICEF Innocenti, 2024.

How immersive exploration and play can encourage creativity

Sandbox experiences, with their open-ended nature, provide great opportunities for creativity. These can be enhanced with engaging and **fantastical storylines** that tap into kids' imaginations. Kids may also be drawn into **life simulations** with interesting narratives.

To maximize creative potential, kids should be offered opportunities to **shape the storyline** through their choices. Through our work with kids, we've seen that they expect to be able to manipulate objects in the digital worlds they encounter. **They are excited to tinker, explore, and try things out**. Applying the DICE framework, consider what creative exploration kids wish they could embrace in real life but can't because of safety, practicality, or expense. Take apart a computer or electric car engine? Test out wild soda concoctions with unlimited ingredients with NPC customers to see what they love or hate? See what would happen if gravity was turned up or down on earth? Design and build a city?

Apps and experiences that are not sandbox or open worlds can also boost creativity. Some may be focused on a creative endeavor, like in music, architecture, or painting. But **any app can be designed to offer multiple pathways and ways to engage**. Giving choices for how to engage and providing features that allow players to build, create, or express themselves are all ways to enhance creativity.

The **multisensory nature** of a headset offers additional affordances for creativity. Providing ways for kids to play with or customize music and other sounds, colors and visuals, and haptics are all ways to tap into creativity.

Usability is a key challenge for VR/MR developers because of the newness of immersive technology. For instance, players may land in a metaverse experience but be unsure of how to explore or what to do. Some level of support is needed; at the same time, being too directive can impede open exploration or communicate that there is a "right" way to approach the experience.

DESIGN RECOMMENDATIONS
CREATIVITY

- Provide a canvas for imaginative role-play and world-building.
- Incorporate fantasy or other rich narrative to tap into imagination.
- Design for open-ended, non-linear experiences that include multiple ways to approach play and flexible objectives.
- Design for choice with a high level of customization.
- Provide lots of manipulable elements to play and tinker with in sandbox experiences and open worlds.
- Use the DICE framework to imagine what kinds of creative testing and exploration kids could use to fulfill curiosities impossible to explore in real life.
- Offer a rich tapestry of music and visuals, and, where possible, give youth opportunities to tailor their sensory experience.
- Support creative exploration by being mindful with tutorials and onboarding; offer suggested ways to get started rather than directive steps.

Remember that emotional mindset and sense of autonomy are key to creativity. See *Immerse, Play, Thrive* for more.

Interest-driven learning

Learning is often associated with school. Yet, across the world, young people spend only 10–20% of their waking hours in school.[15] Self-driven learning, including the capacity to discover interests and pursue passions outside of formal education, is critical for today's youth. Researchers find that the most resilient learners connect their interests to resources and a community to deepen and sustain learning.[16]

Digital media is now a mainstay of preteen and young teen life, with roughly one-third of American teens self-describing their use of top platforms as "almost constant."[17] In this context, it is critical that technology serves as a key resource for interest-driven learning.

The parents we talked to spoke with urgency about the need to offer young people compelling media with nutritional value:

> *"So a big part of this, it's learning. Why does a digital experience need to be* Fortnite*? Why can it not be about, hey, I'm learning something phenomenal about physics or science?"*
>
> **– MOTHER OF A 10-YEAR-OLD**

[15] Evans, 2017.
[16] Ito, et al., 2013.
[17] Faverio & Sidoti, 2024.

Parents in our sessions were enthusiastic about the potential for immersive technology to offer content that is both highly engaging and fundamentally educational.

> *"If you can make the education component compelling and immersive and exciting– something that they want to do– that's the key."*
>
> **– MOTHER OF A 10-YEAR-OLD**

The parents reflected on their experience with YouTube, sharing the way that this platform has lots of interesting, beneficial content but that, all too often, the algorithm pushes what is most popular, rather than educational, quality content. One mother reflected, "YouTube is the worst. I'd much rather he just play a game."

Parents felt enthusiastic about the potential for VR headsets, paired with well-designed apps and interactive experiences for kids, to engage their kids with educationally rich content.

> *"I like the opportunity to experience videos with teaching elements. But I would like to see teaching avenues expand. I love the idea of travel, world expanding philosophical views."*
>
> **– MOTHER OF A 12-YEAR-OLD**

The industry has a tremendous opportunity to meet this enthusiasm with quality, educational content. Given the compelling potential of VR, family consumers are seeking content that inspires kids to find, explore, and deepen their interests and passions.

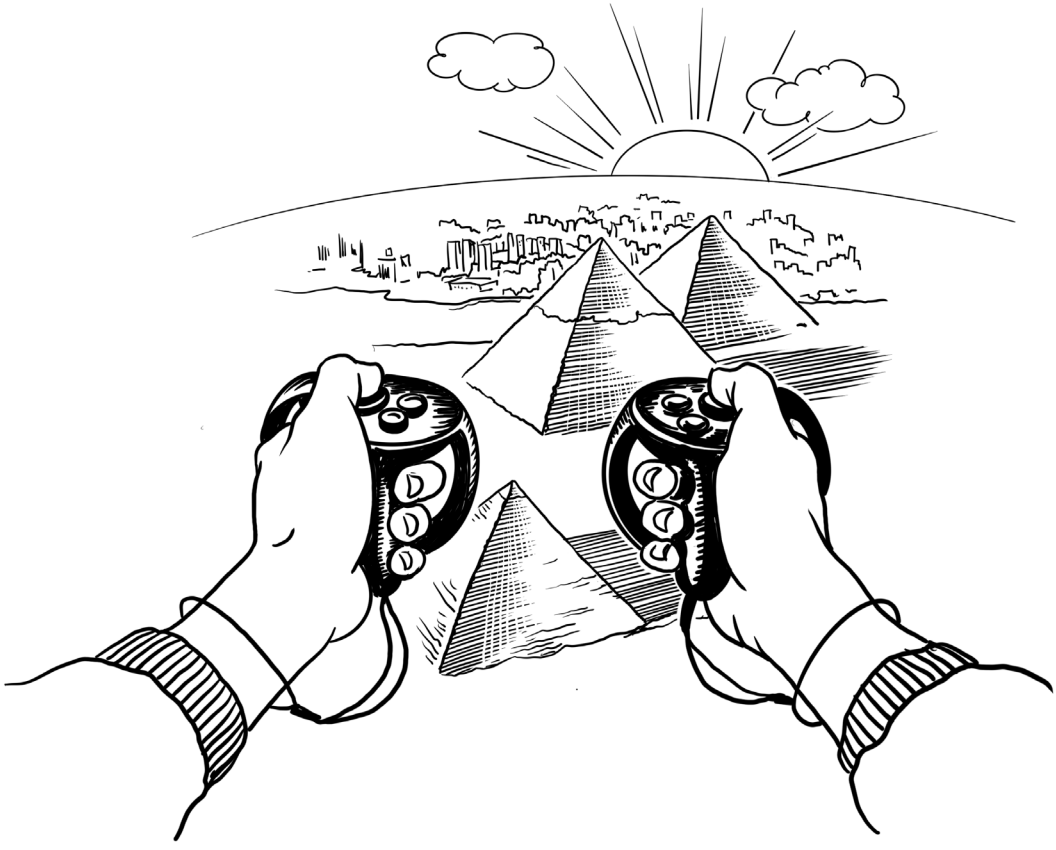
Leveraging VR for interest-driven learning

The parents in our focus group talked broadly about what makes a digital experience educational. From travel and history to science and building, parents recognize **value in a wide range of educational immersive media**. Parents are enthusiastic about the way that digital play and exploration can **motivate kids to explore topics** they may not encounter in their formal education:

> *"Why can't VR utilize these digital avenues for education, especially in public schools where field trips are not offered as much as they should be. The idea of learning physics or traveling or just giving real life experience, using it as an educational tool, is a great opportunity."*
>
> **– FATHER OF A 10-YEAR-OLD**

They also spoke about the value of developing competencies needed for success in real life. One mother described the educational value she believed *Animal Crossing* offered her daughter, teaching entrepreneurial skills, including strategic problem-solving, perspective taking, and persistence.

> *"My daughter plays* Animal Crossing*, and I really like it for her, because she builds the worlds, she has to earn her currency on it, and she has to trade. She had to build a concert venue and think about how she'd attract people there. And one of the very cool things she did is, after a couple of years or more of playing* Animal Crossing*, she just reset her entire account. She wiped everything out, and she wanted to start again, and that was really cool because she didn't want to get shackled by her choices two years ago. That is real life. I really like that aspect."*
>
> **– MOTHER OF A 10-YEAR-OLD**



Interest-driven educational media can help kids **develop a learning mindset**, taking a positive approach to problems and challenges they encounter. This kind of dispositional learning may **transfer beyond the digital experience to the real world**.

Additionally, **VR experiences can support the development of perspective-taking**, a foundational element of social-emotional learning and a cognitive skill important for a wide range of disciplines, from business to history. Content that invites users to embody a person with a different life experience, for example, can provide an opportunity for empathetic understanding.[18]

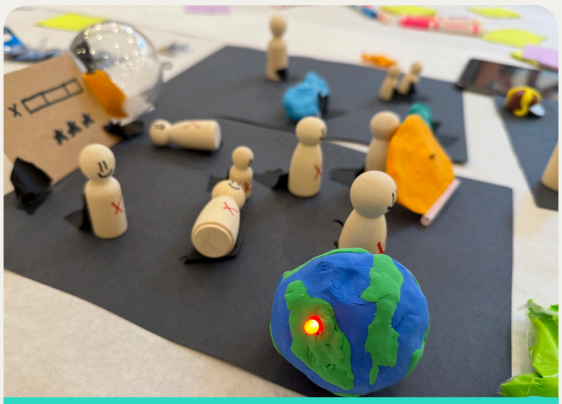
Immersion offers a compelling way to engage with educational media, and parents are enthusiastic about their kids gaining skills and knowledge as they play and explore in VR and MR. Parents define educational value less in terms of formal instruction and more in terms of whether an experience sparks curiosity, persistence, and self-directed exploration.

FROM OUR CO-DESIGN SESSIONS: THOUGHTS ON INTEREST-BASED LEARNING AND DIGITAL PLAY

As we designed VR games together with kids, they imagined many games that had learning elements. 13-year-old Alex designed a highly strategic puzzle game called “Time Travel,” in which players spawn to different points in history to explore and solve a mystery. At each stop in the timeline, players complete challenges and gather clues. Learning about history is embedded in the gameplay and historic information helps players solve the mystery and achieve the game objective.

Another kid co-designer, 10-year-old Corey, designed “Spinning World,” an experience in which the player spins planet Earth and uses immersive media to travel to destinations across the globe, and in different eras.

Jonah, a 12-year-old, designed a racing game in which a player builds new cars and tests them in a race. To win the race, the player needs to learn about car design, physics, and material engineering to design a working car model.



Low-tech prototyping for Corey’s "Spinning World" game

[18] Bailenson et al, 2025.

DESIGN RECOMMENDATIONS
INTEREST-DRIVEN LEARNING

- Design for young people with diverse aspirations, interests, and personalities.
- Provide in-time, easy-to-understand tips and tutorials to support a feeling of competence engaging with VR experiences. Usability challenges can undermine a young person's enthusiasm and discourage their engagement, progress, and openness to challenge.
- Offer opportunities for kids to learn new content or practice new skills and then apply what they have learned to achieve a game objective.
- Develop interest-rich content to allow exploration of a particular topic or engagement with a particular hobby; look at app stores to see what areas of interest are not available for kids.
- Offer opportunities for teens to explore nonacademic interests and passions, including those that link to potential career exploration.
- Offer thoughtful experiences that immerse young people in the experience of other people and living things to promote perspective-taking.
- Consider ways that immersion could support social development, from practicing for a debate or performance to learning a second or third language.
- Design to expand young people's world views through cross-cultural experiential learning, including travel across time and around the globe.
- Use the DICE framework to consider ways to fulfill other wonders that are impossible to experience in real life.

Digital citizenship and media literacy

In recent years, digital platforms have invested considerably in tools for parent support and supervision. A recent poll of 1,000 families by the Family Online Safety Institute shows that parents who use these tools find them helpful and effective.[19] Yet **parent controls are underutilized**: only 35% of parents polled made use of supervision tools included in gaming consoles (compared to 51% for tablets). This lack of adoption indicates that families either feel overwhelmed or are unaware of the tools available. As a parent in our focus group summed up:

> *"Hey, parents, we're going to give you 50,000 controls, and you can figure it out. That's actually incredibly hard. To be honest, I'd just rather not… Life is too hard."*
>
> **– MOTHER OF A 10-YEAR-OLD**

While some safeguards live at the platform level, many of the most meaningful digital citizenship lessons are taught through moment-to-moment content design choices. "*What are the norms of this community? What happens if rules are broken? How can I feel safe and have fun?*" Nearly every parent we talked to voiced a desire to have digital experiences better support their young people so they know how to constructively engage.

[19] Family Online Safety Institute, 2025.

They shared broad worries about what kids glean from digital play that is not wholesome or age-appropriate and shared examples of children becoming more aggressive and talking to peers in inappropriate ways. They shared worries that their kids might come across adult content, be bullied or preyed upon, play longer than was healthy, encounter gambling, or be scammed. In other words, parents were concerned about their kids' developing media literacy skills, such as critical thinking about what they encounter online; they want them to become digital citizens who know how to be safe and contribute positively to online communities.

Our discussions with content creators and developers revealed the challenges they face in creating and maintaining digital spaces that promote positivity and thriving. Many described the great efforts they have gone to keep their digital communities positive and the deleterious impact that one or two players can have on others.

Part of the answer to these challenges lies in intentional design, using strategies such as those included in the Digital Thriving Playbook to create digital environments that are conducive to prosocial interactions. Some developers said that AI-powered content moderation tools were invaluable, especially for smaller development teams who are committed to keeping tabs on interactions to keep young players safe.[20]

At the same time, there is a tremendous opportunity to **reimagine content moderation as digital citizenship learning** in VR and MR experiences. At the most basic level, this means offering a clear code of conduct that **communicates what is expected in simple, kid-friendly language**. In addition, offering the *why* behind the code of conduct—for example, "we are committed to fun and fair competition for all players of all ages"—helps build buy-in. Preteens and teens will be more likely to **find value in community expectations when the purpose is clear, when following norms improves the experience, and when consequences are consistently and fairly enforced.**

Still, as any parent or teacher of a teen will tell you, establishing expectations is not a one-and-done effort. Young people need, and deserve, **continual reinforcement of prosocial norms**. When boundaries are pushed or rules broken, a near-immediate response should follow, such as a warning, the loss of chat functionality, or a temporary suspension. This response is best framed as a consequence and a teaching moment, rather than a punishment.

[20] One that was recommended, though we have not reviewed, is *Voice Patrol*.

In taking a digital citizenship approach, the purpose of communicating rules and enforcing consequences is not only about managing digital social space. It is also about **helping young people better internalize boundaries, develop social skills, and know when and how to find support:**

> *"[Our kids are] learning how to be a person through these platforms. [They're figuring out] 'how do I know if this human being is somebody I can trust or not?' or 'my friend blocked me.' How to look for that social support."*
>
> **– MOTHER OF A 12-YEAR-OLD**

VR and MR experiences can build digital citizenship by pairing prosocial design with proactive content moderation that takes a teaching and learning approach, recognizing that preteens and teens are still experimenting with social interactions and learning what is appropriate, desirable, and fun.

Incorporating **reminders and prompts—related to both social and personal behaviors—can support young people** to develop media literacy skills. Over time, success looks like young people internalizing the messages and demonstrating stronger critical thinking about their choices:

> *"They're evolving and growing. They're learning to self-regulate. Initially, introducing tools to help them is good. 'You should think about taking a pause. You should think about not using these words or doing these things.' But they also need to learn to adopt it as their own practice. They need to learn to say, I need to take a break.'"*
>
> – MOTHER OF A 12-YEAR-OLD

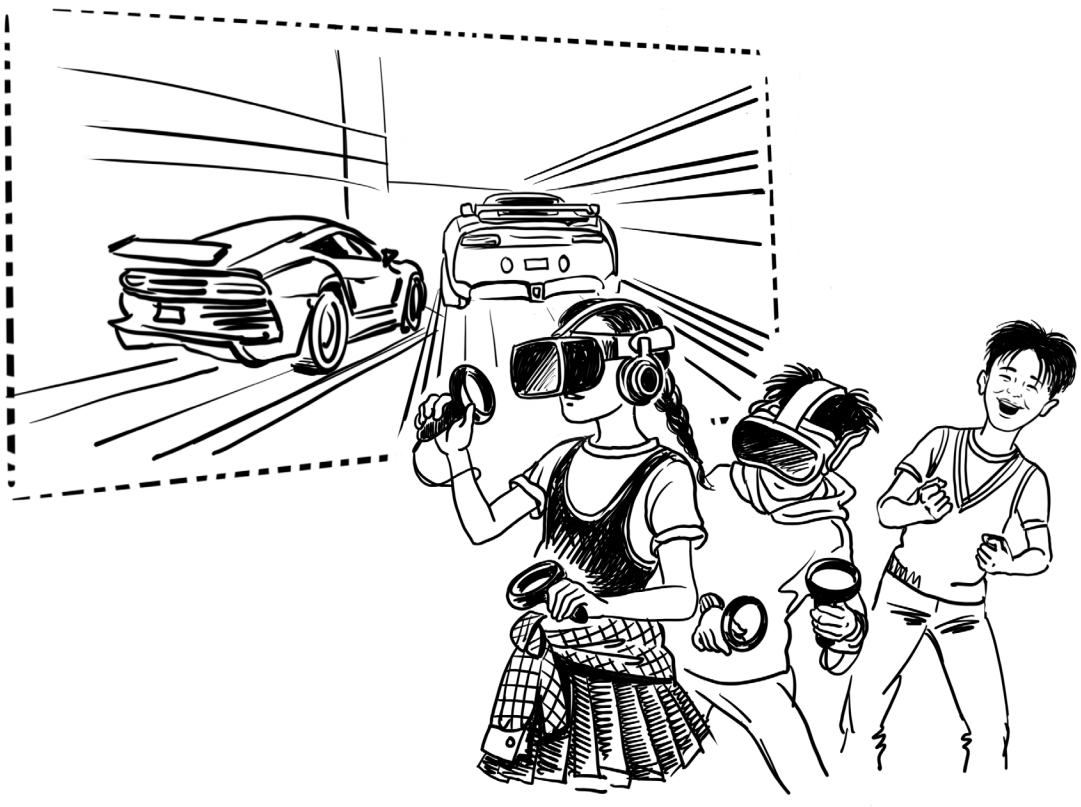
Parents we talked to were enthusiastic about the idea of platforms partnering with them to build their kids' digital citizenship and media literacy skills. They emphasized the importance of better understanding kids' digital lives. They wanted greater transparency not only about screen time but also about activities and interactions that would benefit from dialogue or guidance. For example, they wanted to know when reporting or blocking had taken place:

> *"The quality of reporting is what we're all talking about. The reporting is just not useful enough, or not granular enough, or tuned enough to what we are looking to achieve. Providing a digest would help without infringing too much into the kid's privacy. You could summarize the conversation or flag use of words."*
>
> – FATHER OF A 10-YEAR-OLD

While parent controls are often situated at the platform level, content moderation sits with apps and games. And parents' greatest interest seems to be better understanding the **qualitative experience of their kids' digital play** so that they have the information they need to support children's developing media literacy and sense of digital citizenship:

> *"I'd like VR creators to offer transparency between VR and physical reality, especially a way for parents to understand—and track if necessary—the child's experience. Like, what games are they playing? Who are they interacting with?"*
>
> – MOTHER OF A 12-YEAR-OLD

While they may not want a zillion controls, **parents are enthusiastic about partnering with VR and MR companies** to teach preteens and young teens how to be safe and constructive digital citizens. VR and MR designers have the great opportunity to teach media literacy skills to youth to help them understand and evaluate what is offered to them online.



DESIGN RECOMMENDATIONS
EMBEDDING DIGITAL CITIZENSHIP AND MEDIA LITERACY

- Develop a clear, easy to understand, kid-friendly code of conduct, terms positively framed (what kids should do), rather than a list of problem behaviors. Share the code up front and reinforce it.
- Communicate (and remind) players about the purpose behind the code of conduct, using reasons that will resonate with young people, such fairness, fun, inclusiveness, healthy competition, having a safe space for creative output, or connection and cohesion.
- Design for in-time responses to breaches of conduct and frame these as learning opportunities, rather than punishments. Take care that consequences are consistently enforced and vary in size, depending on seriousness.
- Provide transparency and support for young people for the full range of features (e.g., communication options, in-app purchases, reporting and blocking) so that they are learning to navigate your platform as informed, empowered users.
- Include prompts to encourage breaks, discourage inappropriate language or sharing of information, and confirm spending.
- Support kids' transitions out of the VR and MR session with timers, reminders, and other features designed to make it easier to end game-play and leave the headset.
- Share key information with parents to enlist their support as mentors and teachers related to safe and constructive digital engagement.

Immersive experiences have different opportunity costs, and different potential power, than the 2D gaming, entertainment, and educational technology that has come before. Designing from first principles of beneficial use and creating content with educational value is key to building a VR ecosystem with a positive, beneficial net value for preteens and teens.

Content that offers educational value, understood broadly, is particularly important for parents whose kids are experimenting with this emerging technology. Developers and content creators making new immersive experiences for tweens and teens should pay attention to three areas of educational value—creativity, interest-driven learning, and digital citizenship—so this new technology lives up to its potential.

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