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A Whole New World?

Towards a Child-Friendly Metaverse

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Foreword

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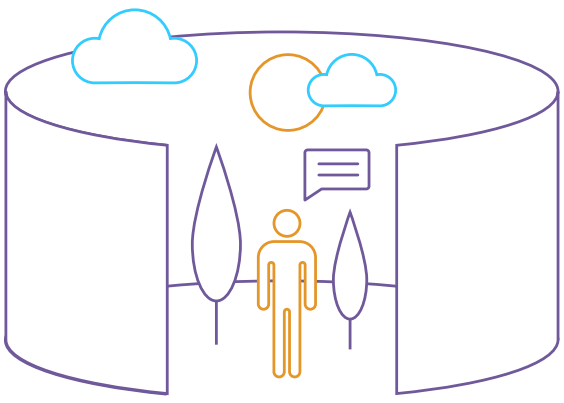
For those of us working in and around technology, the metaverse is a hugely exciting development. There is great promise in its potential to excite and entertain, to transform education and create a more participatory online experience for children, including the most vulnerable.

But it is also a mystifying concept. In my conversations with tech companies, Government and independent experts, I am struck by the lack of consensus about what is, and is not, the metaverse. Some focus on the hardware, others on the functionality and others still on the feelings it will evoke in its users.

It's therefore not a surprise that this confusion has filtered down to families, as demonstrated by this report. A minority of parents, and even smaller proportion of children, feel that they understand what is meant by the metaverse and can explain it to someone else.

This is important because it's a symptom of a wider problem: that those who are creating the metaverse, in the here and now, are not necessarily thinking about children's interests front and centre. In some ways, this is understandable – the metaverse isn't only being designed for children and their parents after all. But children are not a niche group: globally, they make up one third of internet users. Web 2.0 was not built with their needs in mind, to the detriment of families. The same mistake cannot be allowed to happen again.

This report is not intended to be the final word on what a child-friendly metaverse should or must look like, but a springboard for discussion and debate. I look forward to discussing our findings with all those who can influence children's online lives, so that together we can navigate this new, uncharted landscape.



Contents

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Executive summary

For many who work in technology, no conversation about the future is complete without mention of the metaverse. Yet the concept has proved elusive, with no single accepted understanding of what the metaverse is, let alone when, and how, it will enter into existence – if it hasn't already.

Against this backdrop, Internet Matters observed that something was missing from the conversation: the voices of parents and children. The metaverse has the potential to transform family life and yet little work has been done to bring them into the debate. The development of established online platforms, sometimes referred to as Web 2.0, suffered through a failure to consider the needs of families at the outset. As a result, children have come to harm. The same mistake cannot be repeated as the creation of the metaverse unfolds – and it starts with speaking to children and parents themselves.

This report summarises current developments in the metaverse landscape, along with early evidence of the opportunities and risks posed to children. It presents new research into what families think and feel about the metaverse, based on an original survey conducted for Internet Matters.

The key findings are:

Many families say they have little to no understanding of the metaverse

- Four in 10 parents (41%) say they don't know much, or anything, about the metaverse. Over half of children (53%) say the same.
- Even fewer feel able to explain the term to someone else. Among those parents and children who have heard a lot or a little about the metaverse, 61% of parents and less than half (39%) of children would feel confident explaining it.
- Overall, just 33% of parents and 15% of children know a little or a lot about the metaverse **and** feel confident explaining it.

Early evidence suggests that the metaverse presents enormous opportunities for children – but also considerable risks

- Key opportunities include enhanced educational content and experiences, greater access to social or cultural events and new opportunities to develop wide-ranging skills.
- Key risks include exposure to harmful content, greater exploitation and abuse and the misuse of children's personal data.

Parents are more likely than children to identify the risks of the metaverse, meaning that they will play a critically important role in helping children to stay safe

- Parents and children make similar assessments of the benefits of the metaverse, with 81% and 83% identifying one benefit respectively. 51% of parents and 56% of children identify three benefits.
- Only 59% of children identify at least one concern about the metaverse, compared to 81% of parents. Just 14% of children identify three concerns, compared to over half (53%) of parents.

Parents cannot do it alone; those who are building and governing the metaverse need ensure that it is child-friendly from the start

- The best interests of children need to guide the design of metaverse platforms as a primary consideration – not an afterthought.
- The tech industry needs to do more to reach out to families, involving them in the design process and educate the wider public so that parents are prepared for what is to come.
- Regulation, including the Online Safety Bill and Children's Code, needs to keep pace with the metaverse as it develops so that children are not just protected in Web 2.0 environments but in Web 3.0 as well. For example, Ofcom (the forthcoming online safety regulator) should require companies offering metaverse services to identify the risks associated with (or amplified) by these in their children's risk assessments. It should consider developing a dedicated Code of Practice for metaverse services.

Introduction

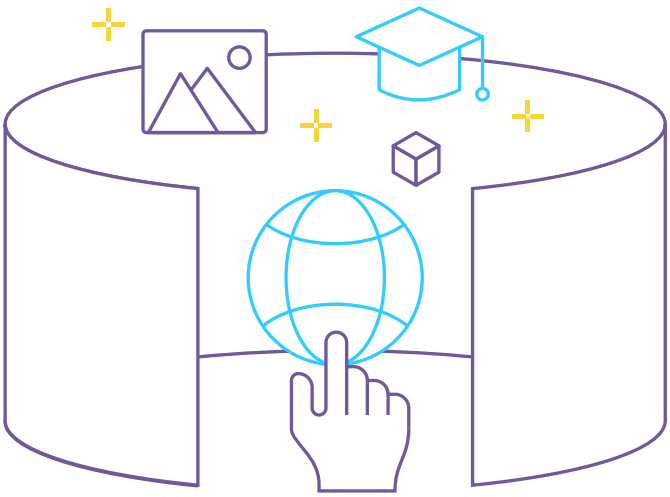
The metaverse is a concept which is receiving ever-increasing investment of time and resources by the technology industry. McKinsey and Company estimate that from January-May 2022, $120 billion was invested in the metaverse – more than double the investments made in the whole of 2021.[1] Discussions about the future of technology rarely go by without mention of the metaverse.

But so far, something has been missing from this fever pitch level of debate and activity: the voices and experiences of families. There are around 8.2 million families with children in the UK.[2] Parents and caregivers are spending more and more on technology – up to £232 per child per year according to recent evidence[3] – making them a key market for the technology industry. Yet little has been done to understand the implications of the metaverse for families.

This report seeks to address this gap. Internet Matters wanted to gauge how familiar parents and children in the UK today are with the concept of the metaverse. Furthermore, we wanted to help spark a much-needed conversation about the opportunities and risks to these groups. Our aim is to help the tech sector to understand not simply what the ideal metaverse looks like, but the ideal metaverse *for children and families.*[4]

This work is based on:

- A review of the existing literature on the metaverse, including grey literature.
- A new, nationally representative survey of 2,000 parents of children aged 4-16 and 1,007 children aged 9-16 in the UK.[5]
- Conversations with leading experts drawn from industry, policy, academia and civil society.



Defining the metaverse

There is no single, unanimously accepted definition of what is meant by the metaverse. However, descriptions of it tend to focus on one (or more) of three things:

1. **What the metaverse will feel like**
2. **What people will do in the metaverse**
3. **The technology used to access the metaverse**

What the metaverse will feel like

Some focus on what the metaverse will feel like to its users. The key comparison used is that it will feel much more life-like than how we currently experience the internet. For example, Nick Clegg, President of Global Affairs at industry-leader Meta, identifies the following factors which will contribute to a more life-like feeling of the metaverse:[6]

- Ephemerality – interactions will be short-lived and without record.
- Embodiment – our bodies will be involved in our experience of the metaverse.
- Immersion – we will find ourselves absorbed in a shared space.

Meta is not alone in presenting its understanding of the metaverse in this way. Words such as "constancy", "immersion" and "persistence" are commonly used. For example, US technology consulting firm Gartner describe the metaverse as:

"...a collective virtual open space, created by the convergence of virtually enhanced physical and digital reality. It is physically persistent and provides enhanced immersive experiences."[7]

Some people talk about the metaverse, while others talk about metaverses (plural). This surfaces a key debate – will there be a single metaverse, made up of different worlds which people can seamlessly move between? Or will there be multiple metaverses which people cannot move between? The former would achieve the goal of interoperability, but there is much debate about how realistic this is.

What people will do in the metaverse

Others focus less on how the metaverse will feel and more on what people will do in the metaverse. Again, there are parallels drawn between online and offline life, this time in terms of the diversity of activities that individuals will be able to participate in. For example, in our own resources for parents, Internet Matters highlights how users can "socialise, sell virtual items, make purchases, learn, work, play games and more, just like they can in the real world but in a virtual space."[8]

Similarly, the NSPCC offer the following description:

"The metaverse refers to the development of an online environment that allows you to take part in day-to-day activities that mirror your experience of the 'offline world'. For example, you could go shopping, watch a film at the cinema or have dinner with friends."[9]

The focus on buying and selling virtual goods and services is notable, and for some a defining characteristic of the metaverse. For example, in his book 'The Metaverse: And How It Will Revolutionize Everything', Matthew Ball offers a lengthy definition of the metaverse, which is simplified by the Economist as:

"an interoperable network of 3d virtual worlds that can be accessed simultaneously by millions of users, who can exert property rights over virtual items."[10]

The technology used to access the metaverse

Finally, there are those who focus more on the technology used to access and participate in the metaverse. Very frequently, this includes references to virtual reality (VR) and augmented reality (AR) hardware, along with more established technology features including avatars. See this example from Common Sense Media:

"We use 'metaverse' to refer to one standalone or many connected, live, immersive networks of avatar-based social interactions taking place through immersive technologies including virtual reality (VR), augmented reality (AR) and mixed reality (MR) environments."[11]

Some commentators, including writer Matthew Ball, are reluctant to define the metaverse in these terms because they argue that the technology used to access the metaverse could change radically over time.[12] Furthermore, a focus on VR and AR misses out browser-based metaverse experiences – although some may argue that these are not 'true' metaverse experiences.

Many (if not most) characterisations of the metaverse do not fall neatly into one of these three categories, but straddle two of them, or all three. For example:

- "Metaverse, as a term, describes an embodied internet: one that no longer relies on representation on a flat screen, but which simulates direct experience. The gateway into the metaverse exists in two connected but different ways: VR and AR." (The Institution of Engineering and Technology)[13]
  - This focuses on how the metaverse **feels** and the **technology used to access it**
- "The metaverse is defined by its ability to satisfy our need to be around other people – live and 'in person'. Much of the internet is made up of lonely experiences; we keep in contact, but we don't feel together. Spending time in the metaverse feels more like reading in a coffee shop or hanging out in the mall with friends." (Dubit founder Mat Warneford)[14]
  - This focuses on what people can **do** in the metaverse and how it **feels**
- "An immersive and constant virtual 3D world where people interact by means of an avatar to carry out a wide range of activities." (European Parliamentary Research Service)[15]
  - This focuses on all three elements: what people can **do**, how it **feels** and **technology used to access it**

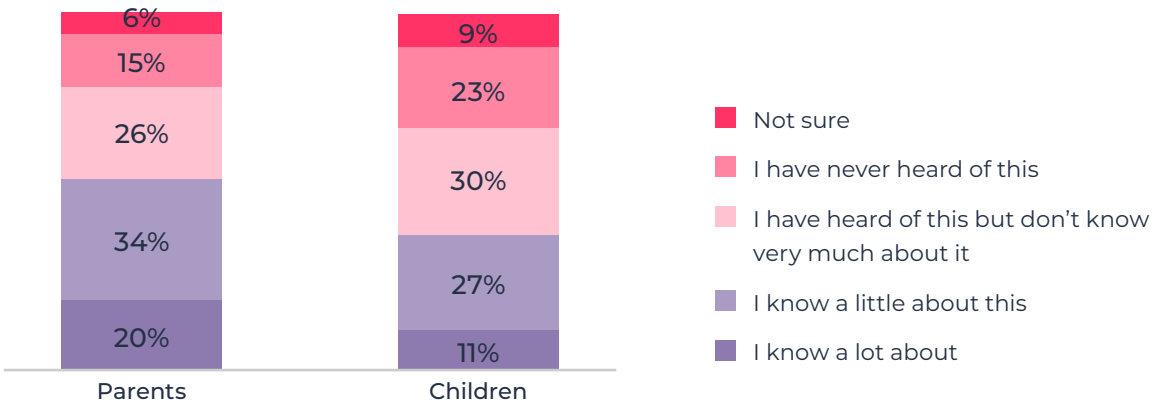
Our survey: awareness and understanding of the metaverse among families

While there continues to be fevered discussion among the tech industry and its commentators about the metaverse, little has been done to involve families in these conversations. In our role as a champion for the views and interests of families, Internet Matters sought to address this gap by commissioning a survey of parents and children on the subject of the metaverse, exploring their awareness, knowledge and experiences.[16]

Our survey reveals that many UK families are being left behind from the debate about the future of the metaverse. Nearly half of parents (41%) say they don't know much, or anything, about the metaverse. An even greater proportion of children (53%) say the same [FIGURE 1].

Figure 1:

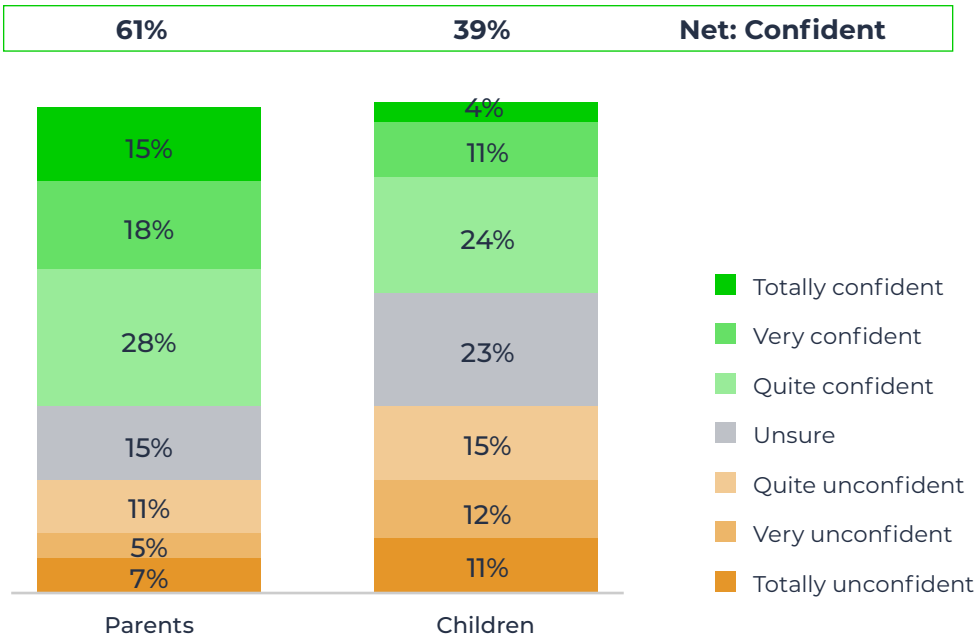
How familiar are you with each of the following terms? METAVERSE



Among those parents and children who have heard a lot or a little about the term, 61% of parents and less than half (39%) of children say they would feel confident explaining it [FIGURE 2].

Figure 2:

How confident would you be to explain what each of these are to someone else? METAVERSE (those that have heard little/a lot about the metaverse)



Overall, just 33% of parents and 15% of children know a little or a lot about the metaverse **and** feel confident explaining it.

We asked respondents who had heard a little or a lot about the term to explain what they thought it meant.

Some respondents used the language of "virtual worlds" and focused on what activities people can do in the metaverse, or how the metaverse feels. For example:

"It's an online environment where it's a virtual world allowing interactions between real world people and organisations. A virtual reality world to do real world transactions and activities."
Dad, 33, West Midlands

"[The metaverse is] a virtual-reality space in which users can interact with a computer-generated environment and other users."
Boy, 14, London

"The metaverse allows you to buy or try things in a virtual reality setting."
Girl, 13, North East

Less commonly, answers focused on the technology used to access the metaverse.

"Metaverse is a digital reality that combines aspects of social media, online gaming, AR, VR, etc."
Mum, 29, London

Other respondents gave less developed and/or confused answers.

"A strange digital world."
Mum, 38, North West

"[It] is a space in which users can interact with computers."
Mum, 35, London

Some were under the impression that the metaverse was inextricably linked to Meta (more commonly referred to by them as 'Facebook'), rather than there being a wider ecosystem at play.

"The metaverse is made by Facebook"
Boy, 14, London

"I think it's the new name for facebook and whats app"
Mum, 48, East Anglia

And some respondents displayed scepticism or cynicism about the metaverse:

*"A load of b****s primarily, but it can also be described as a shared space where you interact via an avatar within a virtual reality setting."*
Dad, 50, West Midlands

"Another silly creation to remove real world interaction"
Dad, 38, Scotland

"It's nonsense"
Mum, 44, South West

"A garbage version of the online worlds you see in films".
Child, 15, Yorkshire and Humberside

"A spying network created by Mark Zuckerberg"
Boy, 13, East England

Taken together, these findings show that as the debate rages on amongst the technology industry about what the metaverse truly is, and billion-dollar investments continue to be made, many families are being left behind from the debate.
Only a minority of parents and children say they have an understanding of the term and are confident explaining it to someone else. Some display a lack of trust or confidence in companies at the forefront of its development.

This is important because it raises serious questions about how far the metaverse is being built - and governed - in a way that meets their needs.

Existing and emerging technology

Despite the debate around terminology, it is clear that there has been a step change in recent years towards the development of increasingly immersive digital experiences. While industrial applications are more advanced, the consumer market is gathering pace.

Established technology and platforms

It can be argued that we have been on this journey for longer than people might think.

The term 'avatar' was first used to refer to an on-screen representation of a person in 1985, by Richard Garriott for the game 'Ultima IV: Quest of the Avatar'. Roblox, which enables users to play games, interact and shop amongst other things via an avatar, came into existence in 2006, followed by Minecraft in 2011 and Fortnite in 2017. These platforms, and others like them, are now used by millions of people (including children) every day, accessible from phones, laptops and games consoles.

Though VR and AR technology feels cutting edge to most families, early more rudimentary forms such as lenses in Snapchat and the world of Pokémon Go have been around and widely used for years. So have virtual assets such as skins, which are frequently purchased and sold in many gaming and social media apps.

Emerging developments

On 28 October 2021, Facebook Inc changed its name to Meta – just one development marking a new era of increasingly immersive technologies and platforms. Today's landscape marks a departure from what came before in the following ways:

Developments in hardware

There is now a significant focus on expanding the quality and range of hardware available to support immersive digital experiences.

As noted above, VR and AR headsets have existed for several years now (for example, Oculus's first headset, the Oculus Rift, was released in 2016), but the combination of a global pandemic, significant industry investment and a decreasing price point is seeing consumer ownership begin to grow. In a survey undertaken for Internet Matters, nearly one in five (17%) parents said that their child uses a virtual reality headset in a typical month. This compares with 10% in October 2020. Amongst parents of vulnerable children,[17] the proportion was even higher at 23%.

Along with Oculus (now a division of Meta), Valve, Samsung, HTC and Sony are among the many companies which have developed their own VR headsets – both tethered options and standalone versions. There is also growth taking place in the AR market, with Qualcomm teaming up with Pokémon Go creators Niantic to develop a blueprint for new AR glasses. Snap has now created four iterations of its Snap Spectacles (although the fourth model has not been put on general sale).

Uses beyond gaming

Whereas immersive digital experiences have mostly been associated with gaming in the past, their uses are becoming increasingly diverse.

Alongside established gaming apps such as Minecraft and Roblox are platforms such as Decentraland and The Sandbox. These platforms are primarily focused on enabling users to create, buy and trade a range of virtual assets including plots of land and tickets to virtual concerts, as well as games. The assets come in the form of Non-Fungible Tokens (NFTs) and are purchased by users with cryptocurrencies (e.g., Ethereum, Bitcoin, etc.). The Sandbox has a minimum age of 18 while children are able to sign up to Decentraland from age 13 with parental permission (although are unable to participate in gambling under any circumstances until age 18).

Other platforms focus on enabling users to socialise – not necessarily while playing games. For example, they might focus on facilitating users to build their own virtual worlds, attend events, join informal meetups or just chat to other users – all via avatars. For example, Rec Room markets itself as "the social app you play like a video game". Other examples include AltspaceVR

and VRChat. Some of these platforms can be accessed without hardware beyond a PC, whereas others such as Horizon Worlds (a Meta product) require the use of a headset. The age requirements vary: Rec Room has no minimum age, but users under 13 are registered to a Junior Account with extra protections in place. Horizon Worlds is limited to users aged 18+. Furthermore, as of November 2022, Meta's policy is that under-13s are not allowed to access third party apps (like Rec Room) via its devices.[18]

We need to reflect on what these technological developments mean for children and families

It is indisputable that there is a trend towards the development of ever more immersive technologies and platforms. Whether or not they are already sufficiently sophisticated to warrant the label of the "metaverse" is contested: some argue that they are rudimentary versions of what will come in the future, while others argue that what we have today can already be described as the metaverse (or metaverses) – there won't be anything distinctive from this in the future.[19]

But the debate around terminology distracts from the core of the issue, which is that:

- immersive technologies already exist; and
- they look set to become more dominant within family life.

Given these facts, it is critically important to consider now – not in the future – what the implications are for children, parents and families.


Anna M.
Jane J.

The opportunities and risks of the metaverse for children

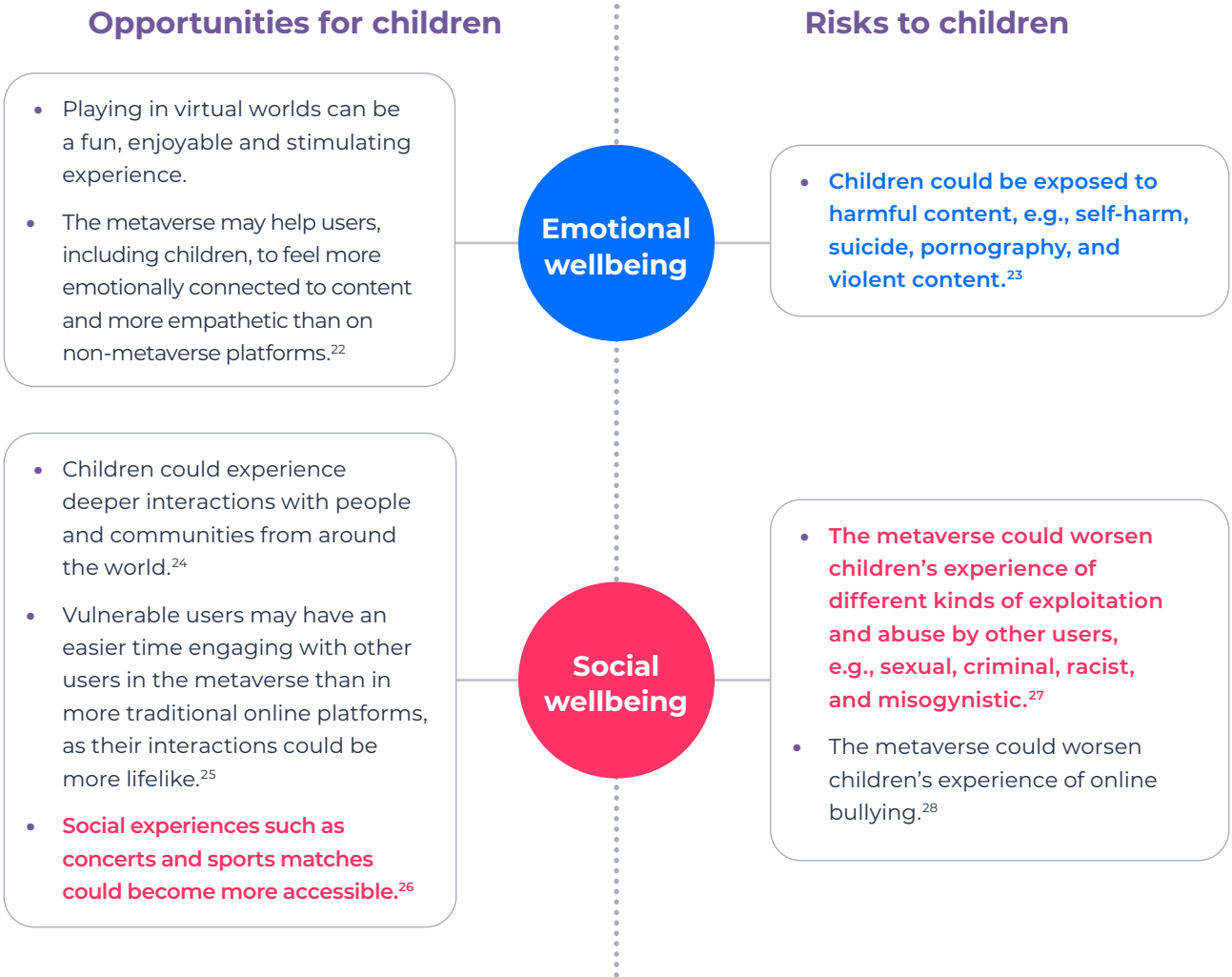
It is particularly important to consider the implications of increasingly immersive technologies and platforms (which will be described as 'the metaverse' from this point on, while noting the debate around terminology), since research has already begun to highlight a range of opportunities and risks to users, and sometimes specifically to children.

The evidence base

Below is a table which maps this early thinking [FIGURE 3]. It is structured according to Internet Matters' *Wellbeing in a Digital World framework,*[20] which aims to capture the full range of opportunities and risks which children may experience online – rather than a narrow focus on safety. The framework splits children's digital wellbeing into four domains: emotional, social, developmental and physical wellbeing.[21]

Some of the opportunities and risks have been more fully and more rigorously explored than others. Perhaps most significantly, the evidence on the risks is more fully developed than the opportunities. In one sense, this is understandable because children's safety is critically important. But if we only aim for children to be safe online, then we miss a huge opportunity – to support children to have the most creative, educational, fulfilling and fun experiences with technology too.

Figure 3:



Opportunities for children

Risks to children

Developmental wellbeing

- **The metaverse could help children to develop a wide range of skills such as digital content creation and interacting with new people.**[29]
- The metaverse could encourage children to be more active creators rather than passive consumers of digital content.[30]
- **The metaverse could provide children with high quality, interactive educational content and experiences.**[31]
- The metaverse could offer children the opportunity to improve their financial literacy through engagement with digital currencies, products and services.[32]

- Children who use digital currencies in the metaverse could experience finance-related harm, including being scammed, participating in gambling or spending excessively.[33]
- **Companies could misuse children's personal data to advertise products that are harmful to their development, and design algorithms that nudge them in ways that are against their best interests.**[34]

Physical wellbeing

- Metaverse platforms could increase users' fitness by offering physically active experiences.[35]

- If overused, the metaverse may reduce children's physical activity, causing a rise in problems such as obesity.[36]
- VR headsets can cause users to lose awareness of their physical surroundings as they become fully immersed in virtual worlds. There is a risk of physical injuries from bumping into walls or tripping over objects.[37]
- Haptic suits and VR headsets may not be well-suited to use by children if they are designed for adults, and/or fail to account for children's neural development. They could lead younger users to suffer from eye strain, fatigue, nausea and dizziness.[38]

Six of the most important opportunities and risks are explored below:

Children could be exposed to harmful content, e.g., self-harm, suicide, pornography, and violent content

At present, it is not hard for children to seek out harmful material in the metaverse. This includes content harmful to all users (e.g., self-harm and suicide content) and content inappropriate for their age and stage of development (e.g., pornography and violent content). The use of headsets can make it more challenging for parents to understand what their children are seeing in the metaverse and to identify problems related to inappropriate content. Furthermore, the boundary between seeing inappropriate content and experiencing abuse and exploitation may become blurred, with the former leading to the latter. For example, in a BBC investigation, a reporter posing as a 13-year-old girl witnessed two avatars simulating sex and was then propositioned.[39]

Social experiences such as concerts and sports matches could become more accessible

In April 2020, Travis Scott held a series of five concerts in the popular metaverse platform Fortnite. During the opening song, a giant avatar of Scott stomped around the island while concertgoers could run on the water, watching him. At one point, Scott's avatar turned into a cyborg, and as the concert went on, the crowd was transported underwater and flew around the planet.

This is one of the many entertaining immersive experiences that the metaverse offers its users, and it is also an example of how tech platforms could make events like these more accessible to a wider range of families and children. They may prove to be more affordable alternatives to offline events, with no travel or accommodation costs – although this depends on the costs associated with digital connectivity, virtual tickets and any hardware needed. Furthermore, events in the metaverse may be more accessible for those with disabilities, whether physical, neurodevelopmental or otherwise.

The metaverse could worsen children's experience of different kinds of exploitation and abuse by other users, e.g., sexual, criminal, racist, and misogynistic

As social interaction is central to many metaverse platforms, children are at risk of experiencing harassment and abuse from other users. This can already happen on non-metaverse platforms but in the metaverse, the experience might be more visceral (e.g., if a child sees their avatar being sexually assaulted or attacked, or they wear a suit that makes them experience it physically) and the impact greater. Research conducted by the Center for Countering Digital Hate highlighted that in VRChat - one of the most popular existing metaverse platforms - "users, including minors, are exposed to abusive behaviour every seven minutes."[40]
This behaviour includes:

- Sexual harassment and abuse of other users
- Minors being encouraged to repeat racist slurs and extremist ideas
- Threats of violence

The metaverse could encourage children to develop a wide range of skills, e.g., digital content creation and interacting with new people

The metaverse could help children to hone new skills and experiment with new things in a safe and controlled environment. It is a space that encourages users to be creative by building new interactive worlds, games and animations, either on their own or in teams, offering a more active experience than passively consuming content.

It could give vulnerable children who struggle with day-to-day interactions a chance to practise conversing with other users in a safe space, which may boost their confidence in the real world, particularly in school. Spending time in the metaverse also helps build children's critical thinking skills through play - in the virtual world, children can test theories, take risks, make mistakes and find innovative solutions.

The metaverse could provide children with high quality, interactive educational content and experiences

With the help of immersive technologies offered by Web 3.0, children could have access to interactive educational activities which may help them understand abstract concepts quickly in a more engaging format. The hands-on experiences offered by the metaverse could allow students to travel to landmarks around the world and historical periods hundreds of years ago. In an article for the Times, Tech CEO Herman Narula underlined how some of the most exciting potential advancements offered by the metaverse are in education. For example, students from all around the world could be taught by "one of the best maths teachers in the world."[41] This is just one illustration of how all children from various cultural and financial backgrounds could receive equal educational opportunities.

Companies could misuse children's personal data to advertise products that are harmful to their development, and design algorithms that nudge them in ways that are against their best interests

A vast amount of personal data could be collected from children participating in the metaverse. Furthermore, increasingly sensitive data may be collected compared to non-metaverse platforms, such as biometric data through tracking facial and eye movements. These can be used to identify what a child is looking at or even how they are feeling. There is a risk that this data is misused by platforms. For example, children could be exposed to highly targeted advertising for products or services which may cause them harm. Furthermore, as advertising becomes more immersive and interactive, children may become more susceptible to its messaging, or even fail to realise that it is an advert at all.

There are some additional points to bear in mind about the opportunities and risks for children which are not captured in the above, yet are important to note:

Many (if not most) of these opportunities and risks are not specific to the metaverse – but they may be amplified

There are some aspects of the metaverse which present new opportunities and challenges. For example, enabling more children to access cultural events in a life-like way is a new opportunity, while handling the physical side effects of using VR and AR hardware is a new risk.

But most of the risks and opportunities outlined above are not new. They have been discussed and thought about in relation to children's online safety and wellbeing for many years now, before there was any conception of the metaverse. Children have long benefited from using technology to keep in touch with families and friends, to be creative and to develop skills. Parents have long worried about children being exposed to inappropriate content online, talking to strangers and spending too much time using technology.

However, while many of the opportunities and risks might be familiar, they do need specific consideration in the context of the metaverse for two reasons.

Firstly, the metaverse may deepen and amplify some of the risks, compared to earlier technology. For example, evidence clearly shows that children are harmed by exposure to inappropriate content such as pornography, self-harm and suicide content on social media. The impact of seeing this content (or these interactions) in a metaverse environment, where children feel in close physical proximity to it, is likely to be more profound.

Secondly, typical strategies for addressing these familiar risks may not be effective in the metaverse. Traditional online content is largely text and image-based, and there is typically a record of it, which

allows moderators to review it and users to report it if necessary. In contrast, the metaverse is based on the idea of interactions between users, with a much greater audio-visual component. They may not be recorded as they happen. As a result, there needs to be significant innovation in safety, moderating and reporting mechanisms. Some companies involved in delivering the metaverse are attempting to respond to these issues. For example, Meta have implemented a personal boundary around users' avatars in Horizon Worlds to help prevent harassment. But it is not clear what the impacts of this measure, and others, have been.

The opportunities and risks depend upon the characteristics of individual children

Children are not a single homogenous group. Their experiences and needs vary based on a diverse range of factors, not least age and gender. The risks and opportunities of the metaverse will be different for a five-year-old girl compared to a 17-year-old boy.

Children's online experiences are also shaped by their wider background and circumstances. Research from Internet Matters consistently shows that children who are vulnerable offline are more vulnerable online too.[42] This includes children with special educational needs and disabilities (SEND), children with mental health problems and children in care. This will likely apply in the metaverse too. For example, children who struggle with anxiety about their physical appearance in the offline world may feel particular pressure to manage and perfect the appearance of their metaverse avatar.

However, Internet Matters research also shows that vulnerable children experience significant (sometimes unique) benefits from their use of technology.[43] This may also apply in the metaverse environment. For example, virtual reality is already being used to support children with autism to acclimatise to new situations (such as visiting a shop or workplace) and develop the skills they need before trying out these activities in an offline context.

What families think of the benefits and risks

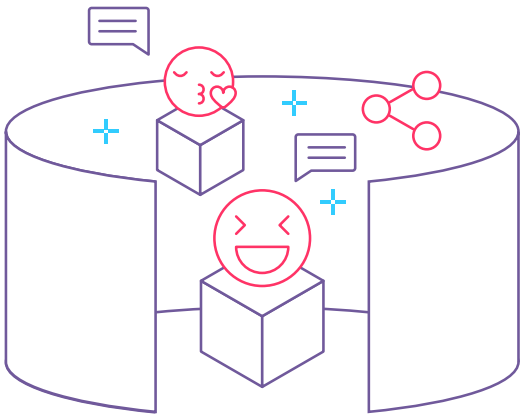
In a survey, Internet Matters asked families themselves to identify what they believed to be the benefits and risks of children engaging with the metaverse. Participants were presented with a list of benefits and a list of risks and could select as many as they wished (or none) from each. We only asked parents and children who were aware of the term 'metaverse'.

Families' understanding of the benefits

Our findings show that families appreciate the opportunities of children engaging with the metaverse. In fact, nearly the same proportions of parents and children identify at least one benefit (81% of parents and 83% of children). Similarly, over half of parents (51%) and children (56%) identify at least three benefits [FIGURE 4].

Figure 4:

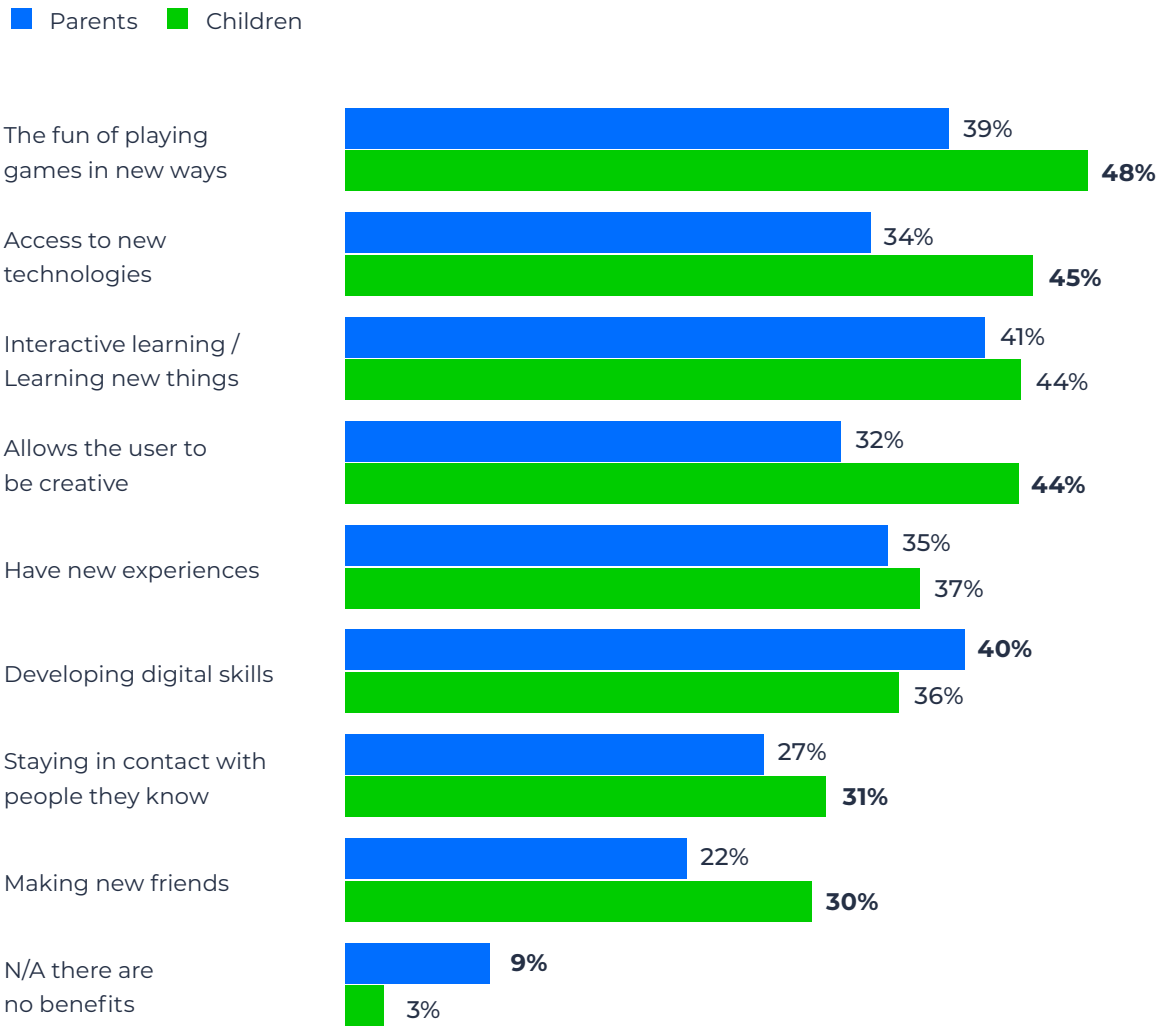
	Parents	Children
At least one benefit	81%	83%
At least three benefits	51%	56%



The ability to learn in the metaverse and to play games in fun new ways are frequently highlighted as benefits by both groups. Parents also see a benefit in children developing their digital skills [FIGURE 5].

Figure 5:

Which of the following, if any, would you consider are the benefits of your children/for you using the metaverse?



Significant testing: **bold** numbers indicate significantly higher than other group number

Vulnerable children identify the ability to make new friends (42% vs. 27% of non-vulnerable children), while their non-vulnerable peers say they enjoy experiencing new technologies and being creative [FIGURE 6].

Figure 6:

Which of the following, if any, would you consider are the benefits of your children/for you using the metaverse?

Significant testing: **bold** numbers indicate significantly higher than other group number

Families' understanding of the risks

While children and parents are similar in their assessment of the benefits of the metaverse, they diverge in their concerns.

Once again, we only asked parents and children about their concerns if they were aware of the term 'metaverse'.

We found that parents are just as likely to be concerned by the impact of the metaverse on their children as they are to appreciate the benefits. 81% identify at least one concern – the same proportion to identify a benefit, as set out above. Just over half of parents identify three concerns – this is very similar to the proportion identifying three benefits.

In contrast, children are much less likely to be concerned by the metaverse, with 6 in 10 identifying one concern and just 14% identifying three [FIGURE 7].

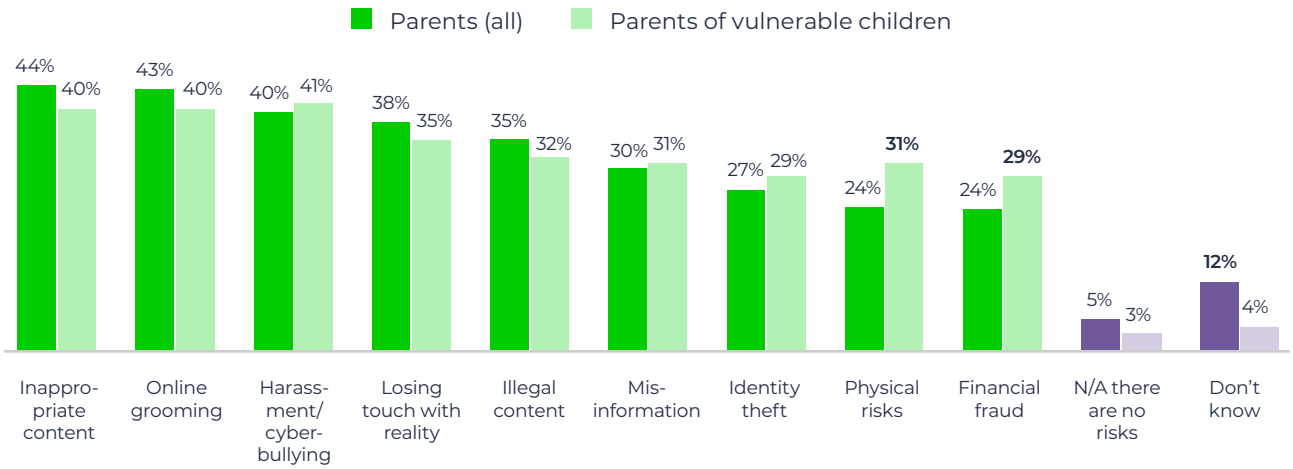
Figure 7:

	Parents	Children
At least one benefit	81%	83%
At least three benefits	51%	56%
At least one concern	81%	59%
At least three concerns	53%	14%

The most common concerns for parents are exposure to inappropriate content (selected by 44%), online grooming (43%), harassment or cyberbullying (40%) and losing touch with reality (38%). When compared to parents of vulnerable children, there is a similar story in terms of the top concerns. However, there are significant differences seen in the **bold** numbers below – parents of vulnerable children are significantly more concerned about physical illness (31%, +7%pts), such as nausea, and financial fraud (29%, +5%pts) compared to parents overall. [FIGURE 8].

Figure 8:

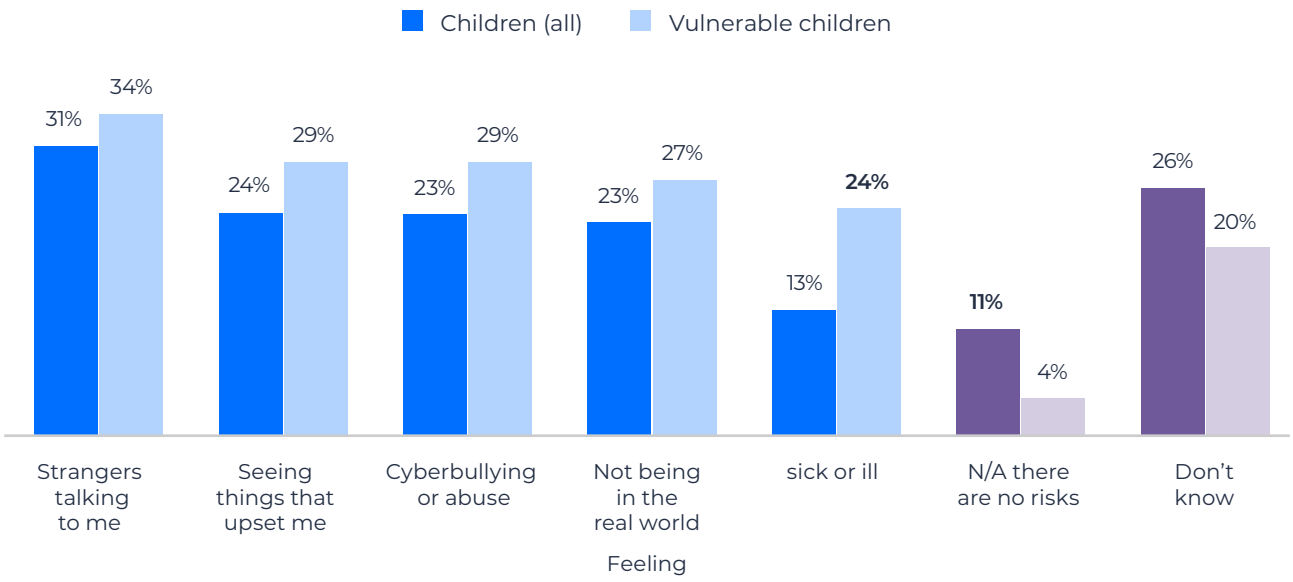
Which, if any, of the following concerns do you have about children being engaged in the metaverse, virtual reality or augmented reality?



Although children are less likely to be concerned than parents, their most common concerns are similar: being spoken to by strangers (selected by 31%), seeing things that upset them (24%), cyberbullying (23%) and not being in the real world (23%). Vulnerable children have generally greater concerns compared to children overall, particularly in feeling sick or ill (24%, +11%pts). [FIGURE 9]

Figure 9:

Do you worry about anything when you think about being in the metaverse, virtual reality or augmented reality?

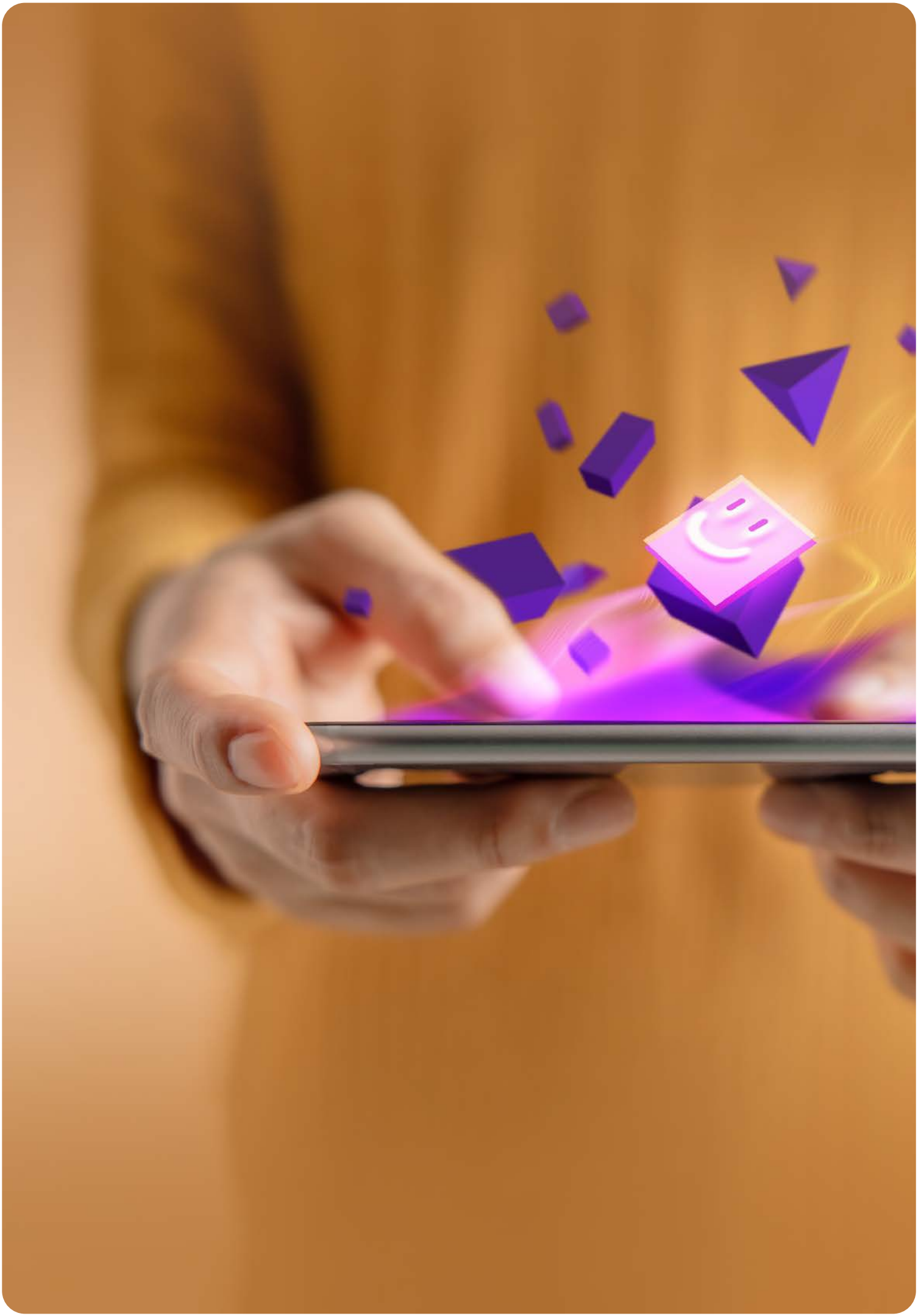


Summary

Although the research base is in its infancy, the early evidence suggests that the metaverse offers both significant opportunities and risks to children, though the opportunities have been less thoroughly explored. It is encouraging that parents and children appreciate these benefits, especially the educational value of the metaverse and the opportunity to develop wider skills, including digital and creative skills.

It is clear that the metaverse could pose risks to children – including the familiar threats of inappropriate content, risky contact from strangers and bullying. It is a critically important insight that parents are much more aware of these risks than children; it means that parents have a crucial role to play in helping children to understand and manage the risks, so that they can enjoy the benefits safely. Parents need support to play this role.

But it cannot be left up to families alone. Technology companies, Government and regulators need to work now to ensure that the metaverse is designed from the outset with children's needs in mind.



Towards a child-friendly metaverse

The internet was not built with children in mind. Yet, globally, one in three internet users are now children.[44] The result is that for the many years, too many children have been engaging with services that are not safe or appropriate for them. Rights that children enjoy offline have not been observed in digital spaces – sometimes with devastating results.

This fact has not gone unnoticed. In recent years, we have seen technology companies roll out an increasing number of safety and privacy features, retrofitting protections into platforms that were not designed for children. Concerned that progress is being made too slowly, governments across the world, including in the UK, are seeking to pass legislation that requires companies to take user safety and wellbeing more seriously.

All of this could have been avoided with greater consideration at the outset of children's needs. Platforms which are appropriate and fulfilling for adults might not be appropriate and fulfilling for children. As the sector moves towards the metaverse, there is an opportunity to do things differently – to learn from mistakes made and consciously build the metaverse with children and families in mind.

Yet, so far, this opportunity has not been grasped. The technology sector is preoccupied by the question of what the metaverse of the future should, or will, look like. But largely missing from its analysis is how it will be harnessed for the good of children and families.

There are of course exceptions to this general rule. Notably, the LEGO Group and Epic Games (maker of Fortnite) announced earlier this year that they would be entering in a long-term partnership to develop a metaverse for kids, underscored by $1 billion of investment from The Lego Group, with further investment raised from Sony. This represents an exciting step forward, but few details have emerged of what specific plans are in place (and Epic Games' recent $520 million fine from the US Federal Trade Commission for breaching children's privacy is a cause for concern). In addition, small companies such as Kabuni are developing education-focused metaverses, but these are in the early stages.

What is needed is a positive vision of what a child-friendly metaverse looks like. And given the ambition for an interoperable metaverse, in which users can seamlessly move from one virtual world to another, no one company can define it in isolation. A collaborative effort is needed from all those who have a responsibility for children's safety and wellbeing – industry, government and the third sector, along with families and the professionals who support them – to define and coalesce around this positive vision.

What a child-friendly metaverse is *not*

On behalf of parents and children, Internet Matters wants to drive this conversation about how the metaverse can be made child-friendly.

At the outset, we want to make clear what a child-friendly metaverse is *not*. It is *not* one in which children are excluded from areas or spaces they have a right to be in. There will of course be some experiences which are not suitable for children and with which they must be prevented from engaging via robust age assurance. Most obviously, this includes experiences relating to sex, gambling and drugs and alcohol. But if children are locked out of other spaces which could have been made child-friendly with thought and consideration, then they will have been failed.

Furthermore, a child-friendly metaverse does *not* mean that every user within the metaverse has to have an experience which is suitable for children, even if they are an adult. Instead, it means that children might need specific, tailored experiences, sensitive to their particular characteristics – especially age. This is not a new principle: the Information

Commissioner's Children's Code, which came into effect in September 2021, requires online services to treat children differently according to their age group (or to provide an experience appropriate for all users regardless of age). As a result, TikTok disabled direct messaging for children under 16 and Google now prevents location history from being enabled for children under 18 while retaining overall minimum ages of 13.

The question that must be answered is therefore: how can the metaverse be shaped so that it fulfils the safety and wellbeing needs of children, whether by:

- Preventing children from accessing certain parts of the metaverse;
- Making parts of the metaverse appropriate for all users, including children;
- Adapting parts of the metaverse so that children receive a differentiated service according to their age.

Or, likely, a combination of all three.

Initial considerations

Below are five areas in which children's participation in the metaverse needs particular consideration to build a child-friendly metaverse.

*Building in **accountability** for children's experiences*

There is a shared responsibility to keep children safe and well online: parents, teachers, Government industry and the third sector all have a role to play. This will not change with the development of the metaverse; exactly how we fulfil these obligations may need to adapt as the technology evolves.

The UK's Online Safety Bill is a landmark piece of legislation which is set to make technology companies more accountable for the safety and wellbeing of their users, especially children. Companies will be required to do more to identify and remove illegal content, enforce their terms and conditions and to tackle children's exposure to legal but harmful content. However, while the Bill is the product of years of extensive development and consultation, it has been designed in a time when screen-based online platforms are dominant. Questions have therefore been raised as to how effectively it will apply to metaverse platforms.

A central challenge is ephemerality: defined by Nick Clegg of Meta as "a shift towards live, speech-based communication that will often feel as transient as face-to-face conversations," in contrast to emails, text messages and written posts on social media which are often "persistent, creating a record that lasts over time and which can be inspected, reviewed, modified or deleted".[45] Ofcom Chief Executive Melanie Dawes has insisted that metaverse platforms will fall under scope of the Online Safety Bill and expected to meet its requirements,[46] but how can the safety of platforms be assessed in the absence of these records? How can users evidence harmful or abusive interactions they have experienced?

Some argue that the answer lies, to some extent, in self-policing. For example, Clegg highlights the ability of users to block or mute people, and to leave spaces they no longer wish to be in, along with the importance of "unwritten codes of acceptable behaviour" rather than formal rules for metaverse spaces.[47] There is a question as to how far it is acceptable to shift responsibility on to adults, but there is an ever greater question as to how far children can be expected to keep themselves safe. This is where children may need a tailored approach: for example, in Horizon Worlds, there is a rolling buffer allowing audio data to be kept for a short period, so it can be reviewed if a report is made. Perhaps the retention period should be longer for interactions involving children.

As with existing digital platforms, protections need to be developed whilst observing children's data rights. Previous research from Internet Matters has found that children welcome greater protections online but not at the cost of their privacy.[48] There is sometimes a perceived tension between respecting children's privacy, and collecting data in order to deliver children a tailored service appropriate to their age. It is useful to look to the Children's Code in these

cases, with its focus on children's "best interests" and "wellbeing" as guiding principles.

Even though technology companies must be held accountable for their role in keeping children safe and happy in the metaverse, it is not their role alone. Others must also play their role – most notably parents. Research from Internet Matters shows that parents have a great deal of influence over their children's digital wellbeing.[49] For example, where parents achieve a good balance of on and offline activities and parents take more breaks from devices, these behaviours are often mirrored by their children. Furthermore, children's digital wellbeing is boosted when parents talk to them about their experiences. It is therefore important for industry to consider how they can empower parents to fulfil this nurturing role when designing their platforms, including through their safety features.

*Helping children to balance **time** in the metaverse with **other pursuits***

The metaverse has implications for the ongoing debate about screentime. The amount of time children spend engaging with digital platforms is one of parents' main concerns about technology, with many parents seeking an answer to the question of 'How much time online is too much?'. Young people themselves identify this is a challenge in their use of digital technology.[50]

The debate about screen time can sometimes be distracting. Critically, what children are **doing** online is just as (if not more) important to consider as how much **time** they are spending online. For example, time spent engaging with educational content is of greater value than passively scrolling through social media.

Nevertheless, parents' concerns about screen time cannot be dismissed out of hand. A significant review of the evidence conducted by the UK Chief Medical Officers in 2019 found no existing research demonstrating a causal link between the amount of time spent online and negative effect. But it warned that this conclusion did not mean that there was no negative effect, and that families would be wise to take a precautionary approach by striking a "healthy balance" between time spent offline and time spent online. Certain activities are strongly associated with healthy development, including good quality sleep and time spent with families, and sometimes this can be at odds with technology use (although not necessarily).[51]

While there is a lack of formal research, some researchers have suggested that moderating time spent in the metaverse could be even more challenging than time spent on social media and other screen-based apps.[52] The immersive nature of the metaverse could be part of the reason behind this, as well as the fact that users can undertake such a breadth of activities in the metaverse – from playing games, to shopping, to attending events and socialising.

In recent months and years, many companies have developed a widening array of tools and policies to help users, especially children, to moderate their use of technology. This has been encouraged by regulation such as the Children's Code, which requires platforms to avoid nudging children to spend more and more time online. For example, in 2019, YouTube disabled auto-play for children and in 2022, TikTok added a new feature which flags its screen time management tools to 13-17-year-olds when they use the app for more than 100 minutes in one single day. This setting cannot be turned off until they reach 18. There needs to be more research into how effective these tools and controls are and, if proven to be effective, consideration of how they can be adapted for the metaverse environment. Furthermore, some commentators have suggested that there should be a minimum age for participating the metaverse, so that children can acquire the skills they need to navigate the wider world before applying these in the metaverse[53]– a view also worthy of consideration.

*Limiting children's **commercial interactions** with the metaverse*

We are already seeing commercial transactions playing an increasing role in the metaverse. As the range of activities supported by the metaverse continues to grow, this trend is likely to continue as users buy, sell and trade a wider array of virtual goods.

It is not, in principle, a bad thing for children to spend money in online environments. It is widely accepted that children spend money in offline environments – indeed, many parents actively encourage this through giving pocket money and birthday money, enabling children to begin to learn how to manage their finances while buying the items they desire.

We have also seen this begin to transfer to the online environment. It is now fairly common for children to spend money in-game and in-app – e.g., to buy new outfits for their avatars or new weapons to enhance their chances of proceeding in-game. But this development has not been without its challenges. While offline transactions are more likely to be mediated by parents, the online transactions can happen at a click of a button and without supervision. As a result, numerous stories have emerged over the years of children as young as six or seven spending huge sums on virtual items, sometimes inadvertently.

As the metaverse develops, there needs to be consideration of how far children are allowed to engage with it commercially. There will likely be goods and services which children should not be allowed to buy, and there should certainly be functionality for parents and carers to set caps on how much children can spend. Metaverse platforms and policymakers should look to some of the protections that have been developed with and by the games industry, and at a very minimum, ensure that there are equivalent protections in the metaverse. For example, European video games rating board PEGI began to identify games with in-game purchasing in September 2018 and now also indicates those which include "paid random items," including loot boxes. Furthermore, there have been several awareness-raising campaigns by the games industry designed to encourage parents to make use of payment settings and other controls to limit children's expenditure online. However, some would argue that these protections are not enough and need to go further, in both metaverse and non-metaverse platforms.

Additional protections will be needed in relation to children's engagement with cryptoassets, including cryptocurrencies and NFTs. These products are likely to play an increasing role in the metaverse. For example, NFTs use blockchain technology to track who owns a particular digital item, which will become more important if the metaverse is to become truly interoperable. But cryptoassets are largely unregulated and have the potential to pose great financial risk to users, including children. Internet Matters will shortly release another report exploring these issues more fully.

Finally, there are important questions around the role of advertising in the metaverse. There have already been efforts in the UK and beyond to prevent harmful online advertising from reaching children. For example, the UK Government is in the process of banning junk food ads on social media (albeit with delays), while the EU's Digital Services Act bans targeted advertising aimed at children. Thinking is needed as to how these protections are translated into the metaverse environment, in which it may be more challenging for children to discern what is advertising and what is not. Roblox is just one company looking at introducing more immersive, interactive forms of advertising which would enable users to make purchases more quickly and easily.[54] Roblox is limiting these ads to users aged 13 and above, recognising that they are not appropriate for younger children – although there is an argument that they are not appropriate for teenagers either.

*Making **interoperability** work for children*

Many, if not most proponents of the metaverse aspire for it to be interoperable – so that users can easily move between different worlds, taking their identity, data and assets with them. This offers clear advantages over the walled gardens of Web 2.0, in which users have separate profiles on different platforms and are unable to move seamlessly between them. It has the potential of offering users – including children – a more instinctive, free-flowing experience.

There is ongoing debate about how realistic it is for interoperability to be achieved. Many companies have set out their ambition to work towards this, and developments such as Meta's new partnership

with Microsoft (which will make Teams, Office and Xbox available on Quest VR headsets) suggest a certain level of commitment and intent, but there are significant technological barriers to overcome, not least the need for common design standards. As a result, organisations such as the World Economic Forum and Metaverse Standards Forum are aiming to bring together key metaverse players and lay the foundation for these standards.

One of the key areas in which collaboration is needed is age verification. In the context of the walled gardens of Web 2.0, users are required to individually age verify with different platforms and services. There is the potential to fundamentally improve users' experiences in the metaverse by requiring them to age verify just once, allowing them the ability to then move to other platforms which are appropriate for their age without having to go through the process again.

However, if a user's age is to be checked just once, it is critically important that the check is rigorous. It is well known that children regularly circumvent age restrictions to access online platforms. This cannot be made even simpler by enabling children to access a whole host of distinct, but interlinked, services after circumventing just one age verification procedure.

*Ensuring fair and equitable **access** to the metaverse*

A significant proportion of the population does not have adequate access to existing digital technology, and the development of the metaverse could exacerbate this problem without mitigations being put in place.

The challenge of digital exclusion was brought to the fore during the Covid-19 pandemic, when much of life transferred online overnight. Efforts were made across Government, industry and the third sector to help people get online – especially children, who needed to do so to participate fully in remote learning.

Nevertheless, there remains a digital divide. The latest evidence from Ofcom suggests that 6% of households do not have internet access at home.[55] Even more have limited access – e.g., via a shared laptop, smartphone access only or a restrictive data allowance.

The development of the metaverse risks further entrenching the digital divide.[56] Some families may be left behind, unable to afford the dedicated hardware and high-speed connectivity required to access certain metaverse technologies and platforms. Even if they are not locked out altogether, they may experience more limited functionality. Indeed, there is already a divide between those accessing certain metaverse platforms via headsets versus those accessing them via smartphones or web apps.

Most families are currently using the metaverse simply to play games but as explored previously, the ambition is for the metaverse to support a much broader range of activity. Over time, children with access to the metaverse may experience significant advantages in their education, health and employment prospects, compared to their peers.

Furthermore, connectivity is only one component of the digital divide. Families need to have access to technology, but they also need the skills to use it. Evidence suggests that 11 million UK adults already lack the essential digital skills for everyday life,[57] along with an unknown number of children. As the tech companies continue the race to develop the metaverse, they risk leaving behind those parents and children who are hesitant or unable to make full use of today's technology – e.g., by sending an email or making an online payment – let alone the technology of the future.

All this points to the continued need for civil society, Government and industry to work together to ensure families and children are not excluded as the metaverse develops.

Conclusions and next steps

The metaverse has the potential to revolutionise many aspects of childhood and family life. It could enable children to learn in more engaging ways, democratise access to cultural institutions and experiences and offer a more active, rather than passive, online experience. It is already providing some children and families with new, exciting forms of entertainment via increasingly immersive games.

However, there are also risks. Many (if not most) of these are not new, but rather familiar harms associated with digital technology. The difference is that they might be amplified in the metaverse. For example, inappropriate content (such as violent or adult content) could appear more lifelike, while abuse and harassment could be experienced in a more visceral way. Metaverse platforms could prove more absorbing than conventional social media and gaming and could collect ever more intimate personal data from children.

It is therefore striking that two in five parents say they know little or nothing about the metaverse, as do over half of children. This contrasts starkly with the level of industry investment being made, and the wider technology sector's preoccupation with the metaverse.

There is a risk that children and parents are being left behind as the race to develop the metaverse continues. A failure to understand the needs of children is what led to the existing challenges seen with dominant social media and gaming platforms today. This can be avoided if Government and industry get on the front foot and work with parents and families to set out a vision of a child-friendly metaverse and build in safeguards from the start so that children can enjoy all the opportunities offered by this exciting technology.

This report has been an attempt to kickstart a conversation about what needs to be considered if the metaverse is to be truly child-friendly. It does not claim to have all the answers but to identify the key issues and questions which need to be addressed.

Below are some of our key take-aways for all those with a responsibility for keeping children safe and happy online.

Government and regulators

- Recent and forthcoming regulation of online platforms (including the Online Safety Bill and Children's Code) needs to be developed or adapted with the metaverse in mind. While technology will often outpace regulation, the time lag between the two needs to be reduced.
  - Ofcom (the forthcoming online safety regulator) should require companies offering metaverse services to identify the risks associated with (or amplified) by these in their children's risk assessments. It should consider developing a dedicated Code of Practice for metaverse services.
- This regulation should seek to enhance children's wellbeing, not just their safety. That means that protections and safety features need to observe children's data and privacy. It also means that regulation needs to protect children from legal but harmful content, not simply the most serious illegal harms.
- The metaverse is fundamentally linked with the growth of digital currencies and assets such as NFTs. It is therefore critical that there is coherence between online safety regulation and forthcoming regulation governing currencies and assets. The Digital Regulation Cooperation Forum could play a key role in this. Internet Matters will soon be publishing new research looking specifically at children's interactions with digital currencies and assets.

- Government and regulators could play a convening role to bring together all the stakeholders where collaboration is particularly needed – e.g., fighting digital exclusion in the metaverse and developing standards around age verification and interoperability.

Industry

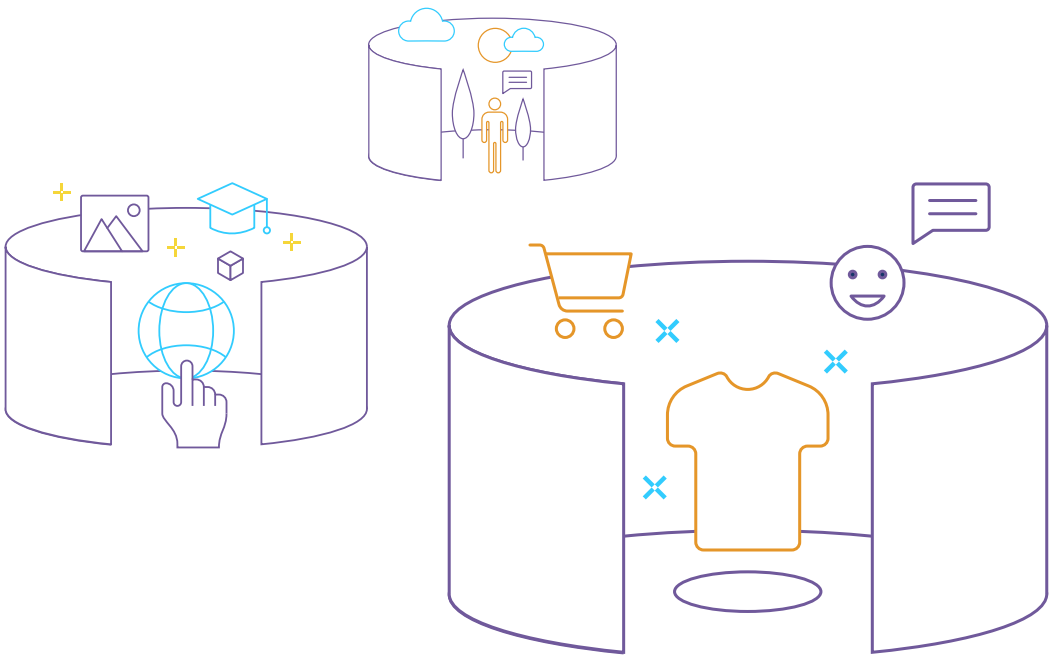
- Technology companies should ensure that they develop their metaverse products in close consultation with parents and children to ensure that their needs are front and centre of this process. Existing digital platforms have sometimes failed to meet the needs of families because their voices were not heard early in the design – this mistake cannot be repeated.
- The findings of this consultation process should inform design choices made by product teams, so that safety, design and wellbeing are built into emerging metaverse technologies. A focus on wellbeing is critical – industry should aim not just to make children's experiences safe, but as fun, educational and enriching as they can possibly be. Furthermore, protecting children from harm should not come at a cost of excluding young people from spaces they have a right to be in.
- Technology companies should also reach out to parents and families to educate them about the metaverse, even while the technology is in its infancy. Familiarising families with the key concepts and applications at this early stage will help ensure that parents are well-equipped to support children as the gradual process of adopting the technology continues.

Media literacy sector

- The metaverse will likely represent a fundamental shift in the way people engage with digital technology, meaning some aspects of existing online safety and wellbeing advice could become out of date. For example, the process for identifying misinformation and disinformation in the context of live dialogue will be in some ways different to identifying it in written text on social media. The sector will need to stress test its existing resources and identify where they need to be adapted as the technology evolves.
- As technology changes, the mismatch between how media literacy is taught and how online technology is experienced could grow. Online safety is often taught via PowerPoint presentations and PDF documents. As the metaverse develops, there are opportunities to teach about online safety in more sophisticated ways – by using the technology which we aim to educate about. This will require resources.
- There is a clear gap between parents and children in terms of how far they appreciate the risks of the metaverse, with children much less likely to identify these. Parents therefore have a critical role to play in educating children about how to manage the risks, so that they can enjoy the benefits. But they cannot play this role without support – the sector must provide high quality resources. Internet Matters has begun to develop our offering in this space, with resources like our 'What is the metaverse? guide'.

Parents and carers

- The key principles of supporting children in their online lives remain the same, even as technology changes. Our key messages to parents and carers are:
  - What you do matters – you can make a difference to this aspect of your child's life.
  - Conversations are key – show an interest in what your children are doing online, perhaps by participating with them.
  - You don't need to know everything about every platform or product your child is using to support them.
- Parents and carers should make use of resources from organisations like Internet Matters to increase their understanding and awareness of key online safety issues and how to face them.



Endnotes

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3. Back-to-school technology costs have surged, survey finds | The Independent
4. Throughout this report the term 'children' is used to refer to people below the age of 18.
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16. Survey conducted by Opinium for Internet Matters in June 2022. Survey of 2,000 parents of 4–16-year-olds and 1,007 children aged 9-16 in the UK (parents and children not of the same household). All finding reported are statistically significant. Further detail on all survey findings can be found in the accompanying data note.
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