How's Life for Children in the Digital Age?

How's Life for Children in the Digital Age?

Please cite this publication as:
OECD (2025), *How's Life for Children in the Digital Age?*, OECD Publishing, Paris, https://doi.org/10.1787/0854b900-en.

ISBN 978-92-64-90899-4 (print)
ISBN 978-92-64-52492-7 (PDF)
ISBN 978-92-64-44251-1 (HTML)

Revised version, June 2025
Details of revisions available at: https://www.oecd.org/en/publications/support/corrigenda.html

Photo credits: Cover © Natalia Lebedinskaia/Shutterstock.com.

Corrigenda to OECD publications may be found at: https://www.oecd.org/en/publications/support/corrigenda.html.

Foreword

The rapid digital transformation shaping our societies presents both remarkable opportunities and pressing challenges, particularly concerning children's well-being. Digital environments have become deeply embedded in children's daily lives, offering invaluable opportunities for learning, play, and social interaction. However, these same spaces also introduce evolving risks that can impact children's development and mental health. Problematic use of digital media can expose children to risks such as uncontrolled screen time, cyberbullying, online exploitation, and negative impacts on sleep patterns, physical development and mental health, including anxiety, depression. Social media platforms, for instance, are increasingly scrutinised for their potential adverse effects on young users, highlighting the urgent need of heightened protection and robust research to fully grasp the scope and scale of these challenges.

The OECD *Recommendation on Children in the Digital Environment*, adopted in 2012 and amended in 2021, is a cornerstone of OECD work in this area, along with related analysis of *Digital Safety by Design for Children*, *Transparency Reporting on Online Child Sexual Exploitation and Abuse*, and the *Classification of Risks Online*.

This report builds on a long history of OECD work on child well-being. Important milestones include the 2021 flagship report *Measuring What Matters for Child Well-being and Policies*, which underscores the diverse factors influencing child well-being. It highlights the interconnected nature of different developmental domains and the deep integration of child well-being within various environments – including the digital environment. The report emphasised the need for protection and strong relational support to help children navigate these spaces safely, develop essential skills, and fully enjoy life. In 2019, the report *Educating 21st Century Children: Emotional Well-being in the Digital Age* explored modern childhood by examining the relationship between emotional well-being and new technologies, the evolution of parenting and friendships in the digital era, and strategies to maximise online opportunities while minimising risks. Previous work has also focused on the challenges of digital media exposure on youth mental health, including the *Spotlight Mental Health and Digital Environments* in the 2024 OECD *Digital Economy Outlook* and the 2018 policy paper *Children and Young People's Mental Health in the Digital Age*.

This report takes a step further by exploring adolescents' experiences in the digital environment, using the latest cross-national data from the 2022 *PISA*, 2022-21 *Health Behaviour of School-Aged Children*, and the 2021 *Progress in International Reading Literacy* surveys. It provides a comprehensive review of research assessing the impact of children's digital media use on their well-being and development. It also addresses policy challenges related to holistic, rights-based, and multi-sectoral approaches to supporting children's well-being both online and offline. Furthermore, it highlights the need to enhance data collection and monitoring capabilities to better understand and mitigate risks.

This report was prepared by the OECD Centre on Well Being, Inclusion, Sustainability and Equal Opportunity (WISE Centre). It was developed under the leadership of Romina Boarini (Director, OECD WISE Centre) and under the supervision of Olivier Thévenon (Head of the Child Well-being Unit, OECD WISE Centre). The report was written by Olivier Thévenon, with cross-national indicators developed by Nora Brüning, and inputs provided by Gráinne Dirwan, Eva Heyl, Paul Michelsen and Marine Matsumura (all OECD WISE Centre). Anne-Lise Faron (OECD WISE Centre) prepared the manuscript for publication, and Martine Zaïda and Taylor Kelly (OECD WISE Centre) provided valuable support and advice on communication and publication.

The report has benefited from helpful comments on early drafts provided by national delegates to the OECD Working Party on Social Policy. Their contributions and advice are kindly acknowledged, and we hope the resulting product can be useful for their work. The report also benefited from comments and feedback from Molly Lesher, Lisa Robinson and Jeremy West (OECD Directorate for Science, Technology and Innovation), Emily Hewlett (OECD Directorate for Employment, Labour, and Social Affairs), Claire Shewbridge (OECD Directorate for Education), Nicole Drew, Craig Matazick, Giulia Morando and Elizabeth Manning (OECD Directorate for Public Governance), Romina Boarini and many other colleagues from the OECD-WISE Centre.

The report was funded by the Secretary General Central Priority Fund to help countries leverage the benefits of digital transformation for children while managing associated risks.

Editorial

The digital transformation shaping our societies presents both tremendous opportunities and significant challenges, including for children's well-being. Digital environments such as social media platforms have become a constant presence in children's lives, offering valuable spaces for learning, playing, interacting, and accessing information. Yet, these same platforms bring risks that can harm children's well-being and development – risks that technological advancements may either amplify or, if properly governed, help mitigate. It is no surprise that these spaces are under increasing scrutiny for their potential to adversely impact children's well-being and mental health, with mounting concerns reported by health professionals, educators, and parents. With digital technologies and media reaching an ever-growing number of children, including younger age groups, the challenges they pose grow in scale, complexity, and severity.

This report emphasises the urgent need to strengthen our evidence base to tackle the multifaceted challenges that arise from the digitalisation of children's lives. This means investing in more robust data collection to track children's digital engagement, assess its impact on their well-being and development, and incorporate insights from children themselves, as well as from health professionals, educators, and parents. By doing so, we can ensure that the support provided is both effective and adaptable to the rapidly evolving digital landscape. This comprehensive and informed approach is needed to protect children's well-being while enabling them to fully benefit from the opportunities the digital world has to offer.

A whole-of-government approach is key for developing policies that encompass all dimensions of the digital impact on children, including health, education, and social well-being. Achieving this requires strong collaboration between the various government entities responsible for these areas and those overseeing digital regulation. A better understanding of the interplay between children's digital behaviour and pre-existing vulnerabilities is also needed. This includes drawing on insights from professionals, parents, and young people – particularly those with lived experiences of severe cases – to identify factors of vulnerability and the dynamics that drive them.

The OECD, through its Recommendation on Children in the Digital Environment, is working to address these issues by placing children's safety at the heart of digital product development. The Organisation has also provided guidelines on implementing digital safety by design, ensuring that products and services designed for children meet high safety standards. Furthermore, in the OECD Declaration on Building Better Policies for More Resilient Health Systems, OECD Member countries have called for coordinated governmental initiatives to mitigate the risks posed by digitalisation and social media platforms, particularly for children and young people's mental health, and ultimately ensure a safer, better tailored digital experience.

Mathias Cormann,

OECD Secretary-General

Table of contents

Tables

Figures

Boxes

Executive Summary

Today's children are growing up in an era of rapid digitalisation, which significantly impacts their development and daily lives. They are introduced to digital media at a fairly young age: by around age 10, 93% had an Internet connection in 2021, according to data from the *Progress in International Reading Literacy Surveys*, compared with 85% a decade earlier; and on average approximately 70% of 10-year-olds already own a smartphone.

Among older children, digital device usage is even more widespread. In 2022, access to digital devices was nearly universal. According to PISA 2022 data, an average of 96% of 15-year-olds in OECD countries had access to a desktop computer, laptop, or tablet at home, while 98% had a smartphone with an Internet connection. Additionally, in almost all countries, at least 50% of 15-year-olds spent 30 or more hours per week on digital devices, with a notable minority – ranging from 10% in Japan to 43% in Latvia – reported spending 60 or more hours online.

This report examines both the opportunities and risks associated with children's increasing engagement in the digital world, providing a cross-national overview of their digital experiences across OECD countries. It explores strategies to enhance child well-being, ensuring that children are both protected and empowered to use digital media positively while managing potential risks. The report calls for holistic, rights-based, and multi-sectoral approaches to support children's well-being both online and offline. Additionally, it emphasises the need to improve data collection and monitoring capacities to better understand and mitigate risks.

Seizing opportunities, mitigating risks: The growing challenges of the digital age for children

Digital devices offer children valuable opportunities for learning, creativity, and social connection but also raise concerns about potential negative effects on their well-being. Risks include reduced face-to-face interactions, exposure to harmful content and behaviours, online abuse, and negative impacts on sleep, physical activity, and overall physical and mental health. However, not all digital media engagement poses the same risks and because of data limitations, most of the existing research is still correlational rather than causal. In general, many adolescents experience neutral or positive effects but a vulnerable minority struggles with problematic digital media use, which is associated with negative well-being outcomes. These findings are supported by firsthand accounts from practitioners in the field, including teachers, doctors, and social workers.

Problematic digital media use occurs when children struggle to manage their time online, feeling compelled to continue even when it disrupts daily responsibilities or well-being. In some cases, this can lead to excessive use or addiction-like behaviours. Research suggests that such usage increases the risk of depression, anxiety, loneliness, academic struggles, body image concerns, and poor sleep, with girls often being more affected. Additionally, certain factors heighten the risk of harm in the digital environment, including intensified social comparison, exposure to idealised images, and cyberbullying. Chapter 4 of this report explores the relationship between digital media use and child well-being, distinguishing findings based on the type of digital activity (e.g., social media, video games), technology design features, and the role of passive versus active engagement, as well as interactions with parents, peers, or other adults. It also examines the influence of contextual factors related to children's personal lives and family environment.

Various personal and environmental factors in the non-digital world can make children more vulnerable to problematic digital media use. These include low interest in physical activity, behavioural issues, weak social connections, family adversity (e.g., maltreatment, parental conflict, poor parenting), and low psychological well-being. Additionally, problematic digital media use and well-being can influence each other, worsening pre-existing vulnerabilities. A key conclusion of this report is the need to better understand how offline factors contribute to or protect against problematic digital media use and its impact on well-being, through additional data and analysis.

Emerging technologies like artificial intelligence (AI) and virtual reality (VR) present both opportunities and challenges for children's well-being. AI can enhance learning, improve medical data analysis, and increase access to knowledge but also poses risks such as bias, privacy erosion, fraud, and exposure to harmful content. Similarly, VR provides benefits in education, pain management, and child psychiatry but also presents risks, including motion sickness, eye strain, and the potential to blur the line between reality and virtual experiences for young children, which may impact cognitive development. To reduce these risks, it is essential to implement safe technological design, establish time limits and breaks, and ensure adult supervision.

A whole-of-society approach is needed to address the challenges faced by children in the digital age

OECD countries are developing policies to safeguard children online, advance digital education, and mitigate risks such as cyberbullying, misinformation, and data privacy concerns. To enhance their effectiveness, a comprehensive, whole-of-society and whole-of-government approach is essential — one that harnesses diverse expertise, aligns policies with children's needs and expectations, and ensures coordinated efforts among key stakeholders, including governments, service providers, educators, and families. Chapter 5 of this report examines the challenges associated with four key pillars of this holistic policy approach:

- Establishing effective regulatory frameworks and fostering the development of technologies and services that prioritise child safety.
- Enhancing digital literacy and skills among children, with schools and teachers playing a crucial role in empowering them.
- Providing guidance for parents and caregivers to help them navigate the benefits and risks of children's digital engagement.
- Incorporating children's perspectives and experiences into policy design to ensure their needs are accurately understood and that support measures are effectively implemented.

A stronger evidence base on children’s digital activities and their impact on well-being is needed to guide policy decisions

Expanding the evidence base on children’s digital activities and their impact on well-being is essential for guiding effective action and ensuring that policies keep pace with evolving technological changes, digital practices, and related well-being concerns. To this end, strengthening efforts to collect data on screen time, digital activities, and their content is crucial. It is also important to assess the impact of screen exposure and usage on children of all ages and to conduct longitudinal studies to better understand the determinants of digital behaviours and their effects on children’s well-being. Incorporating the expertise of health and education professionals, along with insights from parents, is vital for understanding the impact of digital practices on the well-being of vulnerable children. This approach will help to better prevent harm and develop effective coping strategies.

1. Introduction and main findings

This chapter set the scene and provides an overview of the key findings of this report on how children engage with digital devices and the available evidence on the impact of digital activities on their well-being. It also highlights the main challenges that a whole-of-government approach must address to improve child well-being in the digital age. Additionally, the chapter discusses the need for an expanded evidence base to ensure that policies draw on all available expertise, helping children navigate the digital environment safely while harnessing its opportunities.

Today's children are transitioning from childhood to adulthood in an era of rapid digital transformation, where many aspects of their lives and society are being profoundly transformed. In recent years, digital media,[1] including online communication platforms and applications accessed via smartphones, tablets and computers have become increasingly prominent in their lives. The fast progression of technology is best exemplified by access to the Internet, which has – over the course of a single generation – become considerably more widespread. In 2005, about half of all households in OECD countries had Internet access; by 2023, this figure had risen to 92% (OECD.Stat, 2023[1]). In 2022, the PISA survey estimated that around 97% of 15-year-old students in OECD countries lived in households with an Internet connection, up from 85% in 2009. Similar growth is seen in the PIRLS data: 93% of 10-year-olds had an Internet connection in 2021, compared with 85% a decade earlier.

Children are introduced to screens at a fairly young age and their screen time increases rapidly as they get older. Screen time encompasses a number of media digital activities, which are in constant evolution including their increasingly personalised, interactive and immersive feature.[2] Although data on young children's contact with digital devices are pretty limited, a European survey estimates that children typically begin interacting with digital technology by the age of two (Chaudron, Gioia and Gemo, 2018[2]). The few data available suggest that the use of screens increases rapidly in the early years of life. The OECD International Early Learning and Child Well-Being Study found that most five-year-olds (83%) in England, Estonia, and the United States used a digital device at least once a week and 42% did so on a daily basis (OECD, 2020[3]). Children's screen time intensifies from the start of secondary school. A 2024 survey in France estimates that the average screen time is 2h03 per day for 7-12-year-olds, jumping to 2h55 for 13-15-year-olds and 5h10 for 16-19-year-olds (Benyamina and Mouton, 2024[4]).

As the digital world develops and becomes more sophisticated, it offers children an ever-expanding range of opportunities to learn, access information, discover unknown facets of the world, as well as to play and interact with others online (Burns and Gottschalk, 2019[5]; OECD, 2021[6]; Christakis and Hale, 2025[7]). At the same time, the digital world comes with risks for children's well-being. Children often lack the knowledge and skills needed to navigate its environment safely and may not fully anticipate nor understand the consequences of their online actions or the true intent behind certain content or interactions. Children can also be exposed to content that is inappropriate for their age (OECD, 2022[8]; 2021[6]). There is also concern that some children may become overly reliant on digital tools, leading to reduced physical play and face-to-face interactions. There is a concern that such overuse could have harmful effects on their physical health and mental well-being.[3]

Despite the increasing number of studies documenting children's use of digital devices and its impact on various aspects of child well-being, many questions remain including because digital technologies and platform evolve very fast. Based on existing evidence, digital technologies and media[4] influence many facets of children lives, with effects that can be positive and negative, depending on a number of complex factors such as the amount of screen time and the type of digital activity. Focusing on "screen time" taken as a whole can be misleading because it overlooks the diverse ways children use screens. This catchall term tends to lump all activities into a single category, which hinders efforts to target support for identifying and addressing problematic or risky online behaviours (Livingstone, 2023[9]). For this reason, it is important to consider also the type of digital activity, whether it is passive or active; the age of the child; the extent to which devices are used by peers, parents and the community surrounding children and how these and other contextual factors impact on children's engagement and practices with digital resources (Navarro and Tudge, 2023[10]; John and Bates, 2024[11]; Magis-Weinberg, Ballonoff Suleiman and Dahl, 2021[12]). In addition, the causal relationship between the use of digital devices and psychological well-being is complex and is not yet fully understood. Studies suggest that this relationship is possibly bidirectional, with children who are psychologically more vulnerable more likely to develop addictive or hard-to-control behaviours regarding their use of digital devices.

Last but not least, the actual digital environment to which each child is exposed is unique and profoundly unequal. This is because all children do not have the same protective factors and resources to help them make the most of digital technologies and media and mitigate the related risks.[5] For example, children from higher socio-economic backgrounds use digital tools for information-seeking and educational purposes more often than their less advantaged peers (Micheli, 2015[13]; Weber and Becker, 2019[14]). Findings from a meta-analysis also indicate that higher socio-economic status is associated with greater digital literacy, although the socio-economic gap may be weaker than those in mathematics or reading literacy (Scherer and Siddiq, 2019[15]). Socio-economic disparities can impact children's confidence in using digital devices and developing digital literacy. Children with lower digital skills, often from disadvantaged backgrounds, may experience increased stress and develop negative attitudes towards digital technologies and media, which can hinder their motivation to improve these skills (Burns and Gottschalk, 2019[5]; Büchi and Hargittai, 2022[16]; Robinson et al., 2020[17]).

Against the growing yet fast-evolving evidence on how children's digital practices impact their well-being and development, the large presence of screens in children's lives feeds concerns and fears, particularly among parents (Chong, Teo and Shorey, 2023[18]; Livingstone and Blum-Ross, 2020[19]; OECD, 2024[20]). Parents are generally anxious about the amount of time children and teenagers spend playing video games, surfing the Internet, and using social media applications, over which they have limited control. Children's digital practices can also be an important source of parent-child conflict.

Completely banning screens, certain digital devices, or media – such as smartphones or access to social media – has been proposed in some jurisdictions – including recently in Australia – as a precautionary measure to protect children under a certain age. However, access to digital services and devices is already deeply integrated into children's lives from a young age, making it difficult to reverse the trends, and raising questions about the effectiveness of such measures (Australian Human Rights Commission, 2024[21]). Banning digital devices entirely is also not ideal as children need to develop the digital skills essential for their future personal and professional lives. Such bans also fail to address children's and adolescents' expressed need for online protection, while also ignoring the support children can receive from parents and/or trusted adults to help them navigate the digital world safely (Phippen, 2024[22]; Phippen and Street, 2022[23]).

Against this background, promoting children's well-being in the digital environment and addressing related inequalities requires recognition of the various ways in which the digital world can directly and indirectly impact children's health and well-being. This necessitates a global approach to child well-being in the digital world, encompassing multiple aspects such as physical and mental health, cognitive development and learning outcomes, and socio-emotional well-being aspects such as agency, self-actualisation, social connectedness, and pro-social behaviour. Additionally, it is essential to consider the personal, family, and school circumstances that influence children's online practices and outcomes, as well as the role of institutional and policy contexts in shaping opportunities and risks in the digital world.

This report contributes to the current discussion by reviewing the available evidence and data to understand and monitor the well-being of children in the digital world – holistically – at a cross-national level. Building on the existing OECD Recommendation on Children in the Digital Environment (OECD, 2021[6]), the report explores the challenges of creating an institutional framework to promote safety and well-being in the digital age. It stresses the need to build a better understanding of the interplay between children's offline lives, their digital practices, and well-being outcomes. This includes identifying factors in children's personal circumstances and in their off-line environment that contribute to risks of excessive time spent online or to the development of problematic behaviours and conducts.

At a policy level, the report highlights the need for evidence-based regulations and cross-sectoral government action in response to the widespread use of digital media by children, advancements in technology, including artificial intelligence, and immersive experiences that offer both opportunities and risks. Effective measures are required to protect children in the digital and the school environments,

ensuring that the responsibility for protection and fostering health digital practices does not place un undue burden on parents and children. There is also a need for clear guidance to assist educators, parents, and caregivers in helping children manage their engagement with digital technologies, develop digital skills, establish appropriate limits and recommendations, and fulfil children's expressed desire for protection and support without being excluded from key areas of the digital environment, such as social media. These actions should be evidence-based, informed by research, and the expertise of professionals and caregivers, addressing vulnerabilities and strategies to mitigate harm.

The rest of the present chapter offers an overview the main findings of the report. The second chapter presents the comprehensive approach used to identify the key aspects that influence children's digital well-being, as well as to capture the opportunities and risks they encounter in the digital world. It underscores the importance of considering not only the opportunities and risks within the digital environment but also the broader context of children's lives – including offline factors that shape their digital behaviours – in order to gain full understanding of their engagement with digital media and its association with well-being. The third chapter examines the how children use digital devices and what can be learned on their engagement with digital media from the available cross-national data. It also considers the risks children encounter online. Chapter 4 examines the current evidence on the impact of children's digital activities on well-being, namely physical health, learning and cognitive development, and psychological well-being and mental health. Next, the discussion focuses on key challenges that countries may consider when developing global actions to foster children's well-being in the digital age (Chapter 5). The final chapter discusses how to improve data-based evidence on children's digital well-being to better understand its drivers and enable countries to monitor it (Chapter 6).

Based on the analysis of large-scale surveys of young adolescents,[6] our key findings are as follows:

1.1. How children use digital devices

- In 2022, access to the digital environment was almost universal, with an average of 96% of 15-year-olds in the OECD having access via desktop computer, laptop, or tablet at home. On average, 98% had a smartphone with an Internet connection. By the age of around 10, approximately 70% of children already have their own smartphone, although major disparities exist between countries, from only 29% in Türkiye and 40% in France, but more than 90% of 10-year-olds in Latvia, Poland, and the European Nordic countries.
- At least 50% of 15-year-olds in most OECD countries spent 30 hours or more per week using digital devices. Japan stands out with a significantly lower proportion (31%) of 15-year-olds doing so, and a much higher proportion spending as little as 10 hours per week. A significant minority of these teenagers, ranging from 10% in Japan to 43% in Latvia, spent 60 hours or more on digital devices.
- The time 15-year-olds spent using digital devices just for leisure often exceeded the two-hour per day screen time limit recommended by health organisations in a few OECD countries, including Australia, Germany, and the United States. On average, 60% of 15-year-olds in the OECD spent two hours or more per weekday on digital devices for leisure activities, in addition to time spent for learning. Again, significant variations exist between countries, from 24% in Japan to 81% in Estonia.
- Across the OECD, 95% of 15-year-olds browsed the Internet and social networks for fun. Most used digital devices for communication and sharing content (88%), seeking practical information (84%), and playing video games (83%). A smaller but still high percentage (69%) created or edited their own digital content, with notable variations between countries.
- Child well-being in the digital age primarily depends on the activities, practices, and connections children develop in the digital environment, as well as on the design and delivery of the digital services themselves. These activities interact with many factors, including the resources and

protective factors children get from their family, school, trusted peers and adults in their social network. Consequently, online inequalities tend to reflect offline disparities, and not all children have equal opportunities to leverage digital resources or manage risks threatening their well-being, including physical and mental health, cognitive development, and learning outcomes.

1.2. How digital activities impact child well-being

- Digital technologies and media offer children numerous opportunities to learn, play, connect with friends, and gain gradually independence. However, excessive or problematic use of digital technologies[7] raises concerns about negative impacts on their health, learning ability, and well-being. A substantial body of evidence suggests that excessive screen time may negatively impact several aspects of the physical health of children and adolescents, including sleep quantity and quality, adolescents' physical activity, and risk of overweight and obesity. The evidence is less clear-cut regarding possible eyesight problems, such as the development of myopia and potential risks to the retina from blue light exposure. Nevertheless, given the potential severity of harm to adolescents' health and wellbeing, pre-emptive action is needed.
- In the early years, active engagement with digital devices, such as e-books, when accompanied by interactive involvement from parents and caregivers, can promote emerging literacy, verbal skills, and language development. However, excessive and passive screen exposure can negatively impact neurocognitive development due to the brain's high plasticity and vulnerability, particularly during the early years.
- Especially for school-age children and teenagers, digital resources offer opportunities to learn and create: 84% of 15-year-olds across the OECD spend 2 hours or more per week using digital devices to learn something outside of school (including by consulting tutorials or using educational applications). More girls (87%) than boys (81%) use digital resources for over two hours per week to learn outside of school. Teenagers from high socio-economic backgrounds are twelve percentage points more likely to use digital resources for learning purposes than their peers from lower socio-economic backgrounds. Around seven out of ten 15-year-old students use digital resources during leisure time to create or edit personal digital content, such as pictures, videos, music, or computer programs. Adolescents with a migrant background (76%) are consistently more likely to engage in these activities than their native peers (68%).
- Digital platforms, online games, social media apps, and other digital services offer children numerous opportunities for enjoyment and getting support, providing easy access to information, discreetly answering their questions, and offering online support not available offline. Social media allows them to connect with peers, share ideas, seek moral support, and engage in meaningful social interactions. Social media may offer opportunities to form connections: across the OECD, on average 40% of adolescents aged 11 to 15 are in regular contact through social media with friends they met online. However, the enjoyment and benefits for socio-emotional well-being of digital tools are maximised with moderate use. The debate revolves around whether children's exposure to digital media is significantly altering their cognitive and emotional development and contributing to the rise in mental health issues among youth.
- Digital media can pose risks to children and adolescents' mental health through direct pathways, such as reduced in-person social connection, exposure to harmful or idealised online content, and online abuse or bullying, as well as secondary effects like sleep deprivation and decreased physical activity, which can exacerbate mental health challenges. However, evidence linking digital technology use directly to mental health problems is not definitive including because it relies on limited, partly inappropriate sources of evidence. Population-based research often shows only moderate effects and is mainly correlational, lacking clear causal relationships. While some studies suggest negative impacts, others indicate some positive or no effects for the majority of

adolescents. Nevertheless, a minority of adolescents may be vulnerable to negative impacts on their well-being due to excessive or problematic use of digital media and "hyperconnectivity" – i.e. the constant, often overwhelming, access to and interaction with digital media:

(i) Around 27% of 15-year-olds across the OECD report playing video games for at least three hours on a weekday; 8% of boys (compared with 3% of girls) spend at least seven hours on a typical weekday playing video games, with this proportion reaching 12% on weekend days. Adolescents from low socio-economic families are more than twice as likely as their most affluent peers to play for seven hours or more on a typical day.

(ii) On a typical weekday, 65% of 15-year-old girls and 55% of boys spend three hours or more on social media.[8] This high level of use is prevalent among 15-year-olds from all socio-economic backgrounds, but it is more common among those from lower socio-economic status (64%) compared to those from higher socio-economic status (54%).

(iii) Across the OECD, roughly 35% of teenagers aged 11 to 15 report being almost constantly in online contact with friends and/or relatives throughout the day. The likelihood of constant online interaction rises with age, from 29% among 11-year-olds to 38% among 15-year-olds. Girls (38%) are more likely to maintain constant contact than boys (31%), and adolescents from one-parent families (37%) are slightly more inclined to do so compared to those from two-parent families (33%).

(iv) In 2021-22, around 10% of adolescents aged 11, 13 and 15 across the OECD report experiencing problematic use of social media,[9] up from less than 7% in 2017-18. Girls (12%) are again more often exposed to this type of problem than boys (8%), and children with a migrant background (14%) are more exposed than native born (10%). Additionally, adolescents from one-parent families (12%) report problematic social media use more frequently than those from two-parent families (9%).

(v) Approximately 16% of 11-years-old and 20% of 15 years-old adolescents using social media across the OECD reported that they regularly neglected other activities (e.g. hobbies, sport) because they wanted to use social media.

(vi) Approximately 17% of 15-year-old teenagers report feeling anxious or nervous at least half the time when they are without their digital devices. In nearly every country across the OECD, girls (22%) are significantly more likely than boys (13%) to experience this anxiety.

- Digital technologies have transformed how children communicate, offering both benefits and new risks, particularly for mental health. Online interactions often involve anonymity, disembodiment, and disinhibition, leading to negative behaviours such as cyberbullying, excessive Internet use, and problematic social media use, with immersive technologies potentially amplifying these effects (OECD, 2024[24]).
- Online friendships and social media can enhance adolescents' sense of companionship, particularly for socially isolated teens, by providing platforms for support, maintaining distant connections, and fostering online-exclusive friendships. While some studies suggest a small negative relationship between social media use and social connection, methodological limitations complicate conclusions, and specific social experiences, such as peer feedback, can have varied impacts. For instance, social media can reduce loneliness when used to strengthen existing relationships or build new connections but may increase it when used as an escape. It also offers marginalised groups, including LGBTQIA+ youth, valuable opportunities for identity exploration, peer support, and community building, though emotional investment in such platforms can sometimes exacerbate feelings of loneliness and stigma. Additionally, social media can serve as a resource for mental health peer support, though its effects on well-being remain complex and context dependent.

- Research on children's Internet use highlights challenges in measuring activity-specific impacts, often focusing on overall use and its links to well-being. Problematic Internet Use (PIU) is associated with negative outcomes like depression, anxiety, loneliness, strained relationships, and reduced academic performance, with some evidence suggesting that poor mental health may also contribute to PIU. Gender differences show boys may experience stronger links between PIU and loneliness, potentially due to usage patterns like gaming, while family adversity, such as maltreatment or parental conflict, increases the risk of PIU as adolescents turn to online spaces for escape. For instance, approximately 46% of adolescents aged 11, 13, and 15 (respectively 36% of boys and 55% of girls) using social media reported across the OECD in 2022 that they often used social media to escape from negative feelings. Parental mediation shows mixed results: while content-based rules are more effective at reducing PIU, strict time limits may provoke rebellion or withdrawal symptoms. These findings underline the complexity of PIU's relationship with well-being and the importance of nuanced approaches to mitigating its risks.
- Video games, like social media, are designed to maximise engagement, making children particularly vulnerable to persuasive features that encourage prolonged use, potentially leading to problematic gaming behaviours that affect personal and social well-being. Boys are more prone to gaming disorders[10] and girls to problematic social media and mobile phone use. Studies reveal that a significant minority of adolescents struggle with excessive video gaming, often reporting stress or anxiety when unable to access these activities. Certain game genres, particularly immersive ones like Massively Multiplayer Online Role-Playing Games, Multiplayer Online Battle Arenas, Real-Time Strategy Games, are strongly associated with gaming disorders. Additionally, structural features of games, such as in-game rewards that trigger dopamine release and the unpredictability of these rewards, play a key role in reinforcing prolonged gaming sessions and sustaining gaming disorders. Family dynamics, including neglectful, authoritarian, permissive parenting styles are also associated with higher levels of gaming disorders.
- Research shows that excessive social media use, especially beyond two hours a day, is linked to negative mental health outcomes, including depression, anxiety, body image concerns, and poor sleep, with girls often being more affected. Factors such as social comparison, exposure to idealised images, and cyberbullying increase the likelihood of a negative association between social media use and subjective well-being. The impact of social media varies based on content type, with positive content linked to better well-being and negative content exacerbating mental health issues. Social media use can also lead to addiction-like behaviours and social media-induced stress, particularly among vulnerable adolescents, such as those with minoritised identities or those facing offline vulnerabilities. While social media offers benefits like online support communities, it can also heighten feelings of isolation and worsen mental health, particularly when used for comparison or as an escape from real-world interactions. Personality traits and individual motivations for social media use also shape the extent of these effects.
- Many personal and environmental factors or experiences in the non-digital world can predispose children to excessive use of digital technologies. For instance, a lack of interest in physical activity, behavioural problems, weak social connections, family-based adversity factors, such as child maltreatment, and parental conflicts and poor parenting, or low psychological well-being are factors associated with intensive and/or problematic use of digital devices. Moreover, a bidirectional dynamic can link adolescents' problematic use of digital tools with their subjective well-being, exacerbating the impact of pre-existing vulnerabilities. For instance, social media can be used by adolescents to develop interpersonal interactions and combat feelings of loneliness. However, some evidence suggests that, although engaging with social media and online interactions can help temper negative feelings, the effect may dissipate and be associated with increased negative emotions and loneliness, and more intense use of digital devices the next day.

- Adolescents who navigate the digital space often have negative experiences: over a third of 15-year-olds (36%) report they got upset when encountering age-inappropriate content online, 42% were upset by receiving offending messages, over half (53%) were upset by discriminatory content, and nearly 40% of adolescents are affected by information about them being shared without their consent. Across the OECD, girls report such experiences substantially more frequently than boys.
- Adolescents' exposure to cyberbullying is increasing in all OECD countries: on average, one in six 11 to 15-year-olds report experiences of cyberbullying in 2021-22, with significant variation across countries. Girls and adolescents from single-parent families are more likely to be victims in most countries. However, in Slovenia, Israel, Lithuania, and Türkiye, boys report higher rates of cyberbullying than girls. A significant minority of younger children (around 5% of 10-year-olds) also report being victims of cyberbullying, with this risk being twice as high in countries like Belgium and Brazil. Cyberbullying is also more prevalent among children from low socio-economic status families (7%) compared to those from high socio-economic status families.
- Slightly more than 10% of teenagers aged 11 to 15 years report having engaged in cyberbullying, with boys (13%) more frequently involved than girls (8%). This behaviour is also slightly less frequent among children from two-parent families (10%) than others (14%).
- The influence of contextual factors highlights the need for a nuanced approach to understanding how social media affects adolescent mental health, particularly in groups of children where negative impacts are stronger, like older adolescents, females, and those with pre-existing mental health issues. A better understanding of protective factors, including active coping strategies, supportive offline relationships, and family environments, is needed to help mitigate the negative effects of cyberbullying and online harassment.

1.3. How to enhance child well-being in the digital age

- To enhance child well-being in the digital age, it is essential to have a broad understanding of the benefits and risks associated with the digital environment, along with a strong legal and policy framework that ensures comprehensive protection and support for all children (OECD, 2021[6]).
- Beyond time spent on screens, policy makers, parents, and educators should be aware that digital technologies affect children and adolescents in different ways:
  - (i) Globally, girls are more likely to use social media intensively and report being more often affected by exposure to inappropriate content or hate speech. Boys, on the other hand, are more likely to engage in risky digital behaviours: they tend to spend excessive amounts of time playing video games, enable notifications on their devices when they go to bed, participate in cyberbullying, and more frequently to recklessly share online information they know to be untrue.
  - (ii) Adolescents from low socio-economic backgrounds are less likely to use digital resources for learning outside school or for seeking practical information. They have a significantly higher risk of spending excessive time on video games, are less likely to change privacy settings, and are more likely to leave digital tool notifications on when going to sleep.
  - (iii) Promoting the dissemination of best practices to manage risks and enhance the benefits for children's learning and well-being can also help reduce the socio-economic inequalities affecting children's and adolescents' online behaviours.
  - (iv) Children's use and engagement with digital technologies and media depend not only on protections within the online environment but also on offline factors and life circumstances that can either serve as protective influences or create vulnerabilities. These factors can shape the likelihood of digital behaviours and either mitigate or amplify their impact on well-being.

Understanding the interplay between offline life and digital behaviours is essential for better preventing potentially harmful practices and mitigating their effects on well-being.

- Children should be safeguarded from harm in digital spaces and supported in using digital media beneficially, while also managing potential risks. This responsibility cannot rest solely on adolescents and caregivers. A coordinated, multisectoral and whole-of-government and whole-of-society approach is essential to address all aspects of children's involvement in the digital world, including technological development, health, education, family support, and justice, coherently (OECD, 2021[6]). This requires developing a shared understanding of the benefits and risks associated with child well-being in the digital environment. This understanding should leverage the expertise of various groups, including digital device developers, digital world stakeholders, health professionals, educators, child development experts, and parents, and align with children's views and expectations. Such a collaborative effort can yield a balanced understanding of both the benefits and risks of digital media and base digital policies on solid evidence to enhance learning and well-being outcomes.
- Strengthening policies around digital media does not require it to be the sole or primary cause of mental health issues, nor does it need to directly improve mental health to justify intervention. Even as one of many contributing factors, regulating digital media use may be warranted. The impact of digital media varies depending on usage patterns, motivations, and interactions, which are challenging to measure with current tools, particularly in extreme cases like exposure to harmful content about suicidality. Understanding the interplay between digital behaviour and pre-existing vulnerabilities is crucial, as is incorporating insights from professionals, parents, and young people – especially those involved in severe cases – to identify vulnerability factors and underlying dynamics.
- Healthy digital practices for children include balanced screen time, safe and positive online interactions, participation in offline activities like play and exercise, and protection from harmful or inappropriate content. Helping children develop such practices is essential for their well-being and rights during childhood, while also preparing them for life online as adults and equipping them with the digital skills needed for adulthood. Managing risks associated with digital technologies and media for children involves promoting offline well-being and addressing real-life vulnerabilities that may lead to the development of problematic digital habits.
- Artificial intelligence (AI) has significant potential to advance well-being, from supporting the analysis of medical data, to supporting learning and making knowledge more accessible to students of all ages. At the same time, AI also involves risks to both well-being and inclusion, such as the amplification of bias and discrimination, erosion of privacy, fraud, and exposure to inappropriate content. AI-generated deepfakes can produce highly realistic yet fake images or videos, which may be used for bullying or exploiting children. Moreover, the lack of transparency and accountability in AI systems can foster unethical behaviour, as identifying the source of harmful content or actions becomes challenging. Additionally, AI-driven content recommendation algorithms may expose children to inappropriate materials or online communities that increase their risk of depression, anxiety, self-harm, or engagement in unethical activities. Further research is required to confirm and assess the extent of these risks.
- Similarly, Virtual Reality (VR) offers significant opportunities and challenges for children due to their developmental plasticity. Positive uses include enhanced learning, pain management, and applications in child psychiatry. However, risks involve physiological issues like motion sickness and eye strain, as well as mental health concerns, isolation, and exposure to harmful content. VR's immersive nature can blur the line between virtual and real experiences, particularly for younger children, and fast-paced content may hinder cognitive and executive skill development. To reduce these risks, it is essential to ensure adult supervision, set time limits, and incorporate regular breaks when using VR technologies.

- OECD countries are strengthening policies to protect children online, promote digital education, and address risks such as cyberbullying, false information, and data privacy concerns. The OECD Recommendation on Children in the Digital Environment provides guidance for creating frameworks that safeguard children, promote well-being, empower participation, and mitigate risks (OECD, 2021[6]). It advocates for a whole-of-society and whole-of-government approach, leveraging diverse expertise and aligning policies with children's needs and expectations, while also aiming to ensure coordinated efforts among key stakeholders like governments, service providers, educators, and families. This report explores the challenges involved in implementing and strengthening policies related to the four pillars of such a comprehensive policy approach:

Implementing effective regulatory frameworks and developing technologies and services that prioritise child safety

- Ensuring child safety in the digital environment is a critical priority, with digital service providers playing a key role in safeguarding children online with obligations to respect privacy, combat the diffusion of inappropriate content, and provide clear, accessible reporting mechanisms for children facing issues, along with well-defined enforcement mechanisms. These measures are essential to prevent the burden of protecting children online from falling solely on children, their caregivers, and educators.
- Governments are responsible for establishing regulations and standards that digital service providers must adhere to and can also encourage the incorporation of protective measures into the design of digital services and devices.
- Embedding protective measures into the design and functionality of digital products and services from the outset is essential to safeguarding children effectively and fostering a culture of child safety across the board. Key measures include implementing default privacy settings, content filters to prevent exposure to false information, inappropriate content, and hate speech, and parental controls, as well as reinforcing age assurance systems that are simple for children and their caregivers to understand and use. Additionally, establishing complaint mechanisms that allow children to report and resolve issues, and involving them in safety discussions ensures their needs are adequately addressed. This approach is especially important given that only 53% of 15-year-olds report that they can easily adjust device or app settings to protect their data and privacy. It also aligns with children's desire to be protected in the digital world while maintaining a high level of autonomy.
- Establishing codes and standards for digital service providers is crucial for evaluating risks to children and implementing effective protections, particularly as AI advancements and the growth of immersive media amplify these risks. For example, Australia's Online Safety Act mandates safeguards against harmful content, such as child sexual abuse material and pro-terrorism content, requiring compliance from tech companies, including those using generative AI, with penalties for violations. However, codes alone may be insufficient without rapid enhancements in design, filters, and moderation by digital providers. Some jurisdictions, like Australia, have considered banning social media access for children under 16 to address these concerns, though such measures face challenges in enforceability, potential circumvention, and implications for children’s rights and digital participation. Critics also argue that such bans may shift responsibility away from tech companies, while advocates see them as a political lever to pressure digital service providers into creating safer online spaces.
- Cross-sectoral collaboration is essential for addressing the complex challenges of the digital environment for children, requiring integrative “whole-of-government” policy frameworks. In 2023, nearly one-third of European countries have national action plans for children in the digital environment. Notable examples include Norway’s National Strategy for a Safe Digital Upbringing

and Slovakia's National Strategy on the Protection of Children in the Digital Environment, which demonstrate effective coordination among multiple ministries to comprehensively address child well-being issues related to the digital environment. Successful implementation requires clear leadership, institutional procedures, timelines, monitoring tools, and data-driven reporting. However, most countries lack a central coordinating body or formalised plans with defined responsibilities and key performance indicators, posing challenges in governance, accountability, and achieving policy goals.

Promoting digital literacy and skills among children, with schools and teachers playing a crucial role in empowering them

- Teachers, schools, and education systems play a crucial role in helping children develop digital literacy and citizenship[11] skills, understand digital risks, and manage problematic situations online. They can also help raise awareness among parents about the risks associated with excessive screen time, video games, and intensive use of social media. This support is especially important for children without parental or familial guidance in digital spaces. To further these efforts, teachers need adequate training in ICT skills to overcome their lack of knowledge and confidence in using digital tools. Schools can help prevent cyber risks by incorporating guidance into curricula and promoting collaboration among teachers, principals, and school psychologists to detect and respond to cyberbullying and cyber trauma.
- Schools also face the challenge of preventing mobile phones from disrupting learning. Banning phones in class can reduce distractions and improve focus, but enforcing these bans outside the classroom is difficult. Allowing local adjustments to manage the bans can make them more effective. Moreover, the evidence on the impact of banning phones in schools on students' academic performance and well-being remains inconclusive. While some studies suggest that restricting smartphone use can improve academic outcomes, particularly for disadvantaged students, the findings are mixed, with some research showing no benefits or even negative effects due to increased anxiety from phone restrictions. Similarly, evidence on the impact of phone bans on students' well-being, mental health, and bullying is inconsistent, with some studies reporting positive outcomes and others finding no impact or increased anxiety and victimization. Due to the limited number of studies, the evidence is not comprehensive enough to determine which policies are most effective in promoting overall student well-being or addressing the needs of children across different age groups.

Providing guidance to parents and caregivers to help them understand and manage the benefits and risks of children's digital device use

- Parents are essential in guiding children towards safe and enriching practices in the digital environment. They set rules for using digital technologies and media and may help children develop the skills to navigate the digital environment.
- Parenting strategies for managing children's digital media use should adapt as children age. Younger children require strict rules and supervision, while adolescents may benefit from more flexible guidelines and open discussions. As children grow, they need more autonomy, along with guidance on maintaining healthy media habits that foster learning and creativity. At all stages, it is important for parents to engage in conversations about digital media use and model healthy habits.
- However, not all parents have the same experience with digital devices, the same knowledge of the opportunities they offer and the risks involved, or the large time resources needed. Passing on this information and providing guidance on best practice for managing screen time and content is crucial for fostering healthier screen habits in children. For instance, reduced screen exposure in the evening, and screen-free time before bed, and keeping smartphones outside of children's

bedrooms at night are good habits that can be promoted to foster healthier sleep habits in children. Parental supervision of the content accessed by children is also important and can potentially be less conflictual than solely enforcing time restrictions.

- Although parental control functions in digital tools can help parents set boundaries and guide children's online exploration, their use presents risks, including a false sense of security, overly controlling behaviour, and children avoiding responsibility for their own learning and growth. Additionally, parental controls may shift responsibility onto parents, limiting their ability to make meaningful changes to services beyond basic access decisions. Critics argue that digital service providers should focus on designing safer services rather than relying on parental controls.
- Parents' active involvement in children's digital activities is also crucial in ensuring that young children benefit from digital tools. It can be promoted, as suggested, for instance by the Canadian Paediatric Society, with practices such as being present and engaged during screen time, co-viewing to promote digital literacy, prioritising educational and interactive content, and monitoring media use to limit exposure to advertising. Additionally, families could consider creating a media plan to agree on healthy digital practices and encourage older siblings to mentor younger children in their digital use.
- Media use plans that involve all family members can be particularly helpful in encouraging parents to reflect on their own habits, as research shows that parents' use of digital devices can interfere with their parenting, leading to "distracted" behaviour and less attention and responsiveness to their children's expressions and actions. Therefore, family media plans can address both children's and parents' media use, such as by establishing device-free zones – like the dinner table – to foster healthier interactions. When media use plans involve the entire family, rather than focusing solely on children, they are also more likely to be accepted and respected by the children.

Ensuring that children's views and experiences are reflected in the design of digital policies

- Incorporating the views and experiences of children and adolescents into the definition of digital policies is essential to ensure decisions address the risks they experience, respect their expectations – including their desire for autonomy – and can be effectively implemented. This requires participatory processes to be in place for children to be consulted and have their views represented when policy options are debated and adopted. It is also important to represent children from disadvantaged backgrounds, to remove obstacles such as time constraints, geographic access, limited availability of digital devices for online consultations, and to provide language support for non-native speakers.
- Involving young people in consultations about digital matters is becoming more common, although countries vary in how they engage children in shaping digital environment policies. Some countries have dedicated structures for active participation, while others gather input through surveys or existing data. A survey in Europe found that over half of the countries directly involve children in policy development, using methods like consultations and specific surveys. Countries such as Ireland, Italy, Norway, and Slovenia have established structures for active child participation, with examples like Ireland's Youth Advisory Committee, which advises on policies like the online safety code. At the European level, the Better Internet for Kids' Youth Programme provides a platform for young people to share their views on making the Internet safer for children.
- Consultations with adolescents highlight their desire to be protected but not excluded from the digital environment, and get truthful, clear, and child-friendly information about how digital services work and data privacy. They want digital platforms to stop exploiting them commercially, collecting data, and exposing them to false and harmful content. Additionally, they wish for greater trust and

autonomy from parents, to be better informed about the benefits and risks of digital technologies and media.

Expanding the evidence base on children's digital activities and its association with well-being

- Enhancing data and statistics on the impact of digital transformation on people's well-being is central to the digital policies of countries and to the roadmap suggested by the OECD to guide this transformation (OECD, 2022[25]). Children should be covered in this exercise.
- The available evidence on how children engage with digital technologies and media and what is the impact of that on their well-being is scant and not always conclusive. Globally, there is a lack of data to accurately capture the time spent on screens and digital activities, the content of those activities, and to assess the impact of screen exposure and use on children of all ages. For instance, it is very difficult to find reliable, comparable, especially longitudinal data that allows for connecting screen time, digital media use, and content with well-being and mental health outcomes. Longitudinal data would also help explore further the determinants and lasting effects of the time spent on and type of engagement with various digital technologies and media.
- Tracking the time children spend on screens or engaging with digital media, alongside activities like reading, physical exercise, and other leisure activities, is essential for understanding shifts in their daily use of time. It also helps assess whether the presence of digital technologies in children's lives is increasing and potentially displacing other activities. Beyond evaluating the direct impact of screen time on well-being, such data are crucial to determining whether digital activities come at the cost of other activities more surely linked to aspects of children's well-being.
- A stronger focus on data collection regarding the quality of engagement can support evidence-based policies, ensuring that digital technologies are understood and leveraged to promote well-being. This requires moving beyond simplistic screen-time metrics, which overlook the key factors that determine whether digital engagement supports or hinders children's lives. Understanding how and why children engage with digital media – and how it integrates into their lives – can provide deeper insight into its impact on well-being. This is essential for moving beyond simplistic narratives that label digital technologies and media as universally "good" or "bad".
- Recent waves of the PISA, PIRLS, and HBSC surveys have helped document adolescents' digital skills and practices. These surveys are used to develop around 40 indicators covering Internet and digital device access, digital technology use, online social interactions, at-risk digital practices and attitudes, negative online experiences, and protective behaviours and environments. However, significant data gaps on children's digital practices and well-being remain. Filling these gaps can help improve countries' capacity to monitor children's digital well-being, including with:
  (i) **Data on young children's screen exposure and use**. There is a need to gather data for younger children, as research indicates that early screen exposure could impact their early motor and cognitive development. It is also crucial to document how parents engage with children during their exposure to digital devices.
  (ii) **Information on how digital devices is used**. Collecting more detailed information than what is currently available on the time spent using digital tools throughout the day is important to capture practices with higher risks. For example, screen time in the evening or just before nap time may have a potentially greater impact on sleep patterns and quality. Similarly, collecting information on the time spent by type of applications and platforms used by children and teenagers can help portray the risks they face online, given that not all applications or platforms offer equal levels of protection for children.
  (iii) **Data on positive experiences and benefits of children's digital engagement**. Data collection has primarily concentrated on the negative experiences and risks associated with

using digital devices, while information on benefits has been limited to opportunities for learning or creating personal content. A broader range of potential benefits should be considered, such as whether children's digital engagement contributes to their community and civic participation, strengthens their personal, cultural, or religious identity, or helps them access information, networks, or services.

(iv) **Information on children's perceptions of major risks**. Data on children's perceptions and awareness of risks related to their physical or mental health from digital technology use, misinformation on the Internet or social networks, and the dissemination of inappropriate or commercial content, etc. could help measure the need for information and media education. It would also help identify the audience most likely to benefit from better information and support, and the key aspects to emphasise when designing support measures.

(v) **Data on the support children can get in the family, at school or from their social network**. Documenting the support children receive from their environment to navigate digital spaces safely and develop their digital skills is crucial to identify where needs lie primarily as well as to learn about good practices.

(vi) **Data of children's views and priorities**. Considering children's perspectives and their priorities is crucial to aligning protection and support measures with their actual needs and practices. It ensures that these measures are in line with their desire to be safeguarded, educated, and equipped to manage risks, while also fostering their gradual autonomy in the digital realm.

- Gathering comprehensive data to monitor children's digital practices and their impact on well-being necessitates using a variety of data collection methods, each with distinct advantages. Integrating modules on children's digital experiences into established surveys like PISA and HBSC provides a cost-effective way to connect digital engagement with broader aspects covered in these surveys, such as academic performance or health. However, limitations in the number of questions that can be included on digital practices and well-being in these surveys highlight the need for dedicated surveys specifically focused on child digital well-being. Including information on parents' and children's digital practices in longitudinal studies, such as birth cohort studies, is essential for documenting how digital dynamics shape developmental outcomes over time. Digital devices offer valuable real-time insights into children's daily usage patterns and responses to technological advancements. Lastly, observational data from field-based experiments, such as digital play interventions, can effectively document how children interact with digital technologies and how these interactions influence their emotional regulation and social interactions within their physical environment.
- Monitoring children's digital practices and experiences is essential for creating effective policies that ensure their safe and beneficial use of digital resources. Countries can achieve this by analysing data from digital devices and services, conducting surveys on digital usage and attitudes, integrating questions on digital practices into existing surveys, and designing surveys within an international framework. While leveraging global data can reveal usage patterns and identify risks, significant evidence gaps remain. To address these, countries should strengthen their monitoring efforts by selecting or combining various data collection methods to better guide policy decisions.
- The expertise of health and education professionals is essential for understanding the impact of digital practices on the well-being of vulnerable children. Health professionals, in particular, can pinpoint links between problematic digital use and physical or mental health challenges, especially in more severe instances. Educators contribute by observing the impact of digital habits on children's attention spans, learning, and social interactions. Through their direct engagement with children and families, these experts help detect how digital practices are integrated into daily routines, affect sleep quality, and classroom behaviour, while also uncovering environmental dysfunctions. Additionally, they play a key role in documenting how to best prevent harms and

develop coping strategies. Integrating their expertise to inform policies and programs to enhance children's well-being in the digital age is therefore crucial.

- Policymakers, clinicians, teachers, parents, and young people themselves require a clear and simplified understanding of the growing body of evidence as it emerges. The process of collating, filtering, and evaluating new research findings should be guided by well-defined criteria for assessing quality, causal relationships, generalisability, and relevance to policy, education, healthcare, and social care. An explicit hierarchy of evidence could be used to inform policy decisions and practitioners, based on an assessment of the robustness, reliability, and accessibility of research evidence for practical use in decision-making or policy implementation.

References

Australian Human Rights Commission (2024), *Proposed Social Media Ban for Under-16s in Australia*, https://humanrights.gov.au/about/news/proposed-social-media-ban-under-16s-australia?mc_cid=78865662a3 (accessed on 19 December 2024). [21]

Ayllón, S., H. Holmarsdottir and S. Lado (2023), "Digitally Deprived Children in Europe", *Child Indicators Research*, Vol. 16/3, pp. 1315-1339, https://doi.org/10.1007/S12187-022-10006-W/FIGURES/6. [29]

Benyamina, A. and S. Mouton (2024), *Enfants et écrans: À la recherche du temps perdu*, Rapport de la commission d'experts sur l'impact de l'exposition des jeunes aux écrans, https://www.elysee.fr/admin/upload/default/0001/16/fbec6abe9d9cc1bff3043d87b9f7951e62779b09.pdf (accessed on 13 June 2024). [4]

Büchi, M. and E. Hargittai (2022), "A Need for Considering Digital Inequality When Studying Social Media Use and Well-Being", *Social Media and Society*, Vol. 8/1, https://doi.org/10.1177/20563051211069125. [16]

Burns, T. and F. Gottschalk (eds.) (2019), *Educating 21st Century Children: Emotional Well-being in the Digital Age*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/b7f33425-en. [5]

Chaudron, S., R. Gioia and M. Gemo (2018), "Young Children (0-8) and Digital Technology A qualitative study across Europe", https://doi.org/10.2760/245671. [2]

Chong, S., W. Teo and S. Shorey (2023), "Exploring the perception of parents on children's screentime: A systematic review and meta-synthesis of qualitative studies", *Pediatric Research*, Vol. 94/3, pp. 915-925, https://doi.org/10.1038/s41390-023-02555-9. [18]

Christakis, D. and L. Hale (eds.) (2025), *Handbook of Children and Screens*, Springer Nature Switzerland, Cham, https://doi.org/10.1007/978-3-031-69362-5. [7]

Desmurget (2022), *Screen Damage: The Dangers of Digital Media for Children*, Polity Press. [27]

Haidt, J. (2024), "The Anxious Generation : How the Great Rewiring of childhood is causing an epidemic of mental illness", p. 385. [26]

John, A. and S. Bates (2024), "Barriers and facilitators: The contrasting roles of media and technology in social-emotional learning", *Social and Emotional Learning: Research, Practice, and Policy*, Vol. 3, https://doi.org/10.1016/J.SEL.2023.100022. [11]

Livingstone, S. (2023), *Screen time: Impacts on education and wellbeing*, Digital Youth, https://digitalyouth.ac.uk/screen-time-impacts-on-education-and-wellbeing/#:~:text=Greater%20screen%20time%20is%20linked,studies%2C%20socioeconomic%20status%20plays%20a (accessed on 23 October 2023). [9]

Livingstone, S. and A. Blum-Ross (2020), *Parenting for a digital future : How hopes and fears about how technology shape children's lives*, Oxford University Press, https://books.google.com/books/about/Parenting_for_a_Digital_Future.html?hl=fr&id=ATjpDwAAQBAJ (accessed on 16 March 2024). [19]

Magis-Weinberg, L., A. Ballonoff Suleiman and R. Dahl (2021), "Context, Development, and Digital Media: Implications for Very Young Adolescents in LMICs", *Frontiers in Psychology*, Vol. 12, p. 632713, https://doi.org/10.3389/FPSYG.2021.632713. [12]

Micheli, M. (2015), "What is New in the Digital Divide? Understanding Internet Use by Teenagers from Different Social Backgrounds", Vol. 10, pp. 55-87, https://doi.org/10.1108/S2050-206020150000010003. [13]

Navarro, J. and J. Tudge (2023), "Technologizing Bronfenbrenner: Neo-ecological Theory", *Current Psychology*, Vol. 42/22, pp. 19338-19354, https://doi.org/10.1007/S12144-022-02738-3/METRICS. [10]

OECD (2024), "Mental health and digital environments", in *OECD Digital Economy Outlook 2024 (Volume 1): Embracing the Technology Frontier*, OECD Publishing, Paris, https://doi.org/10.1787/596e067d-en. [24]

OECD (2024), *What Does Child Empowerment Mean Today? Implications for Education and Well-Being*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/8f80ce38-en. [20]

OECD (2022), *Companion Document to the OECD Recommendation on Children in the Digital Environment*, OECD Publishing, Paris, https://doi.org/10.1787/a2ebec7c-en. [8]

OECD (2022), "The OECD Going Digital Measurement Roadmap", *OECD Digital Economy Papers*, No. 328, OECD Publishing, Paris, https://doi.org/10.1787/bd10100f-en. [25]

OECD (2021), *OECD Recommendation on Children in the Digital Environment*, https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0389 (accessed on 12 June 2024). [6]

OECD (2020), *Early Learning and Child Well-being: A Study of Five-year-Olds in England, Estonia, and the United States*, OECD Publishing, Paris, https://doi.org/10.1787/3990407f-en. [3]

OECD.Stat (2023), *ICT Access and Usage by Households and Individuals*, OECD. [1]

Phippen, A. (2024), *Why bans on smartphones or social media for teenagers could do more harm than good*, The Conversation, https://theconversation.com/why-bans-on-smartphones-or-social-media-for-teenagers-could-do-more-harm-than-good-224005 (accessed on 18 June 2024). [22]

Phippen, A. and L. Street (2022), "Online Resilience and Wellbeing in Young People", *Online Resilience and Wellbeing in Young People*, https://doi.org/10.1007/978-3-030-88634-9. [23]

Robinson, L. et al. (2020), "Digital inequalities 3.0: Emergent inequalities in the information age", *First Monday*, https://doi.org/10.5210/FM.V25I7.10844. [17]

Scherer, R. and F. Siddiq (2019), "The relation between students' socioeconomic status and ICT literacy: Findings from a meta-analysis", *Computers and Education*, Vol. 138, pp. 13-32, https://doi.org/10.1016/J.COMPEDU.2019.04.011. [15]

Stoilova, M., S. Livingstone and R. Khazbak (2021), "Investigating Risks and Opportunities for Children in a Digital World: A rapid review of the evidence on children's internet use and outcomes", http://www.unicef-irc.org@UNICEFInnocentifacebook.com/UnicefInnocenti (accessed on 23 October 2023). [28]

Weber, M. and B. Becker (2019), "Browsing the Web for School: Social Inequality in Adolescents' School-Related Use of the Internet", *SAGE Open*, Vol. 9/2, https://doi.org/10.1177/2158244019859955. [14]

Notes

[1] Digital media refers to any content that is created, distributed, and accessed through digital technologies. It encompasses a broad range of formats and platforms, leveraging electronic devices like computers, smartphones, tablets, and the Internet. Digital media integrates various forms of communication, entertainment, and information, often characterised by interactivity, accessibility, and instant dissemination.

[2] Screen time refers to the amount of time spent using devices with screens, such as smartphones, tablets, computers, and televisions, for activities including entertainment, communication, work, and learning. The rise in children's screen time is tied to technological advancements that make digital tools more pervasive in daily life – such as smartphones, which are portable and easily accessible – and to the growing prevalence of these devices among children.

The growing access to digital tools among children and their families expands the opportunities for children to engage in various types of digital media activities. These activities may include using digital platforms and devices for social media, video streaming, gaming, online communication, browsing, and educational tasks. Recent advancements in technology have further shaped the content of digital media to become more personalised, interactive, and immersive. This evolution is driven by the rise of algorithms, augmented and virtual reality, live streaming, user-generated content, and an increasing emphasis on short-form and visually rich formats like videos and virtual animations.

[3] One of the most controversial claims on the impact of the digital environment on child well-being can be found in J. Haidt's book on the "Anxious Generation". The book claims that the increase in youth mental health issues coincides with the rise in children's and teenagers' access to digital tools, particularly in the case of the United States (Haidt, 2024[26]). According to Haidt, the spread of digital tools has displaced physical play and face-to-face social interaction, leading to a "rewired" childhood and fuelling an epidemic of mental illness among young people. excessive use of digital devices – smartphones, tablets, video games, and social media – negatively affects children and adolescents. Similarly, Desmurget (2022[27]) argues that screen exposure leads to reduced attention span, poorer academic performance, increased

aggression, and weakened social and communication skills. However, the evidence for a direct causal link between the digital environment and deteriorations in child well-being remains limited, as does the claim that digital technologies are responsible for the brunt of mental health problems affecting younger generations (see chapter 4).

[4] Digital technologies are the tools and systems enabling digital processes, while digital media is the content created and consumed using those technologies.

[5] According to data from the European Union - Statistics on Income and Living Conditions (EU-SILC), an average of 5.4% of children in Europe are "digitally deprived", meaning they live in households that cannot afford a computer or an Internet connection for personal use at home (Ayllón, Holmarsdottir and Lado, 2023[29]). The way children engage with digital devices, learn to use them, and navigate the digital world is also unequal, as it depends on personal factors and various aspects of their environment, including their family's material resources and whether they have a supportive environment at home, at school, or in their social circles (Stoilova, Livingstone and Khazbak, 2021[28]; Büchi and Hargittai, 2022[16]; OECD, 2024[20]).

[6] The key findings reflect the circumstances of young adolescents in 2021 or 2022, primarily based on data from the 2022 Programme for International Student Assessment (PISA) survey of 15-year-olds and the 2021-2022 Health Behaviours of School-Aged Children (HBSC) survey of 11-, 13-, and 15-year-olds. The 38 OECD countries included in the PISA surveys are Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Türkiye, the United Kingdom, and the United States. However, the HBSC survey does not cover Chile, Colombia, Costa Rica, Japan, Korea, Mexico, New Zealand, Switzerland, or Türkiye.

[7] The term "excessive or problematic use of digital technologies" is used in the literature to describe situations where individuals find it difficult to manage their time spent online, feeling compelled to continue using devices even when aware that it interferes with daily responsibilities or well-being. However, no single definition of excessive use exists, and it can manifest in various forms, such as spending more than the recommended amount of time on screens (typically more than 2 hours per day for recreational use), frequent and constant social media use (e.g., checking or scrolling through platforms throughout the day, including during school hours, meals, or before bed), or staying up late using digital devices, resulting in insufficient or disrupted sleep patterns due to blue light exposure. Excessive use may also involve spending many hours playing video games to the extent of neglecting schoolwork, family time, or other important activities, sometimes without taking breaks. Additionally, it can include neglecting physical activity by prioritising screen-based activities over exercise or outdoor play, contributing to a sedentary lifestyle.

[8] These estimates represent the share of 15-years old students who report in PISA 2022 survey that they "browse social networks" or "communicate and share digital content on social networks or any communication platform" for more than three hours or who report spending "between 1 and 3 hours a day" on both activities on a typical weekday.

[9] Problematic social media use refers to engagement with social media that negatively impacts a person's well-being, relationships, and daily responsibilities, often involving compulsive checking, emotional distress, and neglect of other duties. In order to assess the incidence of problematic social media use, children were asked nine questions to test whether social media use over the past year negatively impacted aspects of their lives, such as preoccupation, dissatisfaction, emotional distress, failed attempts to reduce

use, neglect of other activities, conflicts with others, dishonesty, using it to escape negative feelings, and family conflicts.

[10] Gaming disorder is characterised by a pattern of excessive or compulsive video game use that interferes with daily life, affecting personal, social, and academic functioning, and often accompanied by a loss of control over gaming habits.

[11] Digital citizenship refers to the responsible, ethical, and informed use of digital technologies to engage in online environments, communicate effectively, and contribute positively to the digital community.

2. A comprehensive approach to child digital well-being

This chapter emphasises the importance of examining children's engagement in the digital world within a broader framework that considers child well-being and its drivers globally – as proposed by the OECD Child Well-being Measurement Framework. Such a framework can help understanding the relationships between children's offline lives, their vulnerabilities or the protective factors in their environment, and their online activities and outcomes. The chapter also introduce the data sources available to document children’s experiences with the digital environment cross-nationally.

2.1. What does child digital well-being encompass?

Children are individuals typically defined as being in the developmental stages of life from birth to the onset of adulthood. Legally, most countries consider children to be individuals under the age of 18, in accordance with the United Nations Convention on the Rights of the Child. Developmentally, children go through distinct stages – infancy, early childhood, middle childhood, and adolescence – characterised by physical growth, cognitive development, emotional maturation, and social learning. Their needs, capacities, and responsibilities evolve as they grow, often requiring tailored care, education, and protection to ensure their well-being and healthy development.

Child well-being is a multi-dimensional and forward-looking concept that encompasses various aspects of children's lives (OECD, 2021[1]). It aims to ensure children enjoy a positive childhood while developing the skills needed for a successful future. This concept emphasises age-specific needs, the importance of fostering independence, and active participation in decisions that affect well-being, particularly during adolescence and the transition to adulthood. Children's well-being is deeply influenced by their environment, including family, school, community, and broader policy contexts, especially in early childhood when they are heavily reliant on parents or caregivers. Pedagogically, the OECD Child Well-being Measurement Framework identifies key well-being outcomes categorised into four interconnected areas, including:

- *Material Outcomes*: Access to essential resources like food, clothing, housing, and modern necessities such as computers and the Internet.
- *Physical Health Outcomes*: Health status and physical development, including freedom from illness, injury, and disease.
- *Social, Emotional, and Cultural Outcomes*: Behaviours, emotions, social relationships, mental health, identity (e.g., cultural, gender, and sexual identities), and life satisfaction.
- *Cognitive Development and Education Outcomes*: Learning, cognitive skills, educational attainment, and satisfaction with educational experiences.

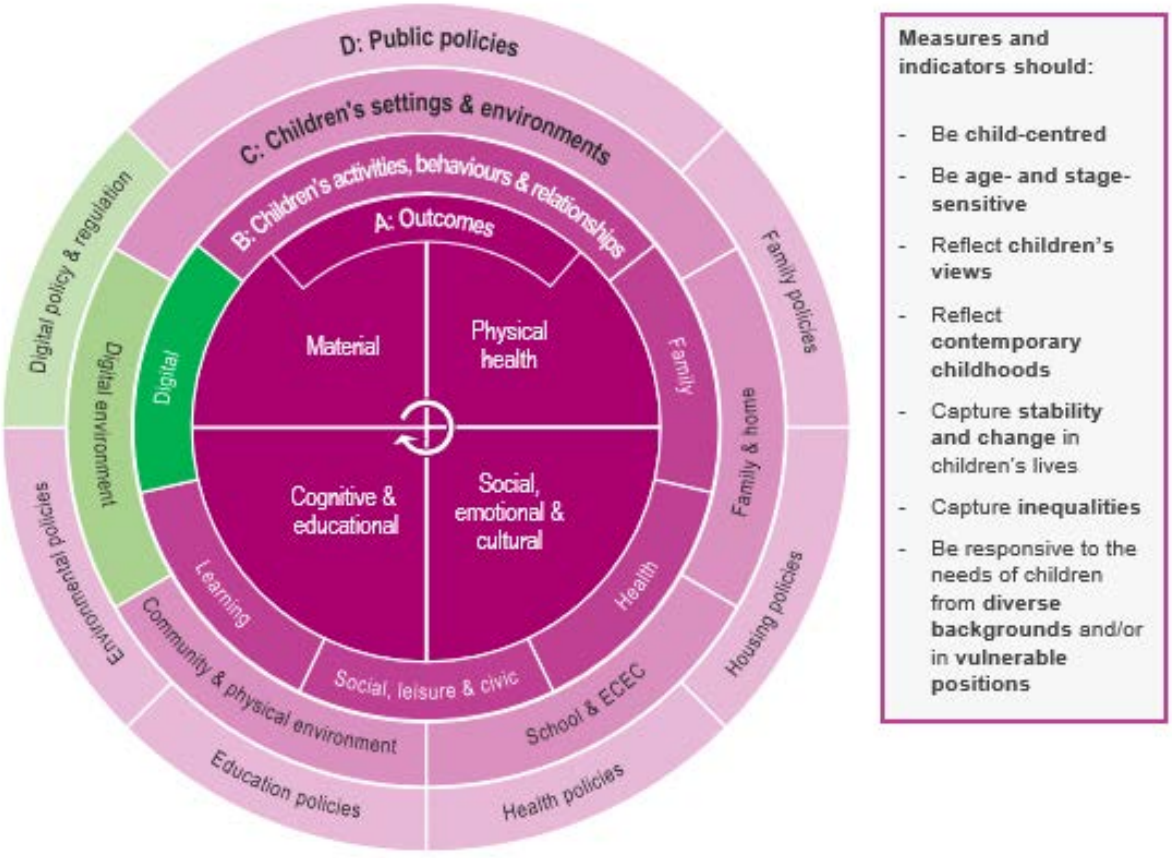
The increasing significance of the digital environment and related activities in children's lives highlights the need to understand their connection to children's well-being. In response, the concept of “child digital well-being” has emerged, though it currently lacks a universally agreed-upon definition (Cao and Li, 2023[2]). It can be conceptualised in two main ways. Firstly, in a narrower sense, it pertains to the psychological or emotional well-being of children during their digital engagements. This definition specifically addresses the online aspect of children's well-being, underscoring the enjoyment they derive from their online activities, or simply put, how digital technology influences children's emotional state. For example, in 2018, about 88% of children living in OECD countries (strongly) agreed that they like using digital devices.

A broader approach to child digital well-being encompasses the effects of digital technology on children's physical health, socio-emotional well-being, mental health, education, and learning. This perspective acknowledges that children's online experiences can have multifaceted effects on their well-being online and offline,[1] extending beyond mere satisfaction or emotional responses to digital tools and the time spent on online activities. In essence, this approach highlights the significant interplay between online activities and outcomes, and the resources, emotions, and experiences from the offline world. Children’s engagement in the digital world can influence their overall well-being, impacting their learning, emotions, interactions with others, and life satisfaction. Conversely, the activities and emotional responses children experience online are shaped by their offline experiences, which can either strengthen their ability to navigate the digital environment or create vulnerabilities. Children facing distress in the offline world may be more likely to engage in problematic digital media use, leading to negative outcomes – see Chapter 4 for a review of evidence. This viewpoint aligns with the OECD Child Well-being Measurement Framework, which is designed to illustrate both child well-being and its contributing factors (OECD, 2021[1]). It is also

consistent with the analysis of how the digital environment more broadly impacts individuals' lives (OECD, 2019[3]; 2020[4]; Hatem and Ker, 2021[5]).

The way children engage with the digital world – i.e., their motivation to explore it, the digital tools and content they have access to, how they learn to navigate the digital world on their own or with others, etc. depends largely on the type and design of the digital services and devices available to them, as well as the protections in place against the risks of harmful contacts and conducts (see Chapter 3). It also depends on the interplay between the digital world and other environments in which children grow up, notably their family, school and their network of friends (Figure 2.1). Certain groups of children may face specific risks such as encountering hate speech or discrimination online, much like they do in offline environments. These risks may arise due to individual characteristics such as disability, sexual orientation, or belonging to a minority group.

Figure 2.1. The embedded nature of child digital well-being



Source: OECD (2021[1]), *Measuring What Matters for Child Well-being and Policies*, OECD Publishing, Paris, https://doi.org/10.1787/e82fded1-en.

Children's activities, behaviours and connections in the digital world are influenced by those they experience in the physical world (Figure 2.1, outer ring B). These activities can either complement each other (e.g., using social media to connect with friends from the physical world) or compete with each other (e.g., screen time replacing physical activities or in-person games). Therefore, it is crucial to consider how the activities, behaviours and relationships developed in the various environments interact with each other, and how this affects the various dimensions of child well-being (including physical health, cognitive development and learning, socio-emotional skills, and mental health).

Children's digital engagement depend on the protection, resources, supports, limits, and constraints that exist in the different environments where they spend time (essentially the family, school, network of friends, and places where they meet up with friends or participate in extracurricular activities) (Figure 2.1, outer ring C). This set is governed by regulations, legal obligations, restrictions, standards, and codes established by governments and relevant authorities to guide the development of digital services accessible to children. It is further supported policies aimed at educating and informing a wide range of stakeholders, including children, parents, and education and health professionals (Figure 2.1, outer ring D).

The amount and type of resources and supports received in these environments notably in terms of access to digital devices, protection, support, control, and advice they can receive from others, may vary across children depending on families' socio-economic status and the type of neighbourhood where they live. These resources are key for children to develop digital literacy and learn to navigate the digital world safely, responsibly, and respectfully. Conversely, when children's digital activities at home lack adequate support and supervision, they may spend most of their digital time unsupervised, increasing the risk of encountering inappropriate content or behaviours without the skills to respond effectively (Fam et al., 2022[6]; Loladze, 2020[7]). Additionally, family-related factors can create vulnerabilities affecting children's digital learning and/or exposure to digital risks. For instance, in Spain, one study found that children with mothers working evenings and with lower educational levels allocate on average less time to educational and social interactions with parents and more time to unsupervised screen-based activities (Gracia and García-Román, 2018[8]). Furthermore, dysfunctional family dynamics, such as inter-parental conflict and childhood maltreatment, can exacerbate the risk of children developing problematic social media and/or Internet use[2] (Geurts et al., 2023[9]; Anderson, Steen and Stavropoulos, 2017[10]; Vossen et al., 2024[11]). The digital practices of parents also influence both their parenting and children's digital behaviours (Reich and Madigan, 2025[12]), highlighting the need to consider the impact of digital transformation on the family environment and its overall functioning.

The network of friends and relationships with peers also influence how the Internet and online social networks are used. Positive peer relationships and strong ties with friends are associated with using social media and the Internet to stay connected. In contrast, weak attachment to peers increases the risk of problematic Internet or social media use (Musetti et al., 2022[13]; Anderson, Steen and Stavropoulos, 2017[10]). Globally, adolescents who indicate lower levels of social support from their parents, peers and teachers are found to be more likely to engage in problematic behaviours (cyberbullying perpetration, problematic social media use) (Boer et al., 2020[14]; van Duin, Heinz and Willems, 2021[15]; OECD, 2024[16]).

The school environment plays a crucial role in shaping how students use digital devices by fostering a positive and structured approach to digital technology, thereby enhancing its benefits and mitigating potential downsides (OECD, 2022[17]; 2024[18]). Key strategies for enhancing digital education include integrating digital literacy into the curriculum, ensuring access to quality educational resources, and offering regular teacher training with robust technical support. Implementing comprehensive Internet safety policies, encouraging collaborative learning, and promoting digital well-being are also essential. Additionally, involving parents through workshops and communication, creating innovative learning spaces, establishing student leadership and peer mentoring programs, and conducting regular assessments of digital practices are components of policies that education systems can implement to

foster children's digital skills (OECD, 2023[19]). The involvement of parents and caregivers is especially crucial in helping both parents and children understand the risks associated with the digital environment, recognise health and well-being concerns, identify misinformation, and implement effective supervision of children's online time and accessible content (see Chapter 5).

The use of digital tools at school – whether to learn how to use them, to support teaching activities, or to regulate the use of personal devices – is also governed by rules and standards that can limit their use or promote good practices (OECD, 2020[20]) (Figure 2.1, outer ring D). More broadly, the overall emotional and relational support children receive from parents, friends, and teachers seems to help prevent or reduce the development of problematic digital tool usage (Mascheroni, 2018[21]; OECD, 2023[19]). Policies and initiatives that promote a supportive environment at home or school are therefore likely to mitigate the risk of developing problematic and risky behaviours online. The array of policies, standards, and legal regulations governing the digital sphere, including the use of digital tools in schools and which help promote a supportive family environment, are then key to promote de diffusion of healthy, safe, and respectful digital practices among children (OECD, 2021[22]).

2.2. Measuring what matters

Measuring what matters for child well-being in the digital environment requires primarily considering the outcome domains affected by the use of digital technologies, the type of digital tools children have access to and use, and the digital activities, practices and connections they engage in. This includes identifying the digital devices children use (such as computers, tablets, and smartphones) and the activities they engage in, such as social media, video streaming, gaming, online communication, browsing, and educational tasks. It also includes examining the nature of their engagement – whether active (e.g., searching for information or using learning apps), interactive (e.g., engaging with social media), or passive (e.g., browsing the web) – and quantifying the amount of time they dedicate to each activity. Other factors that characterise engagement in digital activities, such as motivations and pre-existing vulnerabilities, are crucial to consider as they influence how online interactions are experienced and perceived (see Chapter 4 for further details).

Many dimensions of children's well-being are potentially affected by their involvement in the digital world. First and foremost, their psychological well-being, through the fun or satisfaction that can be associated with certain activities (e.g. video games, social media use); however, psychological well-being can also be negatively affected, as can their mental health, due to the adverse experiences that the digital world can provide (e.g. cyber-bullying, grooming, etc.) (OECD, 2024[16]). As underlined by the UNICEF Initiative on Responsible Innovation in Technology for Children, the resources of the digital world can also be mobilised to stimulate socio-emotional skills such as children's emotional regulation, sense of security, creativity, self-realisation, and other significant dimensions of their well-being (UNICEF Innocenti, 2024[23]), Box 2.1.).

The digital space is also filled with devices, apps, and platforms that can enhance children's learning and positively impact their educational outcomes. However, the cognitive development of young children can be negatively affected by excessive[3] or passive screen time, which may limit the learning opportunities available in the physical world. Finally, children's physical and mental health can also be impacted by their online activities, particularly if these activities replace physical exercise and encourage a more sedentary lifestyle, or if children are exposed to inappropriate content or behaviour online (see Chapters 3 and 4).

Measuring what matters for child digital well-being and its monitoring also requires prioritising what can impact not only children's immediate well-being, but also their development and future skills and well-being. Such a forward-looking approach involves identifying at-risk behaviours, as well as factors which, in the different environments in which children live, can turn digital activities into opportunities to learn, gain self-confidence or strengthen children's group identities and social relationships with their peers and other community members. At the same time, it involves identifying the risks and weaknesses arising from

children's environments, which can lead to problematic use of digital devices or a lack of knowledge regarding how to identify and address the risks of the digital world.

A global approach to child well-being is essential to fully understand the influence of the digital environment on children's well-being and its connection to other aspects of their lives. This influence primarily depends on the activities, practices, and connections children develop within the digital environment. However, these are shaped by and interact with various factors, including the design and delivery of digital services to protect children in the digital spaces, as well as the resources and vulnerabilities stemming from children's physical and social environments – such as material conditions, family dynamics, school settings, peer interactions, and social networks. For instance, a child's ability to seize opportunities and avoid risks when engaging with digital technology depends on their digital skills and the protective factors they have developed at school, at home, or through interactions with peers. Not all children have access to the same resources and support in their physical and social environments to navigate digital spaces safely. As a result, significant inequalities exist in how children engage with digital services and are protected from its risks – mirroring inequalities found in the offline world (Holmarsdottir, 2024[24]). This underscores the critical importance of designing digital services in a way that safeguards children from potential harm.

Finally, three last characteristics need to be considered to properly monitor children's involvement in the digital world and its impact:

- **Age- and stage sensitivity**: The way and the extent to which children use digital technology, as well the impact of that, varies with age. Indicators thus need to take such variation into account; therefore, the measures and indicators developed should be age-sensitive and adjusted to the developmental stages of children.
- **Agility:** Digital space is a fast-changing environment. New technologies are continuously being developed bringing with them new opportunities, and risks. This dynamic setting requires that we constantly update our understanding of how children use and engage with digital technology. Indicators must reflect this.
- **Reflect children's views**: Understanding the drivers of digital child well-being requires listening and learning about children's and adolescents' experiences in the digital world. Children's views on what is important for their well-being, their understanding of benefits and risks associated with digital activities and technologies should be reflected in indicators used for measurement. Taking children's views into account is particularly necessary to find the balance between the autonomy and responsibility desired by teenagers exploring the web and the help they may seek when faced with a problem (Johnson and Francis, 2022[25]).

Box 2.1. Exploring digital technology, play and child well-being

The Responsible Innovation in Technology for Children (RITEC) project, led by UNICEF and the Western Sydney University, aims to explore how digital technology impacts children's well-being and how design choices can enhance positive outcomes. The focus is not only on avoiding harm but also on creating additional value of digital technology. In 2022, the project developed a framework for children to improve the understanding of children's digital experience and their well-being. By involving children in the process, the project sought to ensure that their insights and needs shape the development of digital experiences. Crafted to be both user-friendly and empirically grounded, the framework serves as a resource for businesses developing digital products and services for children, as well as for governments aiming to integrate well-being considerations into their digital transformation efforts (UNICEF Innocenti, 2024[23]). The framework considers the following components for well-being:

- **Competence**: Children perceive digital play experiences as opportunities to enhance their competence by completing tasks, acquiring new knowledge, and solving problems.
- **Emotional regulation**: Children use digital play to manage their emotions, unwind, and recharge, facilitating their ability to engage with friends and their surroundings.
- **Self-actualisation**: Digital play fosters purpose, improved social engagement, and positive self-perception, highlighting the significance of supporting these aspects in play experiences.
- **Empowerment**: Feelings of autonomy and agency should be empowered by digital play, enabling children to feel in control and support them in their decision-making. Digital play can provide a space for them to develop such feelings.
- **Social connection**: In digital environments, it is crucial to foster and support safe social connections with peers, family, and important figures.
- **Creativity**: Children's digital play should boost curiosity, cultivate openness to new experiences, and bolster creativity, which is closely intertwined with learning.
- **Safety and security**: Feeling and being safe and secure is the very basis of children's digital engagement and well-being.
- **Diversity, equity, and inclusion**: Ensuring diversity, equity, and inclusion, digital play experiences should be accessible to children of diverse backgrounds, abilities, ages, and cultures.

Source: UNICEF Innocenti (2024[23]), *Responsible Innovation in Technology for Children: Digital technology, play and child well-being*, UNICEF Innocenti – Global Office of Research and Foresight, Florence, https://www.unicef.org/innocenti/media/8056/file/UNICEF-Innocenti-RITEC-P2-report-2024.pdf.

2.3. International data for monitoring child digital well-being

The body of international data available to map children's experiences in the digital world is relatively limited. Some surveys have been specifically developed to document children's online experiences. For instance, the EU Kids Online Survey covers children from age 9 to 16 in 19 European countries, with questions on access and use of digital tools and several dimensions of children's well-being and environments (Box 2.2). However, the age of the data and the limited geographical coverage of OECD countries mean that these data cannot be used to describe the most recent situation of children online.

Box 2.2. The Global (EU) Kids Online survey

The Global (EU) Kids Online research network established in 2006 is dedicated to contributing and providing better understanding of European children's online experiences. The network conducted a survey, interviewing children and parents from 19 European countries between 2017 and 2019, with the specific year and some methodological aspects in data collection varying by country. Compared to earlier waves it adapts to major shifts in the digital realm since 2010, including the rise of smartphones and new platforms like TikTok (Smahel et al., 2020[26]). Children aged 9 to 16 years were asked questions on multiple dimensions and levels of their digital experiences and lives. The survey included the following aspects relevant for child digital well-being:

- **Access to digital technology**: How often does the child have access to a mobile phone/smartphone, a desktop computer, laptop or notebook computer, a tablet or else?
- **Time use**: How long does the child spend on the Internet during a regular weekday and a regular weekend-day? Monthly frequency of online activities like looking for information about work or study opportunities, using the Internet for schoolwork, using the Internet to talk to people from other countries, looking for news online, playing online games, visiting social network sites, and more.
- **School, peers, and community**: Feeling of belonging at school, feeling safe at school, support at school, teachers suggesting (safe) use of digital technology, support by teachers with digital environment, social support from friends, active mediation regarding digital space by friends.
- **Opportunities**: Feeling safe on the Internet, finding other people kind and helpful on the Internet, knowing what to do if someone acts online in an unpleasant way, talking about personal things online and not offline face-to-face.
- **Risks**: (Frequency of) overall negative online experiences, reaction to negative online experience, contact and interaction with unknown people online, meeting such people offline, online and offline victimisation, online and offline aggression, sexual content, grooming, harmful user-generated content, data misuse, excessive Internet use, sharenting.
- **Skills**: Digital skills like knowing how to save a photo found online, changing privacy settings, checking in information found is true, knowing which information (not) to share, removing people from the contact list, creating and posting online videos or music, editing or making basic changes to online content others have created, installing apps on a mobile device, keeping track of the costs of mobile app use, making in-app purchases.
- **Inequalities**: Perceived discrimination (potential reasons being origin of family, skin colour, religion, height or weight, disability, lack of money, behaviour, beliefs/opinion, others. Survey allows for disaggregation by gender, age, living situation.

- **Subjective well-being**: Life satisfaction in a rating from 0 (worst possible life) to 10 (best possible life), self-efficacy, psychological difficulties (conduct problems, emotional symptoms, hyperactivity).

Source: Zlamal et al. (2020[27]), *EU Kids Online 2020: Technical report,* EU Kids Online, https://doi.org/10.21953/lse.04dr94matpy7 and Global Kids Online.

The data used in this report come from surveys of middle-aged children and young adolescents,[4] whose primary purpose is not to investigate their experience of the digital world. However, they include blocks of questions that are useful for understanding certain aspects of children's involvement in the digital world and linking this information to information on their well-being or their personal, family, or school environment. Three sources of data are being used: the 2022 OECD Programme for International Student Assessment (PISA) surveys, the 2021-22 Health Behaviours of School-Aged Surveys for adolescents, and the 2021 Progress in International Reading Literacy Study.

The OECD Programme for International Student Assessment (PISA) surveys nationally representative samples of young people aged 15 across 70 countries, including OECD countries. The main focus of the survey is young people's ability to apply their mathematical, reading, and science skills to real-life challenges, but it also includes several questions related to students' access to and use of the Internet and digital devices. A more comprehensive set of information on student's digital experience is provided in the 2022 PISA wave which included a special module on the integration of information and communication technologies in teaching and learning. The module documents how students access and use ICT resources in and outside of school and to identify how teachers, schools, and education systems integrate ICT into pedagogical practices and learning environments. It provides information on various aspects of students' access to digital devices and the Internet, use of digital technologies for learning and leisure, their digital skills, online behaviour and safety (including information risk-taking behaviours and exposure to various types of risks), teacher use of digital technologies, and the impact of digital technologies on their learning and well-being (Table 2.1).

Table 2.1. Information on adolescent digital well-being in the 2022 PISA survey

	Topics covers in the 2022 PISA Survey	Asked in the former PISA waves
Access to Internet and Digital Devices	Access to the Internet at home	Yes
	Types and number of digital devices (e.g., computers, tablets, own smartphones) available at home	Yes
	Having educational software or apps in their home	
Use of Digital Technologies for Learning	Using digital devices every day or almost every day at school	
	Type of use of digital resources in the school/preschool context: to find information online about real-world problems, create a multi-media presentation with pictures, sound or video for school, write or edit text for a school assignment, collaborate with other students, play digital learning games	
	Hours spent in a week using digital resources for learning activities outside of school	
Use of Digital Technologies for Leisure	Using digital devices every day or almost every day outside school at home	Yes
	Hours spent in a week using digital resources for leisure or personal purpose (inc. playing video games/browsing social networks/browsing the Internet (excl. social networks) for fun/look for practical information online/communicate and share digital content on social networks or any communication platform/read, listen to or view informational materials to learn how to do something (e.g., tutorial, podcast)/create or edit their own digital content (pictures, videos, music, computer programmes)	Yes
	Talking to their friends on the phone, send them text messages or have contact through social media everyday	Yes
Attitudes and Perceptions towards Digital Devices	Turning off notifications from social networks and apps on their digital device when they go to sleep	
	Turning off notifications from social networks and apps on their digital device during class	
	Feeling nervous/anxious when they don't have their digital device near them, and keeping their digital device near them to answer messages when they are at home	
	Feeling pressured to be online and answer messages when they are in class	
Digital skills & Literacy (Self-assessment of how students consider themselves as able to:)	Search for and find relevant information online, assess the quality of information or a website, and share it with other people	
	Carry out simple activities such as writing or editing text, collecting and recording data, creating a multi-media presentation, creating, updating and maintaining a webpage or a blog using digital resources, collaborating with other students on a group assignment	
	Protect privacy online by changing the settings of a device or app in order to protect their data and privacy	
	Carry out advanced coding activities such as selecting the most efficient programme of App that allows to carry out a specific task, breaking down a problem and representing a solution as a series of logical steps, identifying the source of an error in a software	
	Attitudes Toward Digital Learning: show interest in learning more about digital resources or computer programming	Changes across waves
Online Behaviours and Safety	Risk-taking behaviours: No check of the accuracy of online information before sharing it on social networks	
	Risk exposure: Exposed and upset the last time they encountered content online that was inappropriate for their age, discriminatory content online (e.g. about race, gender, sexual orientation or physical, last time they received unkind, vulgar or offending messages, comments or videos, information about them was publicly displayed online without their consent	

Source: OECD (2022[28]), PISA 2022 Database, https://www.oecd.org/en/data/datasets/pisa-2022-database.html, and OECD (2023[29]), "PISA 2022 ICT Framework", in PISA 2022 Assessment and Analytical Framework, PISA, OECD Publishing, Paris, https://doi.org/10.1787/dfe0bf9c-en.

The Health Behaviour in School-aged Children (HBSC) survey is an international research study conducted in collaboration with the WHO Regional Office for Europe. It assesses the health and well-being of adolescents across Europe, North America, and -more recently- Central Asia, using nationally representative samples at ages 11, 13, and 15. It collects data on the health behaviours, well-being, and social environments of adolescents, and includes information on cyberbullying victimisation and perpetration, and a section on electronic media communication. The aim is to document the relationship between the intensity of electronic media communication and various outcomes, both positive (e.g., peer support) and negative (e.g., problematic social media use, cybervictimisation), at international and national levels.

The intensity of electronic media communication (EMC) is measured with question on how often teenagers have online contact with different groups of people, including close friends, friends from a larger friend group, friends known only through the Internet, and "people other than friends" (e.g., family, classmates, teachers).

Problematic social media use symptoms is assessed using the original validated nine-item Social Media Disorder (SMD) scale with a dichotomous (No/Yes) answer format (Van Den Eijnden, Lemmens and Valkenburg, 2016[30]). The aim is to determine if teenagers have experienced situations in the past year that could be considered problematic, such as constantly thinking about using social media, feeling dissatisfied due to wanting more social media time, feeling bad when unable to use it, unsuccessfully trying to reduce their usage, neglecting other activities for social media, having arguments with others over their social media use, lying about their usage time, using social media to escape negative feelings, or having serious conflicts with family members because of their social media use. “Social media” encompass social network sites (e.g. Facebook, TikTok, Instagram) and instant messengers (e.g. WhatsApp, Snapchat, Facebook messenger).

Finally, the surveys on the Progress in International Reading Literacy Study (PIRLS) and the Trends in International Mathematics and Science Study (TIMSS) provide information on Internet access and digital devices (own computer, tablet, or smartphone) owned by 10-year-old children (in their “fourth grade”) at home. The data also includes information on Internet use skills, particularly the ability to find information on the Internet and discern the trustworthiness of websites, as well as whether the child has been a victim of cyberbullying.

In all, the international data available covers adolescents but not younger children, for whom the use of digital technologies also raises important questions about the impact on well-being and developmental outcomes. The available cross-national data cover important aspects relating to access to and use of digital tools and self-reported views on digital literacy. They also mainly document exposure to certain online risks (exposure to inappropriate content, discriminatory or offensive comments, cyberbullying, problematic social media use) and not so much the positive online interaction experiences that children can also have. It does not document, for example, whether children feel that their experience of the Internet and social media contributed to strengthen friendship, make new friends, or alleviate feelings of loneliness. Nor do they document the extent to which the content accessible on the Internet has been used to get information or supports on matters critical to their physical or psychological health. However, evidence shows that teenagers, for example, use the Internet to seek preventative health care and specific medical information, including sexual health (Park and Kwon, 2018[31]). Moreover, digital health interventions are being developed to support children with mental health issues, incorporating features that align with their preferences for engagement, such as videos, minimal text, personalization options, connectivity with others, and text message reminders (Liverpool et al., 2020[32]; Bergin et al., 2020[33]; Whitehead et al., 2024[34]).

References

Anderson, E., E. Steen and V. Stavropoulos (2017), "Internet use and Problematic Internet Use: a systematic review of longitudinal research trends in adolescence and emergent adulthood", *International Journal of Adolescence and Youth*, Vol. 22/4, pp. 430-454, https://doi.org/10.1080/02673843.2016.1227716. [10]

Bergin, A. et al. (2020), "Preventive digital mental health interventions for children and young people: a review of the design and reporting of research", *npj Digital Medicine 2020 3:1*, Vol. 3/1, pp. 1-9, https://doi.org/10.1038/s41746-020-00339-7. [33]

Boer, M. et al. (2020), "Adolescents' Intense and Problematic Social Media Use and Their Well-Being in 29 Countries", *Journal of Adolescent Health*, Vol. 66/6, pp. S89-S99, https://doi.org/10.1016/J.JADOHEALTH.2020.02.014. [14]

Cao, S. and H. Li (2023), "A Scoping Review of Digital Well-Being in Early Childhood: Definitions, Measurements, Contributors, and Interventions", *International Journal of Environmental Research and Public Health*, Vol. 20/4, p. 3510, https://doi.org/10.3390/ijerph20043510. [2]

Fam, J. et al. (2022), "Is Parental Mediation Negatively Associated With Problematic Media Use Among Children and Adolescents? A Systematic Review and Meta-Analysis", *Canadian Journal of Behavioural Science*, Vol. 55/2, pp. 89-99, https://doi.org/10.1037/CBS0000320. [6]

Geurts, S. et al. (2023), "Predicting Adolescents' Problematic Social Media Use From Profiles of Internet-Specific Parenting Practices and General Parenting Dimensions", *Journal of youth and adolescence*, Vol. 52/9, pp. 1829-1843, https://doi.org/10.1007/S10964-023-01816-4. [9]

Gracia, P. and J. García-Román (2018), "Child and Adolescent Developmental Activities and Time Use in Spain: The Gendered Role of Parents' Work Schedules and Education Levels", *European Sociological Review*, Vol. 34/5, pp. 518-538, https://doi.org/10.1093/esr/jcy029. [8]

Hatem, L. and D. Ker (2021), "Measuring well-being in the digital age", *OECD Going Digital Toolkit Notes*, No. 6, OECD Publishing, Paris, https://doi.org/10.1787/1891bb63-en. [5]

Holmarsdottir, H. (2024), "The Digital Divide: Understanding Vulnerability and Risk in Children and Young People's Everyday Digital Lives", *Understanding The Everyday Digital Lives of Children and Young People*, pp. 57-82, https://doi.org/10.1007/978-3-031-46929-9_3. [24]

Johnson, N. and Z. Francis (2022), "Positive family relationships in a digital age: Hearing the voice of young people", *Children & Society*, Vol. 36/5, pp. 933-948, https://doi.org/10.1111/CHSO.12548. [25]

Liverpool, S. et al. (2020), "Engaging children and young people in digital mental health interventions: Systematic review of modes of delivery, facilitators, and barriers", *Journal of Medical Internet Research*, Vol. 22/6, p. e16317, https://doi.org/10.2196/16317. [32]

Loladze, T. (2020), "Adolescents Problematic Internet Use: Family factors Systematic review", *Translational and Clinical Medicine - Georgian Medical Journal*, Vol. 5/2, pp. 33-51, https://tcm.tsu.ge/index.php/TCM-GMJ/article/view/158 (accessed on 2 June 2024). [7]

Mascheroni, G. (2018), *Digital Parenting: The Challenges for Families in the Digital Age*, https://www.nordicom.gu.se/en/publications/digital-parenting (accessed on 4 December 2024). [21]

Musetti, A. et al. (2022), "Problematic social networking sites use and attachment: A systematic review", *Computers in Human Behavior*, Vol. 131, p. 107199, https://doi.org/10.1016/J.CHB.2022.107199. [13]

OECD (2024), "Mental health and digital environments", in *OECD Digital Economy Outlook 2024 (Volume 1): Embracing the Technology Frontier*, OECD Publishing, Paris, https://doi.org/10.1787/596e067d-en. [16]

OECD (2024), *What Does Child Empowerment Mean Today? Implications for Education and Well-Being*, OECD, Paris, https://doi.org/10.1787/8f80ce38-en (accessed on 13 June 2024). [18]

OECD (2023), "PISA 2022 ICT Framework", in *PISA 2022 Assessment and Analytical Framework*, OECD Publishing, Paris, https://doi.org/10.1787/9bd299c1-en. [29]

OECD (2023), *Shaping Digital Education: Enabling Factors for Quality, Equity and Efficiency*, OECD Publishing, Paris, https://doi.org/10.1787/bac4dc9f-en. [19]

OECD (2022), *Companion Document to the OECD Recommendation on Children in the Digital Environment*, OECD Publishing, Paris, https://doi.org/10.1787/a2ebec7c-en. [17]

OECD (2022), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html. [28]

OECD (2021), *Measuring What Matters for Child Well-being and Policies*, OECD Publishing, Paris, https://doi.org/10.1787/e82fded1-en. [1]

OECD (2021), *OECD Recommendation on Children in the Digital Environment*, https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0389 (accessed on 12 June 2024). [22]

OECD (2020), "Going Digital integrated policy framework", *OECD Digital Economy Papers*, No. 292, OECD Publishing, Paris, https://doi.org/10.1787/dc930adc-en. [4]

OECD (2020), "The OECD Digital Government Policy Framework: Six dimensions of a Digital Government", *OECD Public Governance Policy Papers*, No. 02, OECD Publishing, Paris, https://doi.org/10.1787/f64fed2a-en. [20]

OECD (2019), *How's Life in the Digital Age?: Opportunities and Risks of the Digital Transformation for People's Well-being*, OECD Publishing, Paris, https://doi.org/10.1787/9789264311800-en. [3]

Park, E. and M. Kwon (2018), "Health-related internet use by children and adolescents: Systematic review", *Journal of Medical Internet Research*, Vol. 20/4, p. e7731, https://doi.org/10.2196/jmir.7731. [31]

Reich, S. and S. Madigan (2025), "Introduction to the Section on Parenting in the Digital Age", *Handbook of Children and Screens*, pp. 371-377, https://doi.org/10.1007/978-3-031-69362-5_51. [12]

Smahel, D. et al. (2020), *EU Kids Online 2020: Survey results from 19 countries*, EU Kids Online, https://doi.org/10.21953/lse.47fdeqj01ofo. [26]

UNICEF Innocenti (2024), *Responsible Innovation in Technology for Children: Digital Technology, Play and Child Well-Being*, UNICEF Innocenti – Global Office of Research and Foresight, Florence, https://www.unicef.org/innocenti/media/8056/file/UNICEF-Innocenti-RITEC-P2-report-2024.pdf (accessed on 5 October 2023). [23]

Van Den Eijnden, R., J. Lemmens and P. Valkenburg (2016), "The Social Media Disorder Scale: Validity and psychometric properties", *Computers in Human Behavior*, Vol. 61, pp. 478-487, https://doi.org/10.1016/j.chb.2016.03.038. [30]

van Duin, C., A. Heinz and H. Willems (2021), "Predictors of problematic social media use in a nationally representative sample of adolescents in Luxembourg", *International Journal of Environmental Research and Public Health*, Vol. 18/22, p. 11878, https://doi.org/10.3390/IJERPH182211878/S1. [15]

Vossen, H. et al. (2024), "Parenting and Problematic Social Media Use: A Systematic Review", *Current Addiction Reports*, Vol. 11/3, pp. 511-527, https://doi.org/10.1007/S40429-024-00559-X/TABLES/1. [11]

Whitehead, L. et al. (2024), "The Report of Access and Engagement With Digital Health Interventions Among Children and Young People: Systematic Review.", *JMIR pediatrics and parenting*, Vol. 7/1, p. e44199, https://doi.org/10.2196/44199. [34]

Zlamal, R. et al. (2020), *EU Kids Online 2020: Technical report*, EU Kids Online, The London School of Economics and Political Science, https://doi.org/10.21953/lse.04dr94matpy7. [27]

Notes

[1] Online well-being refers to an individual's psychological and emotional state shaped by digital interactions, focusing on factors like life satisfaction and connectedness. Offline well-being, on the other hand, stems from experiences in the physical world, including face-to-face relationships, physical health, and personal activities. The two domains influence each other, as excessive online engagement can hinder offline experiences, while positive online interactions can enhance real-world connections.

[2] Problematic social media use refers to excessive engagement with social media that negatively impacts a person's well-being, relationships, and daily responsibilities, often involving compulsive checking, emotional distress, and neglect of other duties. Problematic Internet use is similar but broader, involving excessive or compulsive behaviours related to Internet activities such as browsing, gaming, or other online behaviours, resulting in negative impacts on personal well-being and daily functioning.

[3] Excessive screen time refers to spending more time on digital screens than is beneficial for physical and/or mental health, with no universal threshold for what is excessive, as its impact depends on the activities, individual traits, and context, though a few studies and expert guidelines often suggest limiting leisure screen time to under 2-3 hours daily to mitigate risks to health and well-being (see Chapters 4 and 5).

[4] Middle-aged children typically refer to children aged 6 to 11 years, corresponding to the later stages of childhood and primary school years; Young adolescents usually include those aged 12 to 14 years, marking the early phase of adolescence and often overlapping with middle school or early secondary school years.

3. How children use digital media

This chapter explores the digital media available to children, their activities, and their experiences in the digital environment based on available international data. It also examines the risks they face online, building on former OECD work on the types of risks in the digital environment.

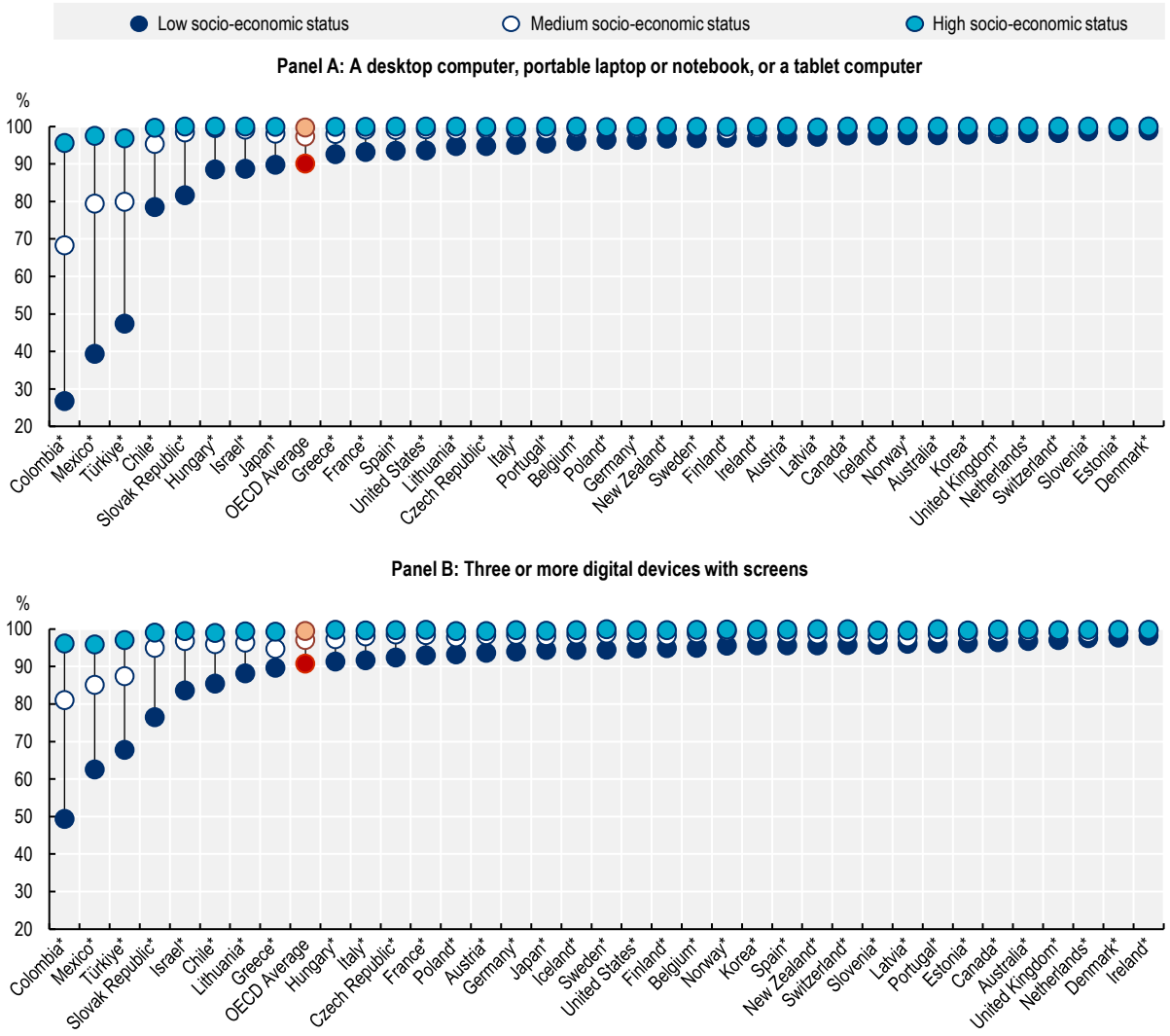
Over the past few decades, technological developments have led to the emergence of a wide range of digital devices that are affordable and easy to transport, such as computers, laptops, tablets and smartphones. As a result, the family home is increasingly equipped with digital tools that children can use for various purposes, from studying and staying informed to playing alone or with others and sharing and creating content. The rapid advancement of AI and immersive technologies is making digital platforms increasingly engaging and appealing to children. However, children's engagement in digital activities differs across countries and can be patterned by gender and socio-economic status (Helsper, 2020[1]; Muschert and Ragnedda, 2015[2]). Technological developments have brought with them – in digital form – both new and more well-established risks for child well-being, which are commonly categorised as the "4Cs": content, conduct, contact, and consumer risks.

3.1. What digital devices are part of children's daily lives?

In 2022, 96% of 15-year-olds in the OECD surveyed by PISA reported having a desktop computer, laptop, or tablet at home. Though the spread of digital tools is relevant to all teenagers, children from low socio-economic backgrounds are much less likely to have digital tools at home than their peers in countries where the overall availability of digital equipment is below average (Figure 3.1, Panel A). In Colombia, for example, fewer than 27% of 15-year-olds from low socio-economic backgrounds have digital devices at home, compared to 96% of their peers from high socio-economic backgrounds.

Most children who use digital devices and connect to the Internet do so through more than one device. Data from the EU Kids Online Survey suggests that children who connect at least weekly sometimes use up to three different devices for this purpose (Stalker, Livingstone and Kardefelt-Winther, 2019[3]). In 2022, most 15-year-olds live in households with at least three digital devices. (Figure 3.1, Panel B). Across the OECD, 96% of 15-year-olds, on average, live in homes with at least three digital devices. Adolescents from lower socio-economic backgrounds more often have fewer digital devices at home, but differences by socio-economic status are substantial in only a few countries. In Colombia, Mexico, Türkiye, Slovak Republic, Israel, Chile, Lithuania, and Greece, the percentage of children from low socio-economic backgrounds who report having access to digital devices at home falls below the OECD average of 91% (Figure 3.1, Panel A).

Figure 3.1. 15-year-olds have access to a wide range of digital devices



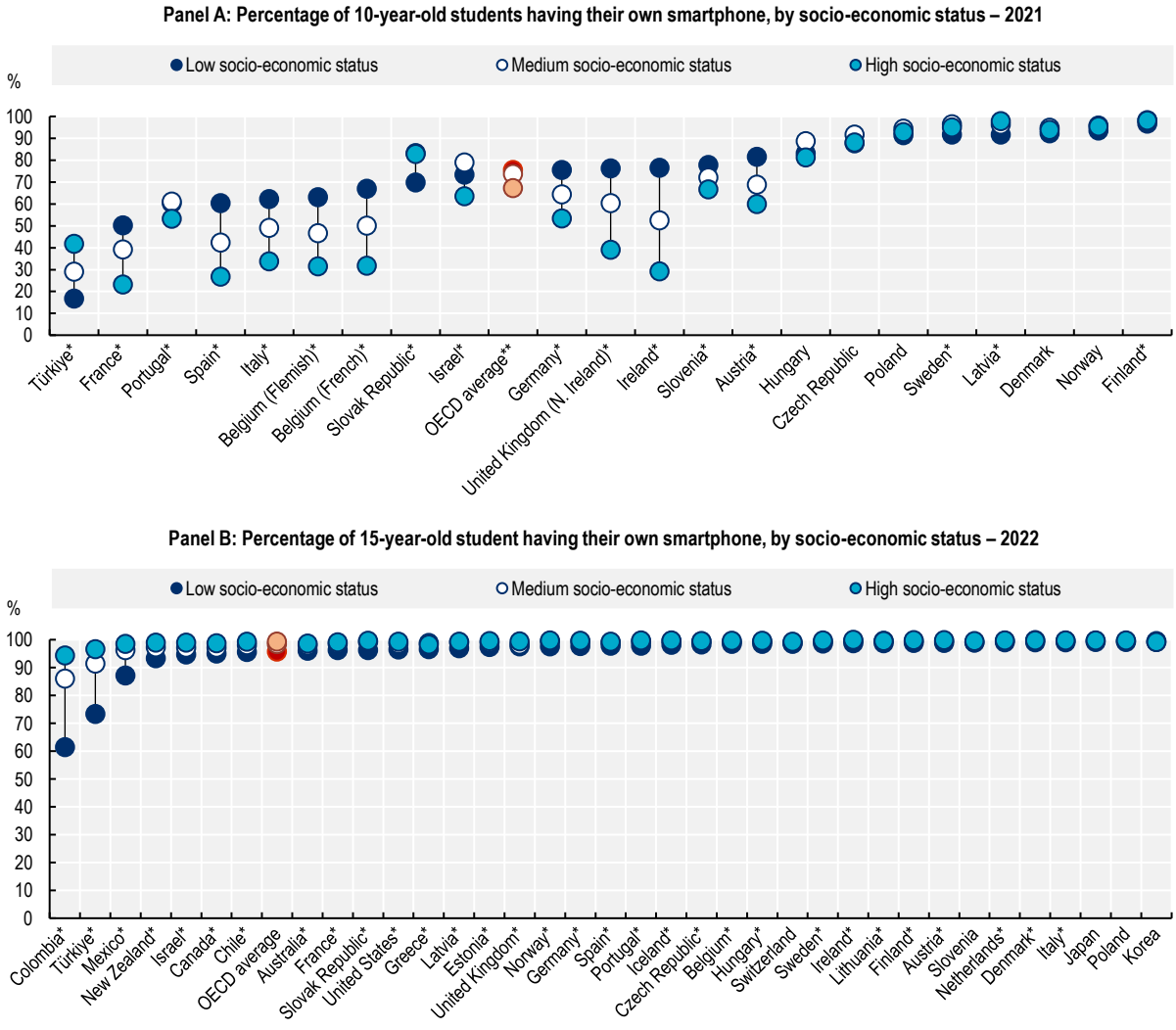
Note: *The difference between students with high and low socio-economic status is statistically significant at the 5% level.
Panel A: 15-year-old students were asked "How many of the following digital devices are in your home?" for each "Desktop computers", "Laptop computers or notebooks" and "Tablets (e.g. iPad®, BlackBerry® PlayBook™)", and presented with the response options "None", "1-2", "3-5", "More than five" and "I don't know" for each question. Data refer to the percent responding "1-2", "3-5" or "More than five" to at least one of the questions. Responses "I don't know" are coded as missing and observations with missing answers to at least one of the three items are excluded.
Panel B: 15-year-old students were asked "How many digital devices with screens are there in your home? (Count all the devices including televisions, computers, tablets, e-book readers, and smartphones.)" and presented with the response options "There are no digital devices with screens", "One", "Two", "Three", "Four", "Five", "6 to 10" and "More than 10". Data refer to the percent responding "Three" or more.
Source: OECD Secretariat calculations based on OECD (2022[4]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/w3rup7

Mobile phones seem to be the most commonly used digital device for Internet access (Smahel et al., 2020[5]). Approximately 70% of fourth-grade students, around age 10, have their own smartphone in OECD countries where there is available PIRLS data (Figure 3.2, Panel A). Nevertheless, this percentage varies widely from country to country. For example, less than half of children in Türkiye and France have a smartphone at this age, whereas almost all children in northern European countries possess one, regardless of their socio-economic status. In several countries, noticeable differences based on socio-economic status persist. Children from low socio-economic groups are at least twice as likely to possess a smartphone than children from high socio-economic groups in Belgium, France, Ireland and Spain. This finding aligns with a few studies suggesting that children of less-educated parents are more likely to receive a smartphone at an earlier age and use it extensively (Gui and Gerosa, 2021[6]; Gerosa, Losi and Gui, 2024[7]). These studies highlight that social disadvantage is now less associated with a lack of access to smartphones and more with a lack of ability to manage – and sometimes limit – their use. However, not much research has been conducted on the motivations behind pre-adolescents acquiring their first smartphone. In general, early smartphone acquisition is linked to growing independence, such as walking home from school alone, and parents wishing for their children not to be left out socially by their peers (Perowne and Gutman, 2023[8]).

Across countries, smartphone ownership is even more widespread among 15-year-olds than among younger children, regardless of socio-economic status. On average, 98% of 15-year-olds own their own smartphone, and disparities by socio-economic status are minimal in most countries. However, major disparities exist along the lines of socio-economic status in Colombia, Türkiye and Mexico (Figure 3.2, Panel B).

Figure 3.2. Most children have their own smartphone by age 10



Note: *The difference between students with high and low socio-economic status is statistically significant at the 5% level.
**The OECD average includes all countries depicted in the figure except Belgium and the United Kingdom.
Panel A: "Fourth grade" students are asked "Do you have any of these things at your home? ... Your own smartphone" and presented with the response options "Yes" and "No". Data refer to the percent responding "Yes".
Panel B: 15-year-old students were asked "Which of the following are in your home? ... Your own cell phone with Internet access (e.g. smartphone)" and presented with the response options "Yes" and "No". Data refer to the percentage responding "Yes".
Source: OECD Secretariat calculations based on IEA (2021[9]), *Progress in International Reading Literacy Study 2021 (PIRLS 2021)*, https://pirls2021.org/results for Panel A and on OECD (2022[4]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html for Panel B.

StatLink https://stat.link/zj5g1t

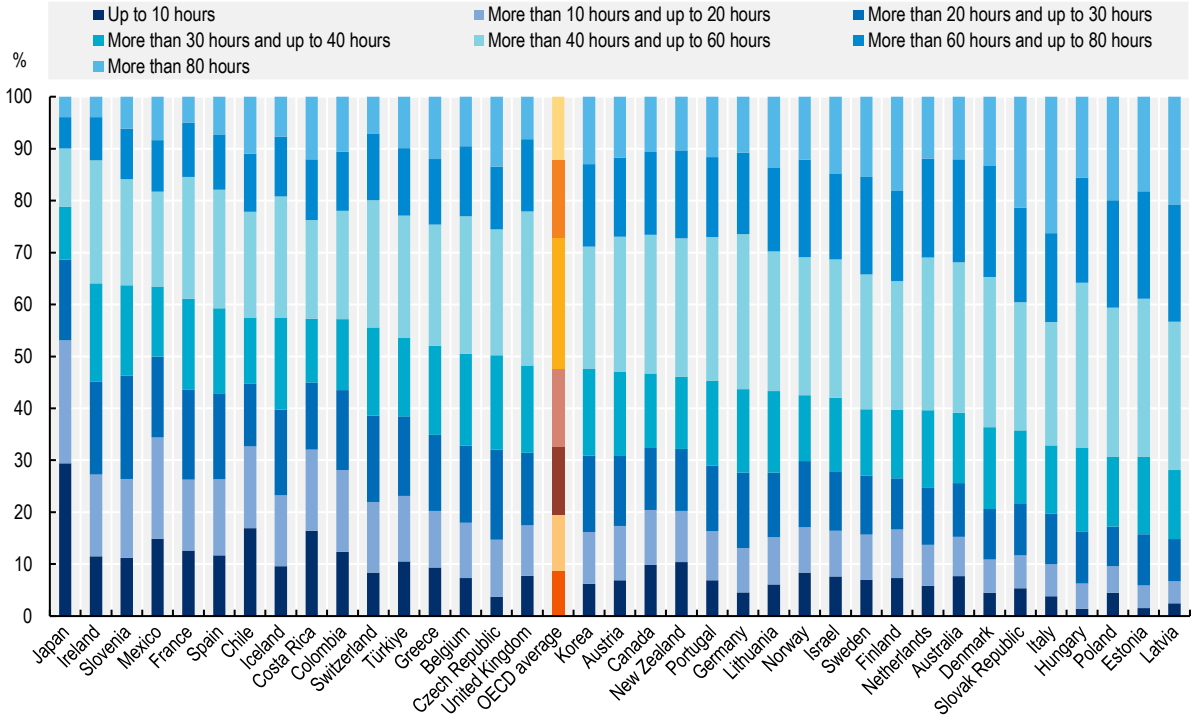
3.2. How much time do adolescents spend on digital devices?

Most 15-year-old adolescents in the OECD spend a substantial amount of time on digital devices. On average, 15-year-olds spend 2 hours per day on digital tools for learning activities at school, combined with 1.5 hours before or after school, and another 1.6 hours per day at the weekend (OECD, 2023[10]). In addition, teenagers use digital devices for leisure, averaging at 1.1 hours per day at school, 2.6 hours before and after school, and 3.9 hours per day at the weekend.

There is considerable heterogeneity in the amount of time spent with digital devices between and within OECD countries. In almost all countries, at least 50% of 15-year-olds spend 30 hours or more a week using digital devices (Figure 3.3). Only in Japan is the proportion significantly lower (31%), with a much higher proportion of teenagers than in other countries spending as little as 10 hours a week. A significant minority of teenagers, from 10% in Japan to 43% in Italy and Latvia, spend 60 hours or more on digital devices.

Figure 3.3. Most adolescents spend more than 30 hours per week on digital devices

Distribution of total time spent per week on digital devices for learning and leisure among 15-year-olds



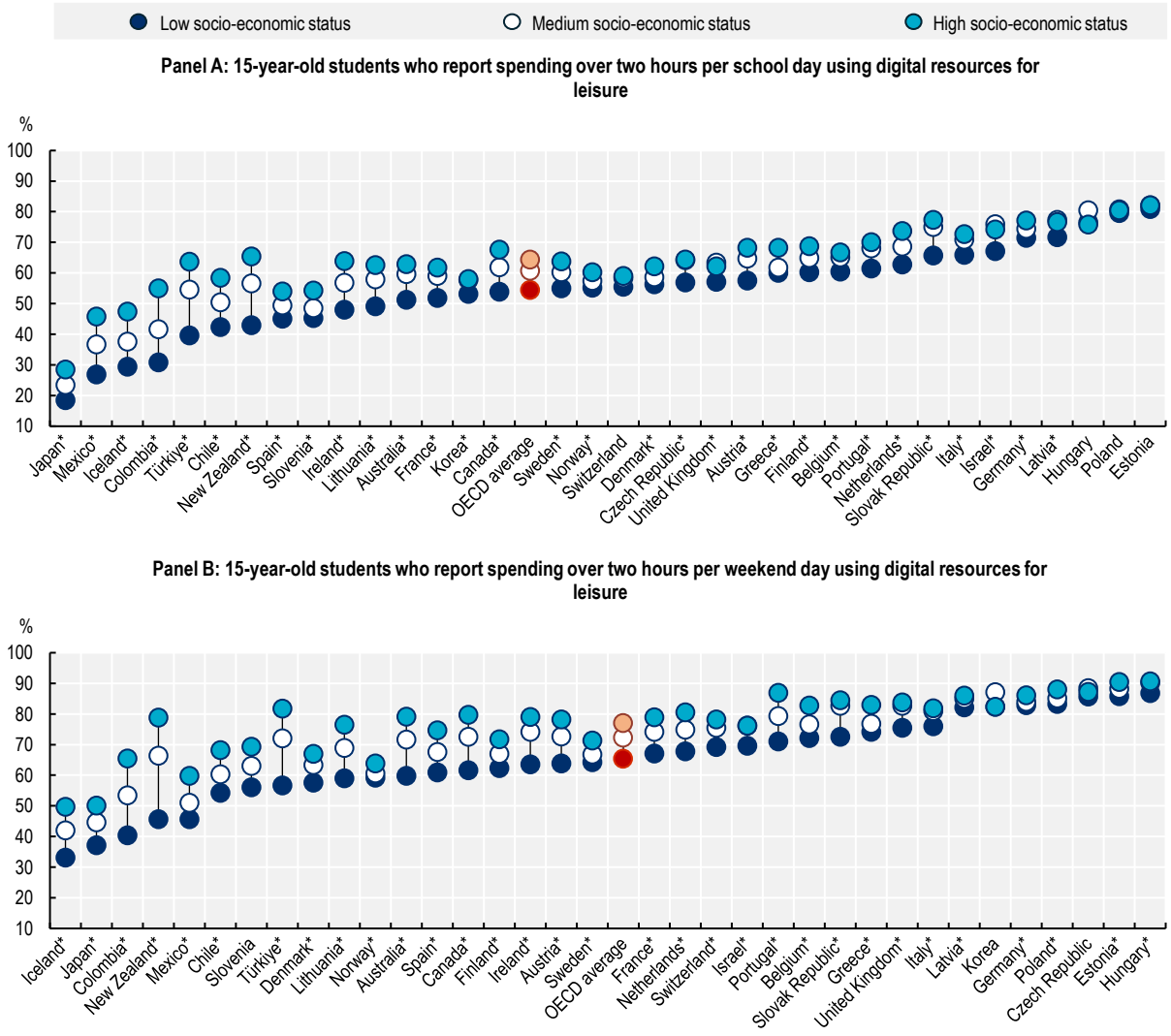
Note: 15-year-old students were asked "This school year, about how many hours a day do you usually use digital resources in the following situations?" with respect to "for learning activities at school", "for learning activities before and after school", "for learning activities on weekends", "for leisure at school", "for leisure before and after school", and "for leisure on weekends". The total amount per week was computed assuming 5 week days and 2 weekend days. Data refer to the percentage of students reporting a given total amount per week.
Source: Adapted from OECD (2023[10]), *PISA 2022 Results (Volume II): Learning During – and From – Disruption*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/a97db61c-en. Data are available at https://stat.link/pyhr6e.

In Japan, children spend comparatively less time engaging with digital technologies both at school and outside of school. On average, Japanese students use digital tools for learning at school for 1.7 hours per day compared to the OECD average of 2 hours, and only 0.4 hours for leisure activities at school compared to the OECD average of 1.1 hours. Japan also performs poorly on the preparedness index for digital learning, with many schools lacking sufficient teacher preparation time and technical-assistance staff. Outside of school, Japanese 15-year-olds spend just 1 hour per day using digital resources, far below the OECD average of 2.6 hours. This limited use is likely due to their demanding school and extracurricular schedules, which leave little time for digital engagement.[1]

As access to digital devices becomes more widespread at home, the amount of time spent by teenagers on digital devices increases. For example, the proportion of 15-years-old teenagers spending 40 hours or more outside school with digital devices rose from 8% in 2012 to 21% in 2018.

The World Health Organisation does not provide specific recommendations for screen time exposure for teenagers, in contrast to its guidelines for children under 5. However, several countries have issued their own guidelines, often recommending that recreational screen time be limited to no more than two hours per day (see Chapter 5). Yet, a large number of 15-year-olds across the OECD spend more time with digital resources than this limit sets. Figure 3.4 shows that a majority of the 15-year-olds in the OECD (60%) spend more than two hours per day on weekdays (Panel A). However, this share varies greatly from country to country, from 24 % in Japan to over 80% in Estonia. Children with high socio-economic status are also more likely to use digital tools for more than two hours a day, particularly in countries where the proportion of teenagers with low socio-economic status using digital devices for two hours or more is comparatively low. There are also large differences in the recreational use of digital devices at weekends (Figure 3.4, Panel B). For example, in Colombia, New Zealand, and Türkiye, the proportion of low socio-economic status teenagers using digital devices for leisure on weekends is lower than the OECD average. However, teenagers from wealthier families in these countries are at least 25 percentage points more likely to use digital devices for leisure for two hours or more on weekends. At the opposite end of the spectrum, more than 80% of teenagers in Latvia, Korea, Germany, Poland, Czech Republic, Estonia and Hungary use digital devices for two hours or more, regardless of socio-economic status.

Figure 3.4. A majority of 15-year-olds spend two hours or more on digital devices for leisure per day



Note: *The difference between students with high and low socio-economic status is statistically significant at the 5% level.
Panel A: 15-year-old students were asked "This school year, about how many hours a day do you usually use digital resources in the following situations?" separately for "For leisure at school" and " For leisure before and after school". Answers from the two questions were combined to calculate the percent of students who use digital resources for leisure for over two hours on a typical school day.
Panel B: 15-year-old students were asked "This school year, about how many hours a day do you usually use digital resources in the following situations? ... For leisure on weekends". Data refer to the percent of children reporting to use digital resources for leisure for over two hours on a typical weekend day.
Source: OECD Secretariat calculations based on OECD (2022[4]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

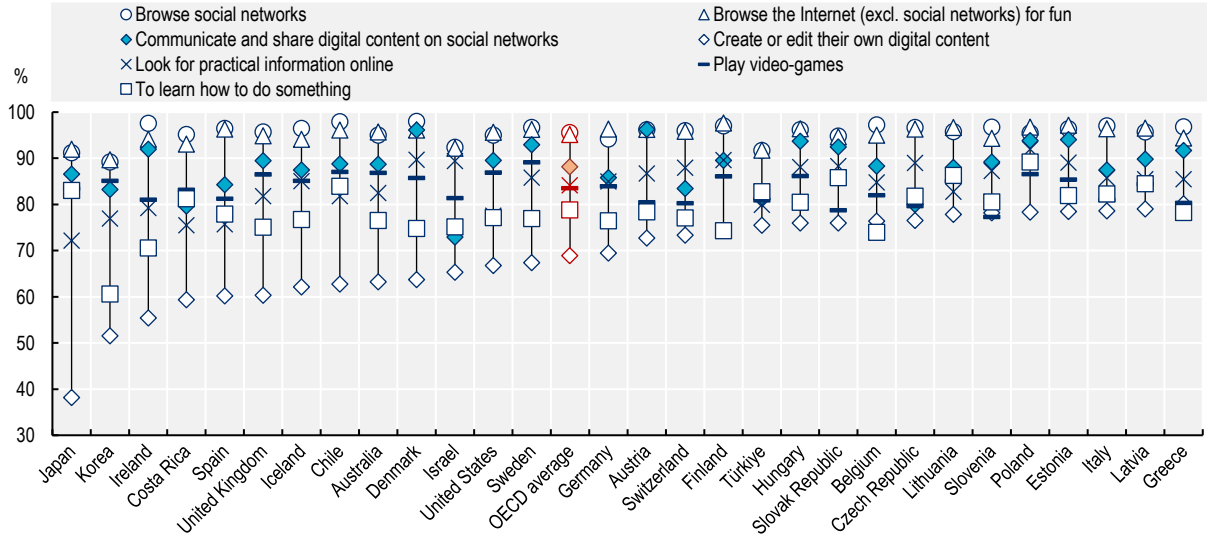
StatLink https://stat.link/xli6s8

3.3. How do adolescents spend their time online?

Adolescents use digital devices for a variety of purposes. Across the OECD, on average, 95% of 15-year-olds browse the Internet for fun, and 96% report browsing social networks (Figure 3.5). Most 15-year-olds also use digital devices for communicating and sharing digital content (88%), seeking practical information (84%), or playing video games (83%). A smaller percentage (69%) engage in creating or editing their own digital content, with notable differences between countries. In Japan, where the amount of time spent on digital devices is comparatively low, adolescents are less likely than the OECD average to use these devices to create content and to search for practical information during a typical week, whereas in countries like Latvia or Greece, where the amount of time spent on digital devices is comparatively high, most adolescents use digital resources for multiple purposes surveyed during a typical week.

Figure 3.5. What adolescents use digital devices for varies across OECD countries

Percentage of 15-year-old students who report using digital devices during a typical week by type of leisure activity



Note: 15-year-old students were asked "[H]ow much time do you spend doing the following leisure activities?" for each "Browse social networks (e.g. <Instagram®>, <Facebook®>)", "Browse the Internet (excluding social networks) for fun (e.g. reading news, listening to podcasts and music or watching videos)", "Communicate and share digital content on social networks or any communication platform (e.g. <Facebook®>, <Instagram®>, <Twitter®>, emails, chat)", "Create or edit my own digital content (pictures, videos, music, computer programs)", "Look for practical information online (e.g. find a place, book a train ticket, buy a product)", "Play video games (using my smartphone, a gaming console or an online platform or Apps)" and "Read, listen to or view informational materials to learn how to do something (e.g. tutorial, podcast)". For each activity, students were asked to respond on their use during a typical weekday and during a typical weekend day. Data refer to the percent responding to use digital devices for a given activity on a typical weekday and/or on a typical weekend day.
Source: OECD Secretariat calculations based on OECD (2022[4]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/ae1d4h

3.4. What risks do adolescents encounter online?

Technological developments have brought with them – in digital form – both new and well-established risks for child well-being. These risks are commonly categorised into four types, known as the "4 C's": content, conduct, contact, and consumer risks (OECD, 2021[11]; Livingstone and Stoilova, 2021[12]).[2]

Content risks

Content risks can be shortly defined as interactions in digital space that take the form of a one-to-many relationship, where children are exposed to harmful or inappropriate material online such as disinformation, as well as to hateful, harmful, and illegal content (OECD, 2021[11]). There are many risks associated with the content circulating on the Internet, and each type has its own specific features and its own repercussions on child well-being. Examples of online inappropriate (or sometimes illegal) content include “false and misleading content” likely to cause or maintain an eating disorder, pornographic material, child sexual abuse material, violent or gory images, and hate speech or extremist content.

Children and adolescents who lack media literacy are particularly vulnerable to the risk of being exposed to mis- and disinformation without the ability to detect it (OECD, 2024[13]). Misinformation refer to false or misleading information that is shared unknowingly and is not intended to deliberately deceive, manipulate or inflict harm on a person, social group, organisation or country, whereas and dis-information refer to verifiably false or misleading information that is knowingly and intentionally created and shared for economic gain or to deliberately deceive, manipulate or inflict harm on a person, social group, organisation or country (OECD, 2024[14]).

PIRLS data from 2021 suggest that, on average across the OECD, one in four 10-year-old students lack confidence in their ability to determine whether a website is trustworthy. As a result, some of them may be vulnerable to exposure to false and misleading content, with limited ability to recognise it. Cross-checking sources is essential in detecting disinformation, however 28% of 15-year-old do not compare different sources when searching for information online. In nearly all OECD countries, boys (31%) are more inclined than girls (25%) to report not comparing sources. Adolescents from low socio-economic backgrounds (35%) are also more likely not to compare sources of information compared to those from higher socio-economic status families.

Accessing sexually explicit content and pornography is another significant content risk in the digital environment. With digital technologies and the Internet being increasingly present in children and adolescent life, pornography has never been more accessible to children and adolescents: in the United States, a recent report estimated that 93% of 13- to 17-year-old boys and 63% of girls have been exposed to Internet pornography before the age of 18, with the average age of first exposure being 12 years old (Robb and Mann, 2023[15]). As adolescents mature, it is natural that they search for information that they do not know. This includes searching for information about dating and sexual relationships, which may often lead to pornography. However, certain pornography content can be particularly detrimental to children and adolescents.[3] Early exposure to pornography appears to be connected to negative developmental outcomes, including a greater acceptance of sexual harassment, risky sexual activity, and acceptance of negative attitudes to women (Bonino et al., 2006[16]; Collins et al., 2017[17]; Binford, 2018[18]; Quadara, El-Murr and Latham, 2016[19]; Paulus et al., 2024[20]; Pathmendra et al., 2023[21]).

Certain content regarding body image, beauty norms, or dietary habits may play a role in the onset or perpetuation of eating disorders like anorexia and bulimia. Social media platforms, where adolescents are highly active, often promote and normalize idealized and stereotypical beauty standards, a trend further reinforced by the use of filters and photo editing software. Being exposed to such imagery can foster a negative self-perception, leading to feelings of dissatisfaction and despair (Stoilova, Rahali and Livingstone, 2023[22]). Findings from the EU Kids Online Survey indicate that, on average, 12% of 12-16 year-olds across 10 European countries have seen online content or discussions on ways to be very thin (Smahel et al., 2020[5]).

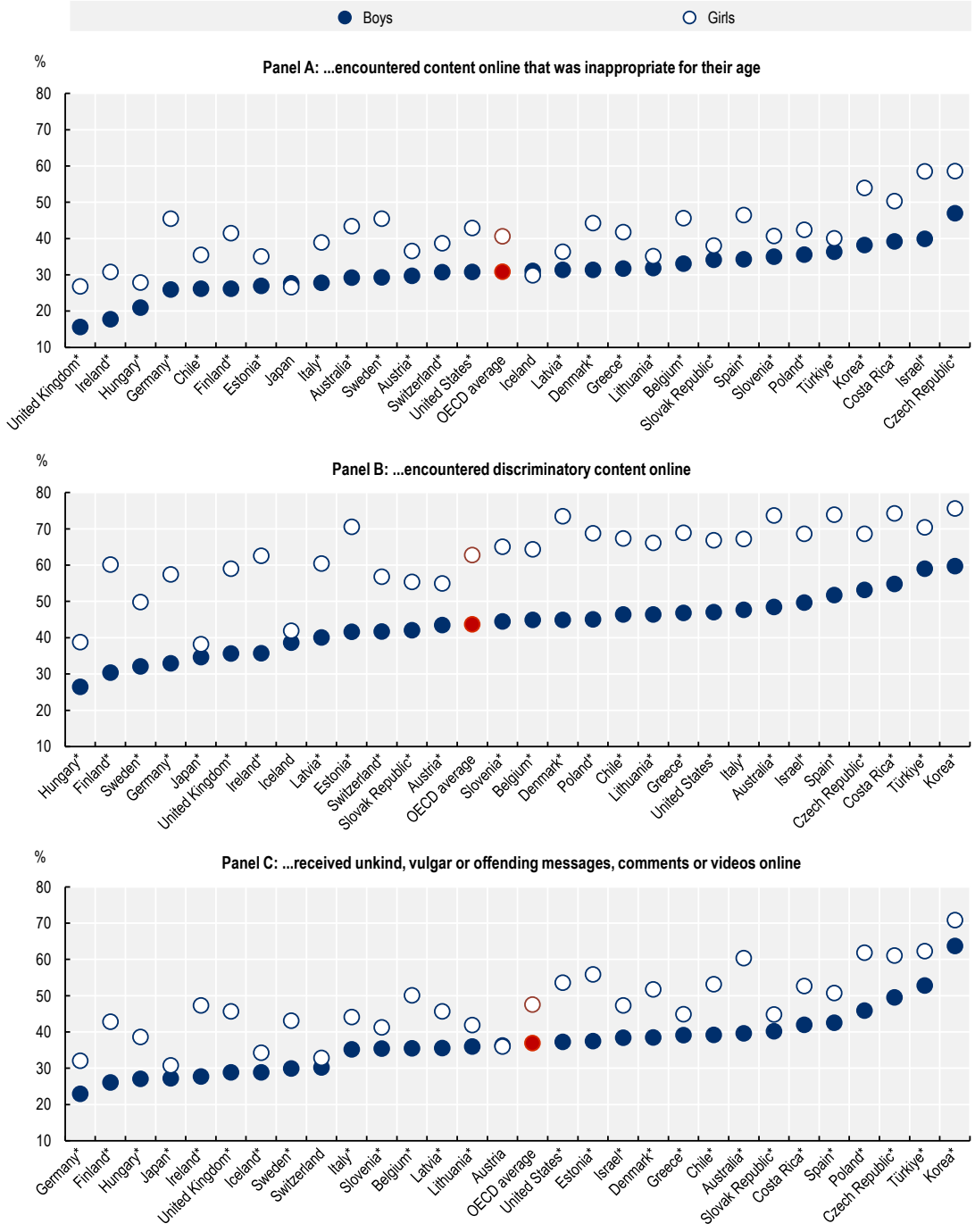
Exposure to violent or gory content can be disturbing or traumatising for children and adolescents. It can create conditions that perpetuate dangerous practices, such as self-harm, which is increasingly frequent among teenagers, particularly girls, in many countries (OECD, 2024[23]). Though the evidence is scarce, the available data suggest that viewing online content on self-harm may have both harmful and protective effects (Susi et al., 2023[24]). On one hand, it can enhance the escalation of self-harm, reinforce engagement behaviours (e.g. commenting and sharing images), encourage comparison of own self-harm with others, and may fuel the development of a self-harm "identity". On the other hand, the exposure to self-harm content can trigger protective effects, encourage social connection and help-giving, and contribute to reducing the repetition of self-harming behaviour (Susi et al., 2023[24]).

Exposure to hate speech or extremist content that promotes violence, discrimination, or extremist ideologies represents another type of content risk. Hate speech is defined as all forms of expression which spread, incite, promote, or justify hatred, discrimination, xenophobia, and other forms of intolerance. (UNESCO, 2023[25]). Online, children are potentially exposed to cyberhate, or online hate, which refers to hate speech expressed on the Internet or via information and communication technologies. Cyberhate exposure occurs when people see or hear hateful content online but do not have to be targeted or feel targeted by it. The EU Kids Online survey conducted in 2018/19 in 10 European countries showed that encountering hateful content online is quite a common experience among children aged 11 to 17, though the prevalence varied across countries, from 21% in France to 59% in the Czech Republic (MacHackova et al., 2020[26]).

National and international data are scarce for documenting in detail the extent to which children and teenagers are exposed to content or behaviour that can upset or harm them. However, PISA 2022 data provides some general information on the frequency of children being upset by harmful content or speech. The data show that over a third of 15-year-olds (36%) report getting upset the last time they encountered age-inappropriate content online. Forty-two percent have been upset because they have received offending messages, and over half (53%) because of discriminatory content (Figure 3.6). In the vast majority of OECD countries, girls report such experiences significantly more frequently than boys.

Figure 3.6. Girls are more likely than boys to have gotten upset the last time they encountered negative content online

15-year-old students who report getting upset the last time they…



Note: *The difference between boys and girls is statistically significant at the 5% level. 15-year-old students were asked "How upset were you the last time the following situations occurred?" with respect to "Encountering content online that was inappropriate for my age", "Encountering discriminatory content online (e.g. about race, gender, sexual orientation or physical appearance)", and "Receiving unkind, vulgar or offending messages, comments or videos". The presented response options for each of the statements were "This did not happen to me", "Not at all upset", "A little upset", "Quite upset" and "Very upset". Data refer to the percentage responding "A little upset", "Quite upset" or "Very upset" to a given situation.
Source: OECD Secretariat calculations based on OECD (2022[4]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/hk5es0

Contact risks

Interacting in the digital space can come with contact risks, including, for instance, contacts established for the purpose of online sexual coercion and extortion of children, cyberbullying victimisation, sex cyber grooming and contacts made to promote extremism and radicalisation (OECD, 2021[11]; Nienierza et al., 2021[27]).

Child **sexual exploitation, or abuse** are major online risks that are accelerating in scale,[4] severity and complexity (OECD, 2023[28])**.** Although data on online sexual harm are limited, a study commissioned by the WeProtect Global Alliance in 2021 asked about the experiences of sexual harm in childhood of more than 5 000 individuals aged 18 to 20 worldwide (WeProtect Global Alliance, 2023[29]). One of the main findings of this study is that 54% of respondents (48% of boys and 57% of girls) had experienced online sexual harms before they were 18. Respondents who self-identified as transgender or non-binary, disabled, LGBTQIA+, or as a racial or ethnic minority were more likely to have experienced such harms. First exposure to sexual harm occurs young and is getting earlier: 20-year-old respondents, on average, had their first exposure to sexually explicit content online at 13.4 years old, falling to 12.7 years old for 18-year-old respondents. Two-thirds of respondents who received sexually explicit material online as children received it through a private messaging service, most commonly on their personal mobile device. Moreover, 34% of respondents were asked as children to do something sexually explicit online they were uncomfortable with or did not want to do.

Online sexual coercion and extortion involve predators using the Internet to build relationships with children to exploit or harm them. It usually comprises digital blackmail where sexual information or images are used to extort sexual material (such as photos or videos), or to arrange an offline sexual encounter, or to extort money from the victim in exchange for not sharing the sexual material publicly. According to EU Kids Online surveys, on average in the European countries surveyed, around 22% of children aged 12-16 reported having received sexual messages in the past year. Additionally, 6% reported that they have been the sender of such messages during the same period (Smahel et al., 2020[5]). Although the vast majority of children report not having received unsolicited sexual requests, an average of 13% reported that it had happened to them a few times in the past year, and 4% reported it happening at least once a month.

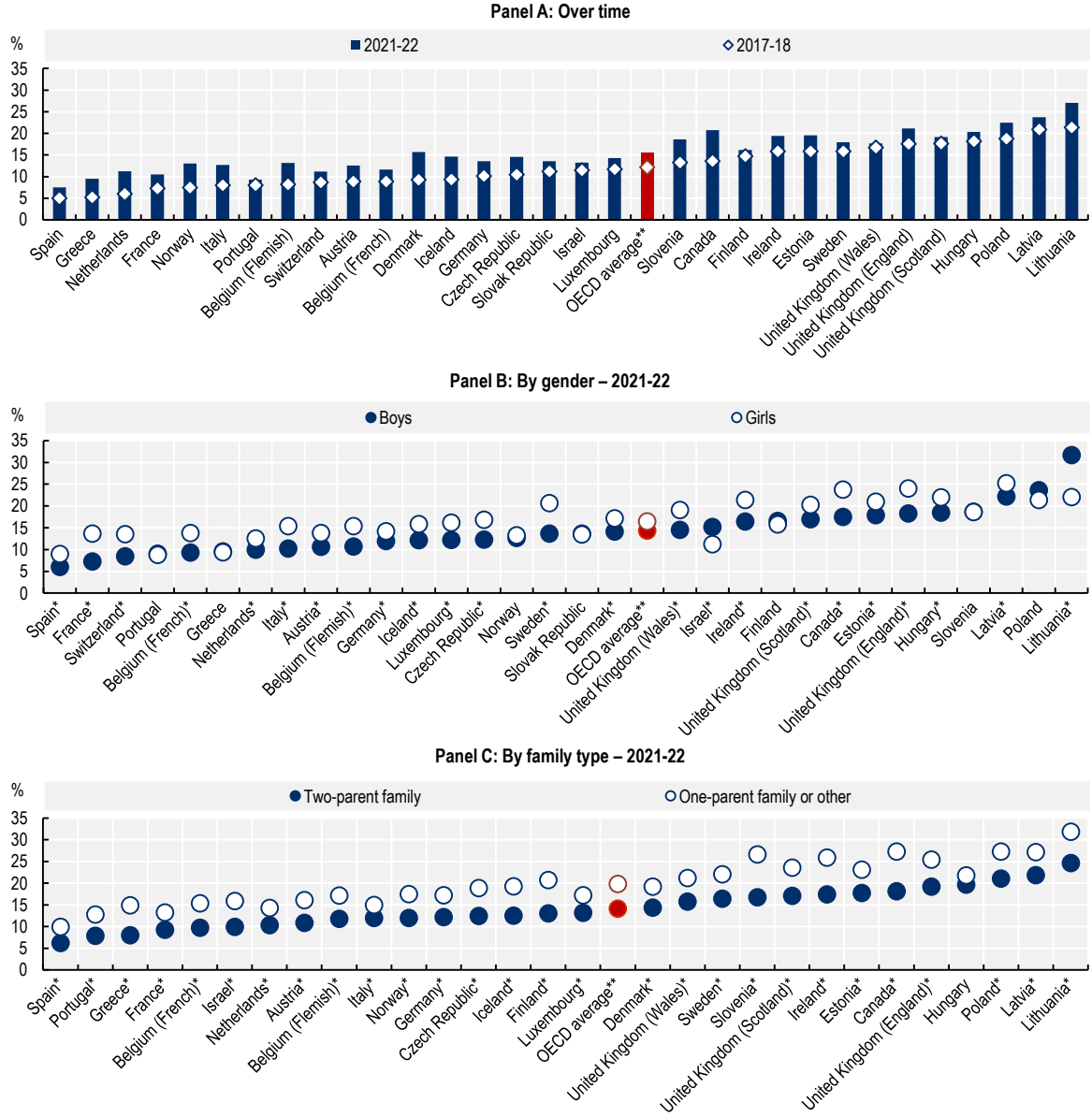
Cyberbullying is another risk that evidence indicates is on the rise (OECD, 2024[30]). Cyberbullying encompasses harassment, threats, or negative comments online directed at a child from peers or strangers. The literature lacks a consistent definition of cyberbullying, but it generally includes repeated, intentional aggressive behaviour, a power imbalance, and the use of online media (Campbell and Bauman, 2018[31]; Gottschalk, 2022[32]). Unlike traditional bullying, cyberbullying's impact is amplified by the widespread dissemination of harmful content about the victim, which intensifies the phenomenon. Cyberbullying is linked to decreased life satisfaction and various mental health issues, including depression and psychological distress (Hamm et al., 2015[33]; Brailovskaia, Teismann and Margraf, 2018[34]; Giumetti and Kowalski, 2022[35]), and may have a stronger negative impact on mental health than face-to-face bullying (Baier et al., 2018[36]). Research indicates a substantial overlap between cyberbullying and traditional forms of bullying, suggesting that digital devices are not the root cause of these behaviours but amplify the phenomenon (Zych, Ortega-Ruiz and Del Rey, 2015[37]; Gottschalk, 2022[32]).

Reports of cyberbullying have been on the up over the past number of years (Figure 3.7). Data from the Health Behaviour in School-aged Children (HBSC) reveal an increase in the prevalence of cyberbullying from 2017 to 2022 in nearly all OECD countries. Cyberbullying victimisation increased by more than 25% on average across the two waves. On average, one in six children report experiences of cyberbullying, with substantial variation across countries. In many countries, girls (Panel B) and adolescents from single-parent families (Panel C) are more likely to report cyberbullying victimisation. Moreover, cyberbullying can begin as early as primary school age. Five percent of 10-year-olds report cyberbullying in the form of nasty or hurtful messages being sent to them or to others about them. There is a strong socio-economic gradient

with 10-year-olds from low socio-economic background twice as likely to report cyberbullying than those from high socio-economic backgrounds (Box 3.1).

Figure 3.7. Cyberbullying rates have increased in nearly all OECD countries

11-, 13- and 15-year-old school children who report having been a victim of cyber-bullying at least once in the last couple of months



Note: *The difference between boys and girls, and by groups according to family arrangement is statistically significant at the 5% level.
**The OECD average includes all countries depicted in the figure except Belgium and the United Kingdom.
Children were asked "In the past couple of months how often have you been cyberbullied (e.g., someone sent mean instant messages, email or text messages; wall postings; created a website making fun of you; posted unflattering or inappropriate pictures of you online without permission or shared them with others)?". Response options ranged from "I have not been cyberbullied in the past couple of months" to "Several times a week". Data refer to the percent of children who responded "Once or twice" or more often. One-parent family or other includes: children who reported living with only one person they identify as a parent (either their 'mother' or their 'father'), with or without stepparents, or in some other arrangement (for instance, a foster home or cared for by non-parental family members).
Source: OECD Secretariat calculations based on WHO (n.d.[38]), Health Behaviour in School-aged Children (HBSC) World Health Organization Collaborative Cross-National Survey, 2017-18 and 2021-22, https://hbsc.org/about/.

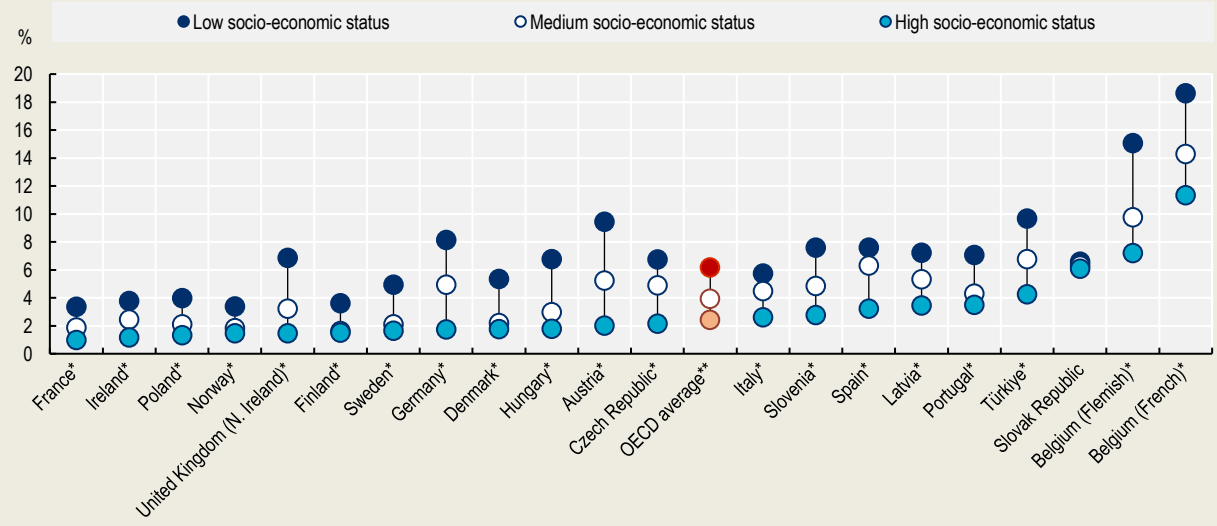
StatLink https://stat.link/dntv2m

Box 3.1. Cyberbullying: What does the PIRLS and TIMSS data tell us?

The PIRLS and TIMSS surveys ask children in their fourth year of formal schooling (i.e., around age 10) whether they have experienced cyberbullying in the form of nasty or hurtful messages being sent to them or about them being shared with others. On average, 5% of children report having been victims of such acts in the OECD countries for which data are available, but the proportion is over twice as high in Belgium. In all countries, children from lower socio-economic backgrounds are more likely than others to report having been victims.

Figure 3.8. Cyberbullying starts already in primary school

"Fourth grade" students who report experiencing any of a specified list of online bullying acts by other students at least once or twice a month



Note: *The difference between students with high and low socio-economic status is statistically significant at the 5% level.
**The OECD average includes all countries depicted in the figure except Belgium and the United Kingdom.
"Fourth grade" students were asked "During this year, how often have other students from your school done any of the following things to you, including through texting or the internet?" with respect to "Sent me nasty or hurtful messages online" and "Shared nasty or hurtful information about me online". For each question, they were presented with the response options "Never", "A few times a year", "Once or twice a month" and "At least once a week". Data refer to the percentage who responded “Once or twice a month” or “At least once a week” to at least one of the two questions.
Source: OECD Secretariat calculations based on IEA (2021[9]), *Progress in International Reading Literacy Study 2021 (PIRLS 2021)*, https://pirls2021.org/results.

StatLink https://stat.link/6e9kxb

Attempts by individuals or groups to recruit children into extremist and radicalised ideologies or activities is another example of contact-related online risk. In 2017, a UNESCO report found that the evidence linking the Internet, social media and violent radicalisation was very limited and inconclusive (Alava, Frau-Meigs and Hassan, 2017[39]). Based on descriptive evidence, it was hypothesised that chatrooms could act as accelerators of radical transformation, where members are self-selected and positively inclined toward extremist ideologies. However, researchers found no empirical evidence to either support or refute this hypothesis.

Radicalisation doesn't happen overnight. It is a gradual process, meaning that young people who are affected may not realise what is happening. For this reason, it is extremely difficult to collect data to assess whether children and adolescents have been exposed to interactions that could lead to their radicalisation. Nevertheless, research from the United States shows that individuals (especially youths) who spend more time online and use certain websites (i.e., YouTube, Reddit and Snapchat because of the anonymity/freedom they offer, and in the case of YouTube, recommendations based on prior viewing history) may face an increased likelihood of being exposed to or engaging with hateful or potentially radicalising content (Costello et al., 2021[40]).

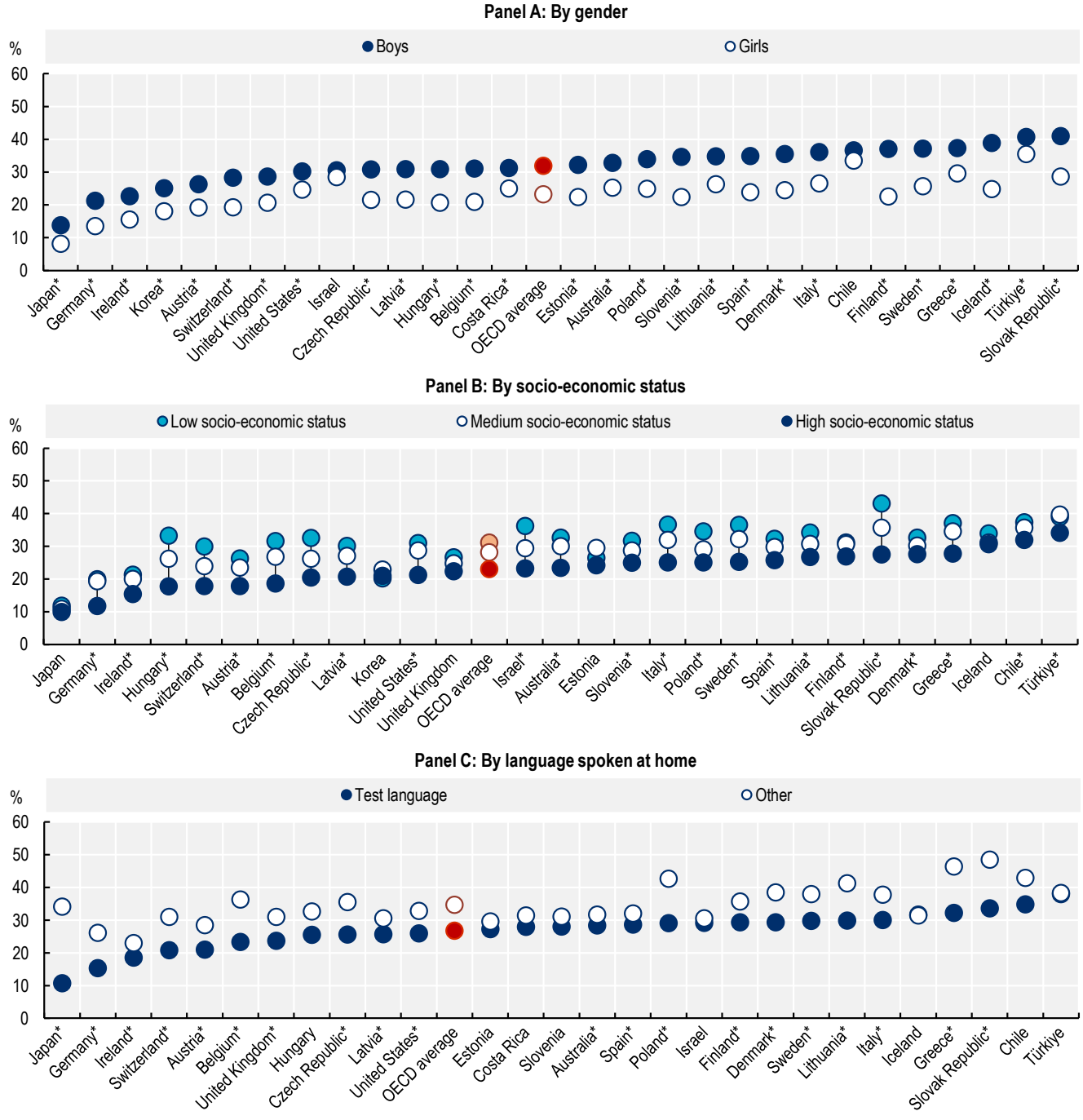
Conduct risks

Conduct risks pertain to risks "where children are actors in a peer-to-peer exchange, including when their own conduct can make them vulnerable (for instance, in the case of sexting,[5] or cyberbullying)" (OECD, 2021[11]). Under conduct risks, the following risk manifestations are recognised: i) hateful behaviour, ii) harmful behaviour, iii) illegal behaviour, and iv) user-generated problematic behaviour. These risk manifestations not only pose a threat to children who are the targets of such behaviour in the digital environment, but also to those whose actions create the risk. Specifically, a conduct risk occurs when a child engages in behaviour that contributes to risky digital content or interactions.

Conduct risks include behaviours such as engaging in cyberbullying, in illegal activities such as hacking, piracy, or engaging in online challenges that can be dangerous or unlawful, or in activities that can damage children's reputation (e.g. sexting or posting content that could harm their reputation or future opportunities). Another online risk is **contributing to dissemination of false and misleading content**. According to PISA 2022 data, this risk is quite high with nearly one in three 15-year-old students – especially boys and teenagers from low socio-economic backgrounds – reporting that they may share made-up information online without indicating its inaccuracy (Figure 3.9).

Figure 3.9. Boys with lower socio-economic status are more likely to share inaccurate information

15-year-old students who agree that they share made-up information on social networks without flagging its inaccuracy



Note: *The difference between boys and girls, high and low socio-economic status, and between groups according to the language spoken at home is statistically significant at the 5% level.
15-year-old students were asked "To what extent do you agree or disagree with the following statements? ... I share made-up information on social networks without flagging its inaccuracy" and presented with the response options "Strongly disagree", "Disagree", "Agree" and "Strongly agree". Data refer to the percent responding "Agree" or "Strongly agree".
Source: OECD Secretariat calculations based on OECD (2022[4]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

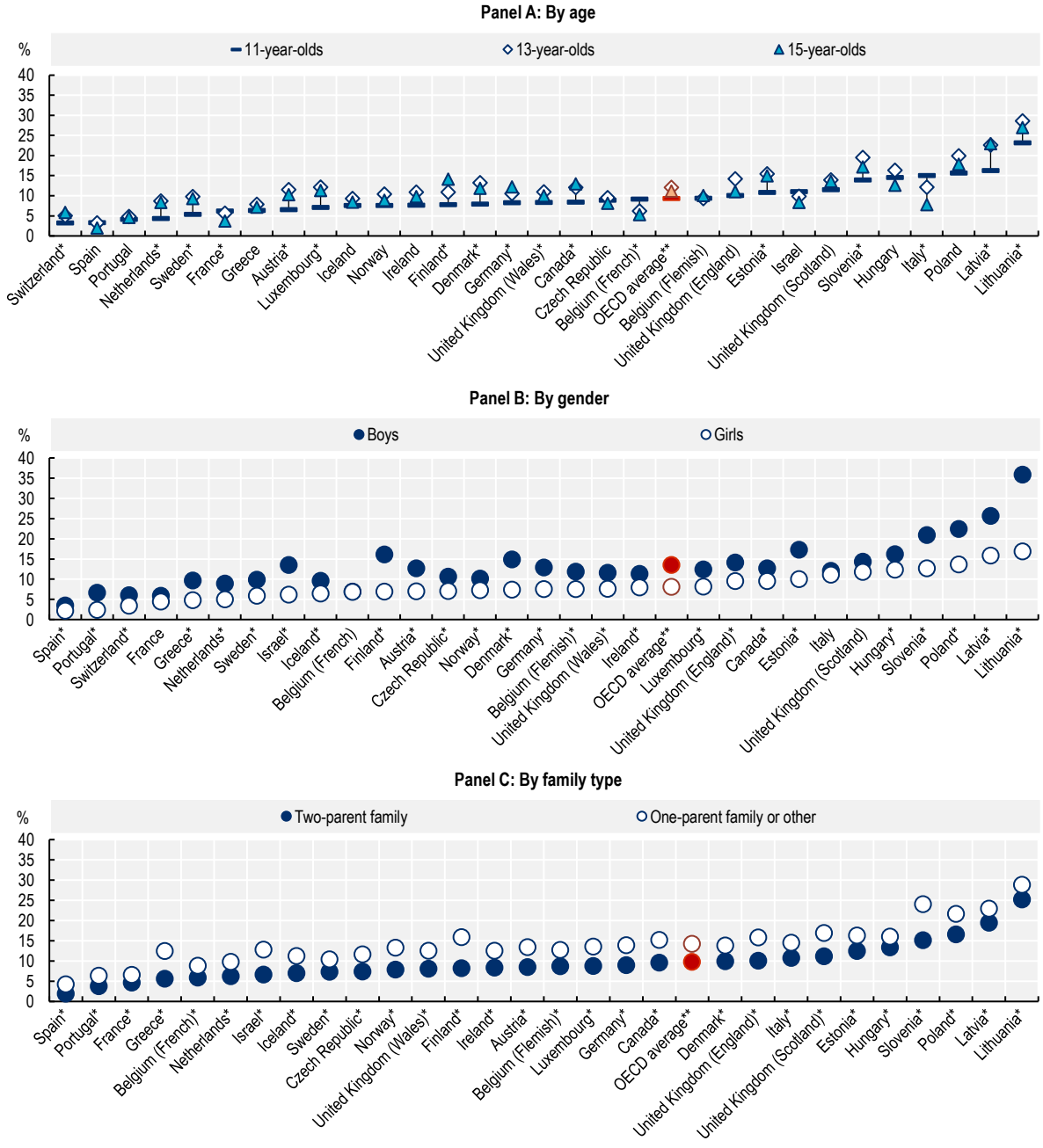
StatLink https://stat.link/uvipes

As mentioned earlier, cyberbullying is also a major issue in the digital world, and combating it is a priority for action within education systems and beyond in many OECD countries (OECD, 2024[13]). As previously mentioned, a significant proportion of children report being victims of cyberbullying. However, a notable minority of adolescents also admit to being perpetrators. According to HBSC data, it is estimated that in 2022, slightly more than one in ten 11- to 15-year-olds will have engaged in actions resembling cyberbullying (Figure 3.10). In Lithuania, over a quarter of teenagers in this age group report having engaged in such actions. Moreover, in most countries, there is a clear increase in the proportion of teenagers involved in cyberbullying between the ages of 11 and 15 (Panel A). Boys (14% on average in the OECD) report participating in cyberbullying more frequently than girls (8%) (Panel B). Additionally, teenagers living with both parents (10%) report engaging in cyberbullying less often than those living with one parent or in other family situation (14%) (Panel C).

There are certainly many reasons for engaging in cyberbullying, but three features of the online world explain why people communicate and interact differently online than offline: anonymity, disembodiment, and disinhibition (OECD, 2024[41]). Anonymity allows people to express opinions and behave without fear of judgment, which can lead to a lack of accountability, enabling impulsive and aggressive behaviours such as cyberbullying and trolling. Disembodiment lets people create virtual identities that they may consider as less vulnerable to aggressive behaviours such as hate speech. Disinhibition involves a lack of restraint in online interactions, often resulting in hostile behaviours like cyberbullying and trolling. Anonymity and reduced visibility in digital environments can exacerbate disinhibition, making people feel less accountable and more likely to act differently than they would face-to-face.

Figure 3.10. Around one in ten children partook in cyberbullying in the past few months

11-, 13- and 15-year-old school children who report having cyber-bullied others in the previous couple of months



Note: *The difference between 11- and 15-year-olds, boys and girls, and groups according to family arrangement is statistically significant at the 5% level.

**The OECD average includes all countries depicted in the figure except Belgium and the United Kingdom.

Children were asked "In the past couple of months how often have you taken part in cyberbullying (e.g., sent mean instant messages, email or text messages; wall postings; created a website making fun of someone; posted unflattering or inappropriate pictures online without permission or shared them with others)?". Response options ranged from "I have not cyberbullied another person in the past couple of months" to "Several times a week". Data refer to the percent of children who respond with "Once or twice" or more often. One-parent family or other includes: children who reported living with only one person they identify as a parent (either their 'mother' or their 'father'), with or without stepparents, or in some other arrangement (for instance, a foster home or cared for by non-parental family members).

Source: OECD Secretariat calculations based on WHO (n.d.[38]), Health Behaviour in School-aged Children (HBSC) World Health Organization Collaborative Cross-National Survey 2021-22, https://hbsc.org/about/.

StatLink https://stat.link/hudnps

Consumer risks

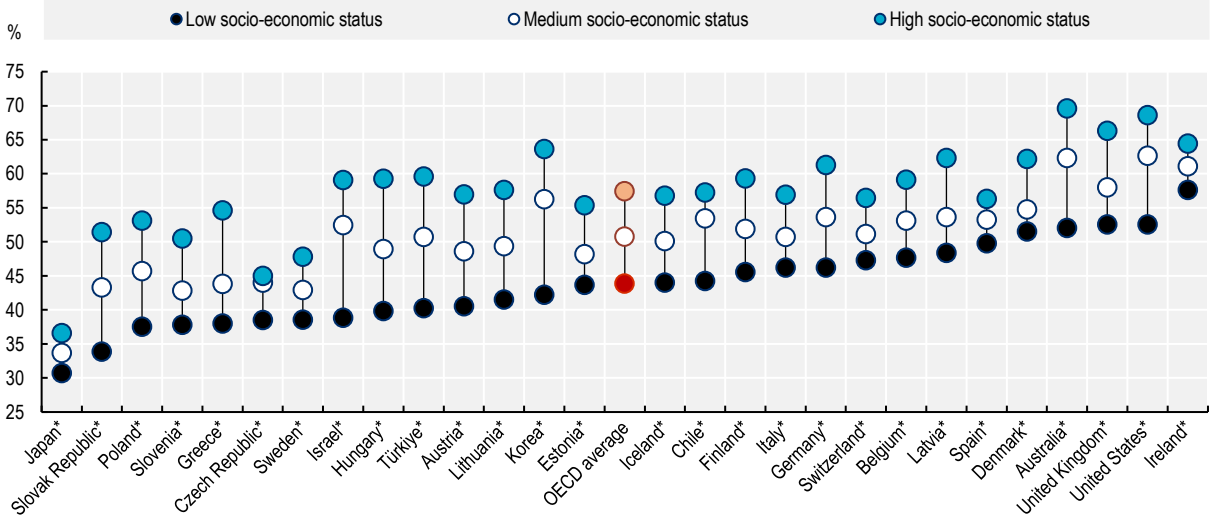
Children may face consumer risks online in several ways: (i) encountering marketing messages that are inappropriate for their age, such as advertisements for age-restricted products like alcohol; (ii) being exposed to commercial content that is not clearly identified as advertising, such as product placements, or material intended for adults, like promotions for dating services; and (iii) having their vulnerability and inexperience exploited, which can lead to economic risks, such as falling victim to online fraud (OECD, 2021[11]). Potential consumer risks for children include online scams and fraud, where children might be tricked into providing financial information or making payments, in-app purchases, where children may accidentally or intentionally spend money on games or apps without fully understanding the costs, and data privacy issues, where companies collect and misuse children's personal data for targeted advertising or other purposes (OECD, 2021[11]).

Privacy risks

Privacy risks cut across all risk categories and are particularly concerning due to their potential to profoundly affect children's lives in multiple ways (OECD, 2021[11]). The Global Kids Online Survey covers privacy related risks and privacy-protection strategies, including questions on whether children only use websites or apps they trust, or whether they use complicated, safe passwords (Global Kids Online, 2020[42]). In OECD countries, only around 51% of 15-year-olds state that they can easily change the privacy settings of their digital devices to protect their privacy and personal data (Figure 3.11).

Figure 3.11. Only half of 15-year-olds can easily change the settings of a device or app to protect their data and privacy

15-year-old students who report that they can easily change the settings of a device or App in order to protect their data and privacy, by socio-economic status



Note: *The difference between high and low socio-economic status is statistically significant at the 5% level.
15-year-old students were asked "To what extent are you able to do the following tasks when using digital resources? ... Change the settings of a device or App in order to protect my data and privacy" and presented with the response options "I cannot do this", "I struggle to do this on my own", "I can do with a bit of effort", "I can easily do this" and "I don't know what this is". Data refer to the percent responding "I can easily do this".
Source: OECD Secretariat calculations based on OECD (2022[4]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/2de6n0

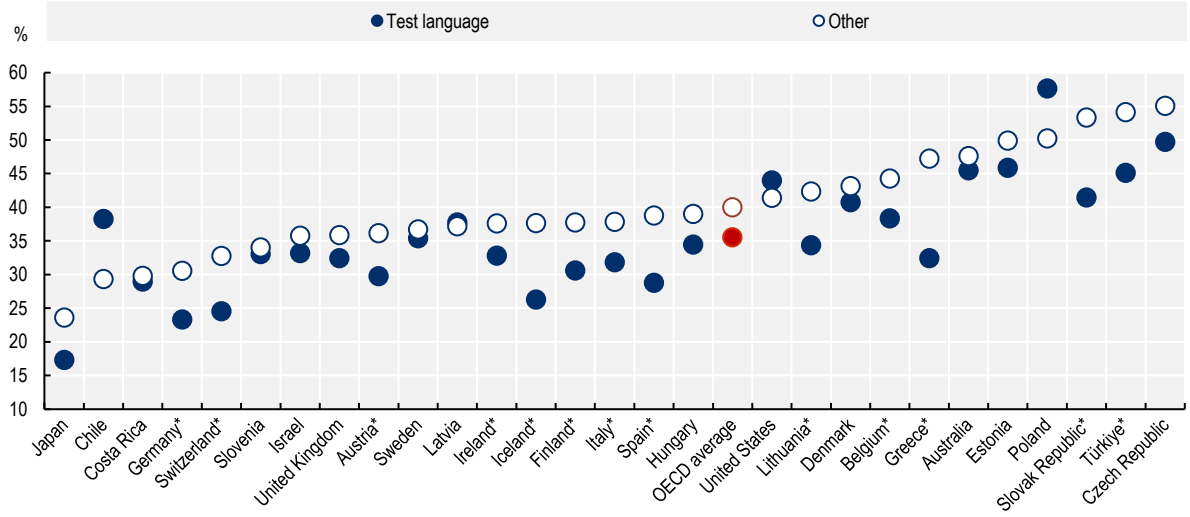
The **spread of private information** and online rumours on digital platforms can also severely harm the reputation of children and teenagers, over which they have very limited control. Although children can manage likes, shares, and comments they post online, their online reputation depends crucially on what others post about them. Even children who do not sign up for social media platforms may have an online reputation shaped by content, data, and information posted by others. Children's online reputation can influence how others perceive and treat them, making it a critical issue for children's well-being.

Online reputational risks were explored by the EU Kids Online Survey. Seven percent of children reported that their personal information was used in a way they disliked in the past year, ranging from 2% in Croatia to 12% in Romania (Smahel et al., 2020[5]). Additionally, 4% of children experienced someone creating an online page or sharing an image about them that was hostile or hurtful. Issues with family members sharing information without the child's permission were also found to be quite common. Between 8% (in Lithuania and Slovakia) and 36% (in Norway and Flanders) of children aged 12 to 16 reported that their parents or carers published information online without asking them, averaging 20 percent across all children. Nearly 10% of children said they were upset by this, and an even higher proportion (14%) reported asking a parent to remove the content (Smahel et al., 2020[5]).

The recent PISA 2022 data also include information on adolescents being affected by the disclosure of personal information without their approval. Nearly 40% of 15-year-old students reported that they got upset the last time information about them was publicly displayed online without their consent (Figure 3.12). However, this proportion varies significantly between countries, ranging from less than 18% in Japan to over 60% in Korea. Moreover, in many countries, adolescents from migrant backgrounds – indicated by not speaking the national language at home – are more frequently exposed to this risk compared to their peers.

Figure 3.12. Nearly four in ten adolescents were upset the last time information about them was shared online without their consent

15-year-old students who report getting upset the last time information about them was publicly displayed online without their consent, by language spoken at home



Note: *The difference between groups is statistically significant at the 5% level.
15-year-old students were asked "The following question is about your experience when browsing online content or using social media. How upset were you the last time the following situations occurred? ... Information about me was publicly displayed online without my consent" and presented with the following response options "This did not happen to me", "Not at all upset", "A little upset", "Quite upset" and "Very upset". Data refer to the percent responding "A little upset", "Quite upset" or "Very upset".
Source: OECD Secretariat calculations based on OECD (2022[4]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/zq5y12

Private content can be shared not only by strangers but also by close friends or family members, including parents. *"Sharenting*" refers to the popular practice where parents share content involving their children online, gaining gratification from posting stories, images, and videos of their children (OECD, 2021[11]). However, sharenting raises several concerns for children's privacy. It can undermine a child's right to privacy, as parents may disclose personal information without their child's consent. Sharenting can also expose children to risks like online grooming, paedophiles, and identity theft.

To conclude, digital media and the digital environment amplify and complicate the risks associated with typical childhood and adolescent behaviours by providing new avenues for both positive and negative experiences. Activities such as exploring identity, seeking peer validation, and testing boundaries – common during these developmental stages – can be intensified in the digital sphere, where content is easily shared, permanent, and accessible to wide audiences. Risks like exposure to inappropriate content, cyberbullying, grooming, and peer pressure are heightened online, while the use of algorithms and tailored content can reinforce harmful behaviours, such as pursuing unrealistic beauty standards or dangerous challenges. Additionally, the anonymity and reach of digital platforms can escalate normal experimentation into problematic or risky behaviours, such as oversharing, engaging with harmful communities. This interconnectedness of digital and offline behaviours complicates parenting, supervision, and the mitigation of these risks.

References

Alava, S., D. Frau-Meigs and G. Hassan (2017), *Youth and violent extremism on social media: mapping the research*, https://doi.org/10.54675/STTN2091. [39]

Baier, D. et al. (2018), "Consequences of Bullying on Adolescents' Mental Health in Germany: Comparing Face-to-Face Bullying and Cyberbullying", *Journal of Child and Family Studies*, Vol. 28/9, pp. 2347-2357, https://doi.org/10.1007/s10826-018-1181-6. [36]

Binford, W. (2018), "Viewing pornography through a children's rights lens", *Sexual Addiction & Compulsivity*, Vol. 25/4, pp. 415-444, https://doi.org/10.1080/10720162.2019.1578311. [18]

Bonino, S. et al. (2006), "Use of pornography and self-reported engagement in sexual violence among adolescents", *European Journal of Developmental Psychology*, Vol. 3/3, pp. 265-288, https://doi.org/10.1080/17405620600562359. [16]

Brailovskaia, J., T. Teismann and J. Margraf (2018), "Cyberbullying, positive mental health and suicide ideation/behavior", *Psychiatry Research*, Vol. 267, pp. 240-242, https://doi.org/10.1016/j.psychres.2018.05.074. [34]

Campbell, M. and S. Bauman (2018), "Cyberbullying: Definition, consequences, prevalence", *Reducing Cyberbullying in Schools: International Evidence-Based Best Practices*, pp. 3-16, https://doi.org/10.1016/B978-0-12-811423-0.00001-8. [31]

Collins, R. et al. (2017), "Sexual Media and Childhood Well-being and Health", *Pediatrics*, Vol. 140/Supplement 2, pp. S162-S166, https://doi.org/10.1542/PEDS.2016-1758X. [17]

Costello, M. et al. (2021), *Radicalization on the Internet: Virtual Extremism in the U.S. from 2012-2017*, Office of Justice Programs, https://www.ojp.gov/ncjrs/virtual-library/abstracts/radicalization-internet-virtual-extremism-us-2012-2017 (accessed on 24 May 2024). [40]

Gerosa, T., L. Losi and M. Gui (2024), "The Age of the Smartphone: An Analysis of Social Predictors of Children's Age of Access and Potential Consequences Over Time", *Youth and Society*, Vol. 56/6, pp. 1117-1143, https://doi.org/10.1177/0044118X231223218/ASSET/IMAGES/LARGE/10.1177_0044118X231223218-FIG1.JPEG. [7]

Giumetti, G. and R. Kowalski (2022), "Cyberbullying via social media and well-being", *Current Opinion in Psychology*, Vol. 45, p. 101314, https://doi.org/10.1016/j.copsyc.2022.101314. [35]

Global Kids Online (2020), *Global Kids Online Questionnaire*, http://globalkidsonline.net/tools/survey/ (accessed on 9 September 2024). [42]

Gottschalk, F. (2022), "Cyberbullying: An overview of research and policy in OECD countries", *OECD Education Working Papers*, No. 270, OECD Publishing, Paris, https://doi.org/10.1787/f60b492b-en. [32]

Gui, M. and T. Gerosa (2021), "Smartphone pervasiveness in youth daily life as a new form of digital inequality", in *Handbook of Digital Inequality*, Edward Elgar Publishing Ltd., https://doi.org/10.4337/9781788116572.00016. [6]

Hamm, M. et al. (2015), "Prevalence and Effect of Cyberbullying on Children and Young People", *JAMA Pediatrics*, Vol. 169/8, p. 770, https://doi.org/10.1001/jamapediatrics.2015.0944. [33]

Helsper, E. (2020), "Digital inequalities amongst digital natives", *The Routledge Companion to Digital Media and Children*, pp. 435-448, https://doi.org/10.4324/9781351004107-41/DIGITAL-INEQUALITIES-AMONGST-DIGITAL-NATIVES-ELLEN-HELSPER. [1]

IEA (2021), *Progress in International Reading Literacy Study 2021 (PIRLS 2021)*, International Association for the Evaluation of Educational Achievements, https://pirls2021.org/results. [9]

Livingstone, S. and M. Stoilova (2021), "The 4Cs: Classifying Online Risk to Children", *CO:RE Short Report Series on Key Topics*, https://doi.org/10.21241/ssoar.71817. [12]

MacHackova, H. et al. (2020), *Children's experiences with cyberhate*, EU Kids Online, https://doi.org/10.21953/LSE.ZENKG9XW6PUA. [26]

Muschert, G. and M. Ragnedda (2015), *The Digital Divide: The Internet and Social Inequality in International Perspective*, https://www.routledge.com/The-Digital-Divide-The-Internet-and-Social-Inequality-in-International/Ragnedda-Muschert/p/book/9781138960268 (accessed on 23 June 2022). [2]

Nienierza, A. et al. (2021), "Too dark to see? Explaining adolescents' contact with online extremism and their ability to recognize it", *Information, Communication & Society*, Vol. 24/9, pp. 1229-1246, https://doi.org/10.1080/1369118X.2019.1697339. [27]

OECD (2024), *Children and young people engaging in self-harm*, OECD Child Well-Being Data Portal, https://www.oecd.org/en/data/datasets/oecd-child-well-being-data-portal.html. [23]

OECD (2024), "Mental health and digital environments", in *OECD Digital Economy Outlook 2024 (Volume 1): Embracing the Technology Frontier*, OECD Publishing, Paris, https://doi.org/10.1787/596e067d-en. [30]

OECD (2024), *OECD Digital Economy Outlook 2024 (Volume 1): Embracing the Technology Frontier*, OECD Publishing, Paris, https://doi.org/10.1787/a1689dc5-en. [41]

OECD (2024), "The OECD Truth Quest Survey: Methodology and findings", *OECD Digital Economy Papers*, No. 369, OECD Publishing, Paris, https://doi.org/10.1787/92a94c0f-en. [14]

OECD (2024), *What Does Child Empowerment Mean Today? Implications for Education and Well-Being*, OECD, Paris, https://doi.org/10.1787/8f80ce38-en. [13]

OECD (2023), *PISA 2022 Results (Volume I and II) - Country Notes: Japan*, https://www.oecd.org/en/publications/pisa-2022-results-volume-i-and-ii-country-notes_ed6fbcc5-en/japan_f7d7daad-en.html. [43]

OECD (2023), *PISA 2022 Results (Volume II): Learning During – and From – Disruption*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/a97db61c-en. [10]

OECD (2023), "Transparency reporting on child sexual exploitation and abuse online", *OECD Digital Economy Papers*, No. 357, OECD Publishing, Paris, https://doi.org/10.1787/554ad91f-en. [28]

OECD (2022), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html. [4]

OECD (2021), "Children in the digital environment: Revised typology of risks", *OECD Digital Economy Papers*, No. 302, OECD Publishing, Paris, https://doi.org/10.1787/9b8f222e-en. [11]

Pathmendra, P. et al. (2023), "Exposure to Pornography and Adolescent Sexual Behavior: Systematic Review", *Journal of Medical Internet Research*, Vol. 25, https://doi.org/10.2196/43116. [21]

Paulus, F. et al. (2024), "The impact of Internet pornography on children and adolescents: A systematic review", *L'Encéphale*, https://doi.org/10.1016/J.ENCEP.2023.12.004. [20]

Perowne, R. and L. Gutman (2023), "Parents' perspectives on smartphone acquisition amongst 9- to 12-year-old children in the UK – a behaviour change approach", *Journal of Family Studies*, Vol. 30/1, pp. 63-81, https://doi.org/10.1080/13229400.2023.2207563. [8]

Quadara, A., A. El-Murr and J. Latham (2016), "Online pornography: Effects on children & young people", https://aifs.gov.au/sites/default/files/publication-documents/online_pornography-effects_on_children_young_people_snapshot_0.pdf (accessed on 23 May 2024). [19]

Robb, M. and S. Mann (2023), *2022 Teens and Pornography*, Common Sense Media, San Francisco, https://www.commonsensemedia.org/research/teens-and-pornography (accessed on 23 May 2024). [15]

Smahel, D. et al. (2020), *EU Kids Online 2020: Survey results from 19 countries*, EU Kids Online, https://doi.org/10.21953/lse.47fdeqj01ofo. [5]

Stalker, P., S. Livingstone and D. Kardefelt-Winther (2019), *Growing up in a connected world*, United Nations Children's Fund (UNICEF) Office of Research – Innocenti, https://www.unicef.org/innocenti/media/7006/file/GKO-Summary-Report-2019.pdf. [3]

Stoilova, M., M. Rahali and S. Livingstone (2023), *Good practice guide: Classyfying and responding to online risk to children*, Insafe helplines and the London School of Economics and Political Science (LSE), https://www.lse.ac.uk/business/consulting/assets/documents/Classifying-and-responding-to-online-risk-to-children-Good-practice-guide.pdf (accessed on 24 May 2024). [22]

Susi, K. et al. (2023), “Research Review: Viewing self-harm images on the internet and social media platforms: systematic review of the impact and associated psychological mechanisms”, *Journal of Child Psychology and Psychiatry*, Vol. 64/8, pp. 1115-1139, https://doi.org/10.1111/jcpp.13754. [24]

UNESCO (2023), “Addressing hate speech through education: a guide for policy-makers”, https://unesdoc.unesco.org/ark:/48223/pf0000384872 (accessed on 4 December 2024). [25]

WeProtect Global Alliance (2023), *Estimates of childhood exposure to online sexual harms and their risk factors*, https://www.weprotect.org/wp-content/uploads/Estimates-of-childhood-exposure-to-online-sexual-harms-and-their-risk-factors-.pdf (accessed on 9 November 2023). [29]

WHO (n.d.), *Health Behaviour in School-aged Children (HBSC) cross-national survey*, World Health Organization, Regional Office for Europe, https://hbsc.org/about/. [38]

Zych, I., R. Ortega-Ruiz and R. Del Rey (2015), “Scientific research on bullying and cyberbullying: Where have we been and where are we going”, *Aggression and Violent Behavior*, Vol. 24, pp. 188-198, https://doi.org/10.1016/J.AVB.2015.05.015. [37]

Notes

[1] In Japan, secondary school pupils spend on average 25.9 hours per week in regular school lessons, which is significantly higher than the OECD average of 23.7 hours. Nearly 87% of Japanese students spend 25 hours or more in class each week (OECD, 2023[43]). After school, about half of lower secondary students in Japan spend up to 12 hours a week in private tutoring schools, or juku, to prepare for exams and reinforce classroom concepts, often including Saturdays.

[2] The OECD's "Children in the digital environment: Revised typology of risks" (OECD, 2021[11]) identifies four primary categories of risks that children may face online, including *Content Risks* (Exposure to inappropriate or harmful material), *Conduct Risks* (Risks arising from children's own behaviour online), *Contact Risks* (Dangers associated with interactions with others in the digital space), and *Consumer Risks* (Threats related to commercial practices targeting children as consumers). Additionally, the typology identifies cross-cutting risks that span these categories, including privacy risks, advanced technology risks, and health and well-being risks. These risks have evolved with technological advancements, necessitating updated strategies to safeguard children in the digital environment.

[3] Children may not be emotionally prepared to process explicit material, leading to confusion, distress, or fear. They may not fully understand what they are seeing and may develop unhealthy or unrealistic perceptions of sexuality. Moreover, repeated exposure to explicit content can desensitize children, potentially affecting their future relationships and attitudes toward intimacy and consent. For some children, exposure to pornography can create feelings of guilt, shame, or anxiety, particularly if they believe they are engaging in something inappropriate or wrong. In addition, pornography often depicts distorted or unrealistic portrayals of sex and relationships, which can affect children’s understanding of healthy sexual behaviour and consent. They may form unhealthy attitudes toward their own bodies and those of others.

[4] For example, OECD (2023[28]) reports that in 2022, the National Center for Missing and Exploited Children (NCMEC) – which operates the United States' CyberTipline and collaborates with law enforcement agencies worldwide – received over 31.8 million reports of suspected child sexual exploitation, up from 29.3 million in 2021 and 21.7 million in 2020. Similarly, the Internet Watch Foundation (IWF), a UK-based child protection organization leveraging technology to identify and remove child sexual abuse material online, investigated 375 230 reports in 2022, marking a 20% increase since 2020. INTERPOL has also reported that child sexual exploitation and abuse continues to rise, noting that 2021 was the worst year on record.

[5] Sexting refers to the "sending or receiving of sexually explicit materials (messages, images or videos) through digital means" (Gottschalk, 2022[32]).

4. The impact of digital activities on children's lives

This chapter reviews the existing evidence on the relationship between children's online engagement, activities, and their well-being and development. It explores key domains such as physical health, cognitive development and learning, as well as emotional well-being and mental health. The review highlights how the impact varies depending on the type of online activity and engagement, as well as the personal and environmental factors that either make children more vulnerable or protect them from possible adverse effects of digital activities on their well-being.

Digital devices and the Internet provide access to a wide range of content, platforms, and applications, offering many opportunities for children to learn, play, stay connected with friends, and make new friends, as well as to find information that matters to them. They also offer a space for freedom that responds to adolescents' desire to be trusted and gain some independence. On the flip side, the growing amount of time children, including very young ones, spend on digital devices raises concerns that excessive or premature exposure to screens and digital resources can negatively affect their health, learning ability, concentration, and psychological well-being. Children who spend too much time online may engage less in physical activity and real-world social interactions, which could lead to worse physical and mental health outcomes[1] (OECD, 2021[1]; 2024[2]; 2018[3]; Burns and Gottschalk, 2019[4]). Moreover, the Internet and the online world are not inherently safe spaces and expose children to various risks related to the content they encounter and the behaviours they witness. The anonymity that often exists online can also encourage them to engage in risky or inappropriate behaviours toward others.

Globally, the scientific literature indicates that there is no single, linear relationship between the use of digital resources, screen time,[2] and well-being outcomes for children and adolescents. These relationships vary depending on the child's age and the specific outcome domain considered (e.g., physical health, cognitive development, learning outcomes, socio-emotional outcomes, psychological well-being, and mental health). Additionally, the relationship can change based on the amount of time spent on devices and the type of digital activity engaged in. For instance, evidence suggests an inverted U-shaped relationship between children's social media use and their socio-emotional well-being, where both low and high levels of usage are associated with lower well-being, while moderate use is linked to higher well-being (Boer et al., 2020[5]; Boer et al., 2021[6]; Boniel-Nissim et al., 2022[7]; Orben et al., 2022[8]; Przybylski and Weinstein, 2017[9]; Ferguson, 2017[10]).

A major debate centres on whether children's exposure to digital technologies has been driving a substantial shift in child socio-emotional development, and is behind a surge in mental health disorders and decrease in mental well-being observed among adolescents and youth in many countries[3] (McGorry et al., 2024[11]; Cosma, 2023[12]). For instance, Haidt (2024[13]) attributes the rise in anxiety and mental health problems among younger generations to a combination of social, cultural, and technological changes. It is suggested that constant exposure to curated, idealised versions of others' lives and the addictive nature of these platforms contribute to a heightened sense of inadequacy and fear among young people. A central argument is that social media platforms and smartphones have exacerbated feelings of anxiety and depression. However, the available evidence does not clearly support the claim that access to digital technologies is the primary driver of mental health trends (Odgers, 2024[14]; Lebedíková et al., 2024[15]; Ferguson, 2024[16]). There is no direct, strong, and unequivocal link between digital tool usage and its effects on developmental outcomes and adolescent well-being. Most findings that do suggest a link are based on correlational data that may not reflect causal relationships and, at best, show only moderate effects. These results cannot be generalised to the entire population, as they indicate that while some experiences are negative, others are positive or neutral for the majority of adolescents (Valkenburg, Beyens and Keijsers, 2024[17]). Moreover, the potential benefits of digital tools are less studied compared to the focus on their harms (Valkenburg et al., 2021[18]).

Debate also exists about the scale and significance of the identified associations, which are often small and comparable to other personal or family circumstances (Ferguson and Heene, 2021[19]; Orben and Przybylski, 2019[20]). For instance, in a notable study, Orben and Przybylski (2019[20]) estimate that the association between adolescent use of digital technology with their well-being is negative but small, explaining at the most 0.4% variation in well-being. In sum, the overall impact of digital technology is no higher than factors that are understood as having a neutral effect on well-being. The paper highlights that most studies in the field report correlational associations between digital technology use and well-being outcomes and not causal impacts.

Recent years have seen the body of evidence assessing the relationships between children's digital practices and their well-being outcomes grow substantially. The many systematic reviews[4] and meta-analyses available in this area provide a crucial information base, offering a critical synthesis of the available evidence.

This section reviews the available evidence on the relationship between the use of digital devices and children's physical health, cognitive development and learning outcomes, and social and emotional well-being. The data available for OECD countries are used to illustrate, when possible, differences in children's experience with digital devices across and within countries depending on their socio-economic characteristics. While increasingly solid, the evidence base remains preliminary and only limited to relatively well-established digital technologies. Very little is understood about the impacts of new technologies, such as AI and Virtual Reality (Box 4.1).

Box 4.1. How will artificial intelligence and virtual reality affect children?

Artificial intelligence (AI) is rapidly changing the way children and adolescents play, communicate, and learn. While it has potential to help solve complex problems, AI presents both significant opportunities and notable risks concerning child well-being (UNICEF, 2023[21]; 2020[22]; Munzer, 2024[23]; Tiches, 2023[24]).

On the **opportunity side**, AI can be interactive and fun for children, offering new ways to enjoy and explore their world. For some, this may be a life-enriching experience that opens new doors, enhances school performance, and helps prepare them for the challenges of adult life, by contributing to:

- **Educational enhancement**: AI can provide personalised learning experiences, adapted to each child's learning pace and style, thereby improving educational outcomes.
- **Creative engagement**: Tools powered by AI can foster creativity by helping children generate stories, artwork, music, and even software with minimal coding skills.

Health and accessibility: AI can aid the early detection of health and developmental issues and offer enhanced accessibility features for children with disabilities, enabling better interaction with digital systems (UNICEF, 2023[21]; Munzer, 2024[23]).

- **Develop parasocial relationships**, which are one-way emotional attachments that viewers or users form with media characters. A study involving a semi-intelligent robot prototype of Dora the Explorer found that children's learning was influenced by their parasocial relationships and interactions with the character. Children's interactions with an intelligent character prototype led to more contingent feedback on their math responses and scaffolding to enhance performance when mistakes were made – exceeding the support typically available in passive media experiences. As a result, children who had a strong parasocial bond with Dora showed faster response times in a math game, and they transferred what they had learned better when the Dora character had been present in the game. The beneficial impact of parasocial interactions on speed of response may be due in part to reduced processing demands as well as enhanced motivation when children feel emotionally close to a character (Calvert et al., 2020[25]; Tiches, 2023[24]).

For all the promise they hold, AI platforms can exacerbate the **risks** experienced online, including:

- **Exposure to mis- and disinformation**: AI-generated content can include persuasive mis- and disinformation, making it difficult for children to discern truth from falsehood, thereby affecting their understanding and critical thinking.

- **Privacy and safety concerns**: The data collected by AI systems can be misused, potentially compromising children's privacy. Moreover, AI can be used to generate deepfake images or voices, posing risks of exploitation and cyberbullying.
- **Mental and emotional impact**: Interaction with AI can influence children's cognitive and social development. AI's unpredictable behaviours can create confusion, impacting how children perceive and interact with technology. However, as children grow older, they seem to become less likely to seek out devices when they feel lonely and are less prone to attribute human-like qualities to AI-enabled characters and devices (Tiches, 2023[24]). Around the age of seven, children begin to better distinguish between reality and fantasy, leading to a shift in their perception of AI. Yet, there is no definitive age at which all children clearly understand the limitations of AI characters, as this understanding can vary widely among individuals.
- AI-driven social media platforms and their recommendation algorithms can exacerbate negative self-perception in adolescents. Features like AI-enhanced filters and curated content often promote unrealistic body standards, which can contribute to body dysmorphia, anxiety, and unhealthy coping mechanisms, such as social withdrawal (Siriudomsait, 2023[26]).
- Data driven systems and advanced technologies may also reinforce **structural biases**, favouring individuals from more privileged backgrounds (Selwyn and Jandrić, 2020[27]; OECD, 2021[1]). If the data used to train digital systems do not reflect the diverse backgrounds and characteristics of children in increasingly multicultural societies, built-in biases may further marginalise already disadvantaged children. Furthermore, limited understanding of algorithms can exclude individuals with low algorithmic awareness from various opportunities, thereby exacerbating existing social inequalities (Shin, Rasul and Fotiadis, 2022[28]).

The immersive and multisensory nature of **Virtual Reality** (VR) offers both significant potential and notable concerns, particularly for children due to their developmental plasticity (Kaufman et al., 2025[29]; Gray, Carter and Egliston, 2024[30]). VR can support positive experiences, such as enhanced learning and pain management during medical procedures,[1] and is increasingly used in child psychiatry for assessment and treatment.[2] However, risks include physiological harms like motion sickness, eye strain, and postural instability, especially for children under 13, due to hardware designed for adults (Yamada-Rice et al., 2017[31]).

VR may also amplify negative experiences, such as cyberbullying and harassment,[3] isolation, and mental health concerns, while fast-paced content can deplete cognitive functions and hinder executive skill development (Kaufman et al., 2025[29]). The immersive nature of VR intersects with children's cognitive development, affecting their ability to distinguish virtual experiences from reality[4] (Gray, Carter and Egliston, 2024[30]; OECD, 2024[32]). While this skill improves with age, younger children tend to face greater challenges in making this distinction. Children's developing impulse control increases susceptibility to excessive use (Gray, Carter and Egliston, 2024[30]). To mitigate risks, adult supervision, time limits, and regular breaks are essential.

1. Research on VR as a distraction tool with children 4 years and older has revealed effectiveness in a range of procedures, such as venipuncture, chemotherapy, burn wound care, dental treatments, and immunizations. By creating engaging and immersive virtual environments, VR diverts the child's focus from the pain and anxiety associated with these procedures, reducing the need for sedatives and analgesics (Kaufman et al., 2025[29]).
2. For instance, neuropsychological VR testing is a valuable method for simulating real-life environments for assessment purposes. It offers a valid and reliable approach for evaluating neuropsychological conditions like ADHD and Acquired Brain Injury. Additionally, it serves as an effective tool for assessing attention performance more broadly, even when not linked to a specific neuropsychological diagnosis (Araiza-Alba et al., 2020[33]).

3. Virtual Reality can amplify cyberbullying and harassment due to its immersive and interactive nature, making negative interactions feel more personal and emotionally impactful. The anonymity of avatars emboldens perpetrators, while the simulated physical presence in VR intensifies violations like unwanted touching or invading personal space. Real-time voice and gesture tracking can escalate harassment, and the spontaneous, private nature of VR spaces complicates moderation. Social pressures, exclusion, and the betrayal of trust in perceived "safe spaces" further exacerbate harm, particularly for younger users who may lack the tools to cope. Limited protective features and prolonged exposure during immersive sessions add to the challenge, necessitating better safeguards in VR platforms.
4. As reported by Gray, Carter and Egliston (2024[30]), claims that children struggle to distinguish VR from reality are often associated with a 2009 false-memory study, which found that children aged 4-5 might confuse VR with mental imagery (such as imagining something), affecting their memory formation (Bailey and Bailenson, 2017[34]). However, this confusion seems to decrease with age, as it was not observed in children aged 6-7. The ability to distinguish all types of media from reality is a learned skill that develops as children's cognitive skills advance and transform throughout various phases of childhood.

4.1. Children's physical health

The development of digital resources, accessible via the Internet, platforms, and applications by children or their parents, presents both opportunities and risks for children's physical health (Table 4.1). Like adults, children can benefit from digital tools that offer numerous opportunities to support their healthy physical development. Digital tools make it easier, for example, for children and parents to access information on practices that promote the physical development of young children, including their nutritional needs, as well as height and weight standards, which serve as indicators of good child development. They also aid in disseminating information about available assistance near families' residences and facilitate access to health services. With regard to healthcare provision, the advancement of technology and the increasing digitisation of healthcare systems have opened new opportunities to transform the delivery of child health services (Siderius et al., 2023[35]; Ponti et al., 2017[36]). For instance, digitalised health care provision creates opportunities to ensure seamless data exchange and communication among healthcare entities, providers, institutions, households, and systems. For the former, it is necessary to strengthen the use of standardised data formats, coding systems, and to overcome the barriers stemming from using different data recording, quality check, and information sharing systems. Digital technologies, such as smartphones, mobile apps, websites, and text messaging, also hold the potential for innovative methods to enhance knowledge, deliver persuasive messages, modify behaviours, and support medical assistance and treatment delivery (Zeng, Ye and Mena, 2023[37]). A key challenge in developing these technological capabilities is ensuring data privacy, ensuring no unintended discrimination of children arising from the use of data, and establishing robust cybersecurity to protect against data breaches (OECD, 2024[38]).

At the same time, the use of digital tools poses a risk factor for children's health, particularly for school-age children and for teenagers when screen time intensifies. In particular, screen time before going to bed is likely to affect both the duration and quality of children's sleep (Box 4.2), and therefore can ultimately impact emotional regulation and quality of learning at school (Suni and Vyas, 2023[39]). As a result, managing screen time, particularly before bedtime, is crucial for fostering healthier sleep habits in children. Reducing screen exposure, especially in the evening, and promoting screen-free time before bed can significantly enhance both the quality and duration of sleep.

Excessive screen time is also a risk factor for other health outcomes, including greater obesity/ adiposity (i.e., body fat) and higher depressive symptoms, and lower healthy diet quality (Stiglic and Viner, 2019[40]; Zhang et al., 2022[41]; Li et al., 2020[42]). Also, the increasing presence of screens in children's lives is suspected to promote a sedentary lifestyle, reducing activity levels. The displacement hypothesis suggests that digital screen media use (DSMU) negatively impacts children's health and development by reducing time for beneficial activities like sleep, physical activity, and in-person socialising (Tremblay et al., 2025[43]). For instance, according to data from the Health Behaviour of School-aged Children 2021-22 survey, approximately 16% of 11-years-old and 20% of 15 years-old adolescents using social media across the OECD reported that they regularly neglected other activities (e.g. hobbies, sport) because they wanted to

use social media.However, evidence is mixed regarding DSMU displacing physical activity. A meta-analysis found small negative associations between physical activity and total screen time, Internet use, and television viewing, while computer use and video games showed no significant associations (Pearson et al., 2014[44]). In children aged 2-3 years, increased screen time was found to be linked to greater sedentary behaviour, reduced physical activity (Chen et al., 2020[45]), and less time spent playing with peers later in childhood (Putnick et al., 2022[46]). A recent clustered randomized controlled trial showed substantial increases in physical activity among children whose families reduced recreational screen media use (Pedersen et al., 2022[47]). However, a longitudinal study of 755 adolescents over three years found no overall evidence for the displacement hypothesis (Lizandra et al., 2019[48]). Gender differences emerged, with boys showing partial displacement linked to video game use and girls spending more time on smartphones. According to the authors, the portability of smartphones may allow simultaneous physical activity compared to more stationary screen types like computers and televisions, highlighting the importance of considering the type of screen use in displacement studies (Tremblay et al., 2025[43]).

Higher durations/frequency of screen time and television viewing are associated with unfavourable body composition such as adiposity and overweight (Biddle, García Bengoechea and Wiesner, 2017[49]; Carson et al., 2016[50]). A vicious circle is also created, as poorer sleep in young people leads to increased tiredness, which in turn makes them more likely to prefer passive activities, such as watching television the next day.

In a meta-analysis of studies exploring the association between screen time and childhood obesity and overweight, Fang et al. (2019[51]) estimated that spending two hours or more per day on screens is associated with a 67% increase in the risk of overweight/obesity. The analysis suggests that television watching and computer use may be the primary drivers of this relationship. However, due to the cross-sectional design of the included studies, it is impossible to establish clear causality and determine whether higher screen time is a cause or a consequence of the individual or social experiences of overweight or obese children. Nevertheless, the relationship between screen time and obesity appears to be influenced by poor eating habits (Staiano et al., 2025[52]). A study analysing total media use – including television, computers, and video games – in 659 288 adolescents found that those who used screen media for six or more hours per day, compared to less than two hours per day, had higher odds of nighttime eating, inadequate sleep, poor dietary intake, and an increased risk of obesity (Stiglic and Viner, 2019[40]). Yet, one of the direct influences that screen time can have on children's risk of overweight and obesity relates to the messages emanating from screens, such as advertisements for unhealthy foods, which can impact children's eating behaviours and nutrition quality (Cabanas-Sánchez et al., 2019[53]; Harris et al., 2025[54]).[5]

Screen time also appears to encourage the development of musculoskeletal disorders in children, with an increased prevalence of neck and shoulder discomforts, wrist and hand pain, and lower back pain (Zhang et al., 2022[41]). Another concern of screen time is the risk of encouraging the development of vision problems in childhood, including myopia. The evidence on whether or not this risk is proven is, however, mixed, although it does seem to suggest that smart device exposure might be associated with an increased risk of myopia (Lanca and Saw, 2020[55]; Foreman et al., 2021[56]). Further research using observational data on screen time (as opposed to self-reported data) is deemed necessary by the authors of these systematic reviews to improve the quality of results and strengthen the conclusions in this area.

Table 4.1. Opportunities and risks of the digital environment on children's physical health

Opportunities	Risks
Easier access to information on healthy practices for parents and youth *Information on good practices accessible via Internet, mobile apps, etc.* **Facilitated access to medical and care services** *Information and appointments with medical and care services accessible via the Internet and mobile applications* **Improved medical diagnosis** *Seamless data exchange and communication among healthcare entities*	**Reduced sleep time and quality** Delayed sleep onset, reduced sleep duration and poor-quality sleep due to blue light emitted by screens, screen time displacing sleep time or psychological excitation **Greater obesity/overweight/adiposity** *Screen time replaces time spent outdoors and time devoted to physical activities, greater exposure to advertising for unhealthy food* **Potential risk of musculoskeletal health issues** *Increased prevalence of neck and shoulder discomforts, wrists and hand pain, and lower back pain* **Potential risk of myopia** Screen time increases the time on near work and reduces the time on protective outdoor activities

Box 4.2. Screen time and sleep among children and adolescents: what does the literature say?

Research indicates that children with high levels of screen exposure during early childhood – i.e. among children less than 6 years of age, especially those with screens (television, computer, mobile phone) in their bedrooms, face increased risk of sleep disorders (Cespedes et al., 2014[57]; Nathanson, 2024[58]; Hale et al., 2025[59]). The primary mechanism involved is that exposure to screens before bedtime delays sleep onset by reducing melatonin production due to the blue light emitted by screens. Prolonged screen use can disrupt natural sleep-wake cycles, replace sleep time, and cause psychological stimulation. Evening screen time increases the risk of fewer sleep hours due to delayed bedtimes and difficulty falling asleep. Additionally, screen use in bedrooms can lead to fragmented sleep from notifications and device checking, potentially causing fatigue and false diagnoses of hyperactivity (American Academy of Pediatrics, 2016[60]).

Several systematic reviews and meta-analyses of scientific evidence confirm the association between excessive screen use by children and the quality of their sleep, including shortened sleep duration, falling asleep and waking up later than desired (Li et al., 2020[42]; Janssen et al., 2020[61]; Stiglic and Viner, 2019[40]; Zhang et al., 2022[41]; Hale and Guan, 2015[62]; de Sá et al., 2023[63]; Moorman, Morgan and Adams, 2019[64]; Lund et al., 2021[65]; Veldman et al., 2023[66]; Kokka et al., 2021[67]). This negative association is found across various types of screen time (television, computers, smartphones, video gaming) and is most evident in primary school-age children and adolescents, though it also affects infants, toddlers, and preschoolers (Li et al., 2020[42]; Janssen et al., 2020[61]; Moorman, Morgan and Adams, 2019[64]; Veldman et al., 2023[66]). Infants exposed to screen media in the evening have shorter nighttime sleep and more sleep fragmentation. Daytime nap duration is inversely associated with screen use, indicating delays in sleep consolidation.

Lund et al. (2021[65]) discuss how the strength of evidence regarding the impact of electronic media use on sleep varies with children's age. Across all ages, there is consistent evidence linking media use to shorter sleep duration. For preschoolers, television and tablet use are associated with difficulties falling asleep and shorter sleep duration, while heavier television use is linked to increased daytime napping. Among 6-12-year-olds, electronic media use, especially at bedtime and in the bedroom, leads to later bedtimes and shorter sleep duration. For 13-15-year-olds, total screen time, computer and mobile

phone use are associated with less sleep and problems falling asleep, while social media is linked to poor sleep quality. More interactive forms of electronic media may have a greater impact on sleep than passive screen time, particularly for older children.

Exposure to screens in the evening, particularly at bedtime, consistently delays sleep and affects other sleep outcomes. While it's challenging to establish a precise threshold of screen time below which there is no effect on sleep, the impact is stronger with excessive screen time, typically defined as 2 hours or more per day. For example, Hale and Guan (2015[62]) suggest that for each additional hour of television screen time, there is an estimated 5-10 minute delay in bedtime. Li et al.'s meta-analysis indicates that children exposed to screens are 5% more likely to have shorter sleep periods compared to non-users, with those exceeding 1 hour of screen time being 42% more likely to have shorter sleep times. Moreover, children with more than 2 hours of screen time are over twice as likely to have shorter sleep times compared to those with less screen time.

These findings should be approached cautiously because the studies lack sufficient quality to definitely establish a causal link between screen time and sleep outcomes, owing to several potential factors. These factors include reverse causality, where individuals with less need for sleep might increase screen time. Factors like low physical activity or being overweight, or having a difficult temperament, could also contribute to both increased screen time and reduced sleep duration (Belmon et al., 2019[68]). Uncertainties in measuring screen use and sleep quality further complicate the issue, potentially limiting the reliability of the findings.[1]

1. Both self-reported and parent-reported data may be subject to uncertainty. For example, adolescents tend to over-report their sleep duration compared with objective measurements such as actigraphy or diary methods, and parents tend to report better sleep for adolescents compared with both self-reported and objective measurements.

4.2. Children's cognitive development and learning

The growing use of digital technologies at all stages of childhood brings with it opportunities and risks for children's cognitive development and learning (Table 4.2). This concerns the learning that occurs in early childhood, particularly regarding language development and cognitive functions. It also addresses the use of digital technologies for educational purposes and their role in fostering non-academic skills that certain digital activities can help develop.

Table 4.2. Opportunities and risks of the digital environment on children's cognitive development and learning

Opportunities	Risks
Stimulation of early language & literacy skills *Interactive use of e-books, early learning apps and videos*	**Delays in the development of language and cognitive functions** *Passive, unsupervised and excessive screen time may replace more beneficial activities.*
Fostering the development of soft and creative (non-academic) skills *Through promoting interactivity and trial-and-error play, coupled with engaging and enjoyable designs, digital tools aid children in cultivating a solution-oriented mindset, fostering self-inquiry, and discovering innovative problem-solving strategies. They may encourage the exploration of curiosity, while also nurturing self-reflection and critical thinking.*	**Reduced attention span** *Neurobiological factors (e.g., reduced connectivity between brain regions) and passive screen time may affect the development of children's ability to concentrate.*

Digital technologies and early language and cognitive development

For younger children, e-books and digital applications can add a playful and interactive dimension to learning and can be used by parents to support early language development and emergent literacy skills (Liu et al., 2024[69]). Numerous studies suggest that e-books can help in developing print knowledge during the early years (i.e., understanding the distinction between print and pictures, the distinction between letters and numbers, as well as the conventions of print, such as knowing that words are separated by spaces and that writing follows a linear arrangement), while the use of tablets and digital spelling games can be effective to help develop alphabet knowledge and phonological awareness.

Research on digital media use initially focused on duration, particularly television, and its potential negative effects on cognitive and language development through the "displacement hypothesis", where media use replaces beneficial activities like family interaction, homework, creative play, and reading (Dore et al., 2025[70]; Kirkorian et al., 2025[71]), (Box 4.6). Studies reveal a small-to-medium negative association between media duration and early language skills. Recently, attention has shifted to content (type of media), context (who media is used with), and interactivity (e.g., videos vs. interactive apps), as well as "technoference" (adult technology use around children). Educational content and co-viewing with adults are linked to better language skills, and interactive media may also support language development, though further research is needed (Dore et al., 2025[70]).

When it comes to infants, toddlers, and preschoolers, the focal point of the debate revolves around the perceived risks of screen use on neurocognitive development, primarily because the high level of brain plasticity and vulnerability during the early years of life (Box 4.3). The available evidence suggests that excessive and passive screen exposure can alter children's neurocognitive development. Passive screen time, particularly television watching, as well as prolonged screen time across various media types, are consistently found to reduce a child's verbal activity and can lead to delays in language acquisition[6] (Massaroni et al., 2023[72]; Madigan et al., 2020[73]). However, this effect can be mitigated by various factors, including the family environment. For instance, when the screen time is interactively used with parents and caregivers, it can contribute to children's vocabulary growth and development of their literacy skills.

Box 4.3. What's the impact of exposure to digital technology on early childhood neurodevelopment?

In their recent review of research on digital media and early cognitive development, Kirkorian et al. (2025[71]) highlight that infants' cognitive constraints, such as attention skills and working memory, limit their comprehension of digital media, and they tend to learn less from on-screen demonstrations compared to real-life interactions. This "transfer deficit" peaks around age 2. However, repeated on-screen demonstrations can aid learning. As children grow, they better understand the link between on-screen and real-life events, and by early adolescence, they can learn from child-directed media and display knowledge gains from carefully designed content.

Neural responses help explain why infants learn differently from video versus real-life demonstrations. Electroencephalogram studies show faster object recognition and more social learning when infants engage with objects in person (Kirkorian et al., 2025[71]). As children grow, neural connectivity varies based on media formats, such as stories with audio and visuals, and potentially between interactive media like games and videos. Current research suggests that young brains process information differently depending on the media type, with potential implications for how they learn.

However, the effects of media use on young children depend on factors such as content, design features, and context (Kirkorian et al., 2025[71]). Educational media are found to generally have positive or neutral effects on cognitive skills, while non-educational or adult-directed content may have negative impacts. Features like "hot spots"[1] in touchscreen applications and digital books can support learning if they align with the lesson, but engagement-promoting features like autoplay might be disruptive. Parenting style, media use context, and family factors also influence the outcomes of media exposure, highlighting the importance of considering the broader family and ecological context.

Several studies and systematic reviews have explored the effect of screen time[2] on child neurodevelopmental and cognitive outcomes, underlining the risks that excessive and passive[3] screen time can have (Hutton et al., 2024[74]; Guellai et al., 2022[75]; Cucalon-Benito, Perez-Palao and Fernandez-Valero, 2023[76]). However, the impact of screen exposure varies across different neurodevelopmental outcome domains (e.g. visual processing, language development, memory development, social cognition), with personal, familial, and other contextual factors playing both an influential and mitigating role. These factors encompass the behaviour of adult caregivers during viewing, the appropriateness of the content for the child's age, the level of interactivity of the screen, and whether the screen is in the background or actively engaged with. Depending on these factors combined, screen viewing can have positive, neutral, or negative effects on children's cognition under age 3 (Guellai et al., 2022[75]) and executive functions in children[4] under age 10 (Cucalon-Benito, Perez-Palao and Fernandez-Valero, 2023[76]).

Digital use begins to influence early childhood during a period of rapid brain development and heightened neural plasticity (Hutton et al., 2024[74]). Several socio-demographic characteristics, including a child's age, sex, socio-economic status, and temperament, also influence the brain's susceptibility to digital media. Higher screen use in very young children is mostly found to be associated with delayed language development,[5] working memory internalising and externalising behaviours[6] (Hutton et al., 2024[74]; Guellai et al., 2022[75]; Cucalon-Benito, Perez-Palao and Fernandez-Valero, 2023[76]; Eirich et al., 2022[77]). Excessive screen time in the first year of life may also cause delays in children's fine motor and communication and problem-solving skills (Takahashi et al., 2023[78]). Problematic media use, such as excessive preoccupation, sneaking media, or distress when media are removed, can develop in children as young as four, and be linked to negative cognitive outcomes, including hyperactivity and inattention (Kirkorian et al., 2025[71]).

Research indicates that the association between screen use and children's cognition may be weak only. For instance, a study using data from the French longitudinal cohort study of 13 763 children aged 2-5.5-years-old found generally negative associations with cognitive development that were small in magnitude. The study controlled for socio-demographic factors, birth outcomes, and lifestyle confounders (Yang et al., 2023[79]). Significantly, when adjusted for child cognitive scores at age 3.5, the negative association of screen use at age 3.5 in the child development index score at age 5.5 disappeared. This may suggest that the true causal effect of screen use on cognitive development is likely to be small. Together, with inconsistent effects across cognitive measures, the small size of the effects is unlikely to have major implications for children's cognitive development at the individual level. The authors suggest some degree of vigilance is justified, nonetheless.

The same study suggests that all types of screen activities do not have the same impact on child cognitive outcomes, and that, for instance, the effect of watching TV during meals on cognitive scores at age two was more than 10 times higher than the effect of a 1-hour increase in screen time daily. The main explanation for this finding is that having TV on in the background interferes with the quality and quantity of parent-child interactions that are crucial for language acquisition in early childhood.

The viewing context matters a lot. Screen viewing is associated with lower cognitive development when unsupervised, when the content is not age-appropriate, or when the screen is in the background and

with limited parent-child interactions (Guellai et al., 2022[75]). For example, a recently published Australian prospective cohort study found that at 12 and 36 months of age increases in screen time were associated with decreases in parent-child talk (adult words, child vocalisations, and conversational turns) across all variables and ages (Brushe et al., 2024[80]).

Joint media engagement, where adults co-use media with children, may support language development by providing opportunities for conversation, offsetting potential negative effects of digital media (Dore et al., 2025[70]). Laboratory studies show that children learn more from media when adults engage in conversations around the content. However, research indicates that parents often do not engage in language-rich conversations during media use, with language quality typically decreasing in favour of functional remarks about the media format. Reduced adult-child conversations may explain the negative link between television and preschoolers' language growth, highlighting adult language input as a critical factor for interventions. High-quality engagement, such as asking questions to enhance understanding, better supports language development. Well-designed media, like interactive e-books with prompts for parent-child interaction, can promote richer language exchanges. Media may also inspire discussions on related topics after use, further fostering language skills. However, technoference, including background television and adults' use of mobile devices during interactions with children, can disrupt parent-child interactions and negatively impact language development (Dore et al., 2025[70]). Parents frequently become distracted by digital devices, leading to reduced sensitivity and fewer verbal interactions. For instance, an experimental study showed that children failed to learn new words when a teaching moment was interrupted by a short phone call (Reed, Hirsh-Pasek and Golinkoff, 2017[81]). Technoference may hinder language development by disrupting key mechanisms like parental responsiveness, gaze-following, and joint attention (Dore et al., 2025[70]).

Outdoor play is also a factor that can mitigate the association between increased screen time and suboptimal neurodevelopment. One study supporting this idea comes from a longitudinal study conducted in Japan. It found that higher screen time at age two was associated with a decrease in daily living skills at age four. Frequency of outdoor play mediated 18% of this association. The study highlights the potential to mitigate the impact of screen time on communication skills through increasing the frequency of outdoor play (Sugiyama et al., 2023[82]).

Finally, an emerging line of research examines a potential association between exposure to screens and diagnoses of developmental cognitive disorders, such as Autism Spectrum Disorder (ASD). A few studies have been carried out to explore this issue, and a systematic review of 11 papers found an association between screen exposure and the risk of an ASD diagnosis (Sarfraz et al., 2023[83]). However, research on digital media effects in children with autism and/or ADHD is limited by small sample sizes, short-term studies, and a lack of demographic and longitudinal representation, often focusing on white, socioeconomically privileged populations in industrialised countries (Alper et al., 2025[84]). Studies frequently exclude children with intellectual disabilities or those who do not use spoken language, and they often rely on parental reports rather than child perspectives, providing an incomplete picture. Additionally, developmental age, rather than chronological age, may better explain technology use and content preferences for children with significant communication or intellectual challenges.

While media use rates for children with autism or ADHD are similar to or higher than those of neurotypical peers, their motivations, usage patterns, and sensory sensitivities differ, which can have varying impacts on their outcomes. For instance, autistic adolescents may prioritise use of digital media for entertainment over in-person social interaction (Alper et al., 2025[84]). Additionally, autistic children with limited social connections may use video games and social media to engage with peers with less pressure than what they experience during in-person interactions (Pavlopoulou, Usher and Pearson, 2022[85]; Alper, 2023[86]). However, individual use of digital media and mobile devices can be associated with social isolation, particularly when autistic children have limited opportunities for in-person

community engagement and recreational activities (Alper, 2023[86]). Further exploration with more longitudinal and observational data is needed to better understand these findings.

1. "Hot spots" in touchscreen applications and digital books refer to interactive areas in the content that respond to user input, such as tapping or swiping. These features are designed to engage users by offering additional information or actions, like highlighting a word when clicked or triggering animations. They are generally intended to enhance learning by focusing on key aspects of the content. However, their effectiveness depends on whether they support or distract from the main educational goals of the application or book.
2. Screen time is defined as the time spent in front of a screen, whatever its nature (i.e., television, computer, cell phone, video games, or tablet.
3. Passive screen time and active screen time are distinguished based on the use of electronic devices and the level of physical and cognitive engagement involved in the interaction with the screen. In passive screen time, there is little to no physical involvement or cognitive effort, and the individual does not actively engage with the screen (e.g., watching television). In contrast, active screen time requires greater cognitive and physical resources, as the individual interacts with what is happening on the screen (e.g., playing video games).
4. Executive functions in children a set of developing cognitive skills, including inhibition, working memory, cognitive flexibility, planning and organisation, and self-monitoring, that help children manage their thoughts, emotions, and behaviours to achieve goals.
5. Hutton et al. (2024[74]) note that there is conflicting evidence regarding the impact of digital media use on child language development, though younger ages appear to be at greater risk. Research suggests that infants learn phonemes through human interaction, not screen-based instruction, with mechanisms like social "gating" of speech cues and joint attention playing critical roles. Interpersonal interactions, such as shared book reading or play, support language acquisition by fostering social engagement and scaffolding that digital devices cannot replicate. Language development aligns with the maturation of white-matter tracts, which peak in plasticity during the first three years, emphasising the importance of nurturing human-mediated language experiences in early childhood.
6. Internalising behaviours refer to emotional or psychological struggles that are directed inward. These behaviours are often characterized by anxiety, depression, withdrawal, and low self-esteem. Children exhibiting internalising behaviours might seem shy or withdrawn, and they may have difficulty expressing their feelings. On the other hand, externalising behaviours are directed outward and are typically more visible and disruptive. These behaviours can include aggression, defiance, hyperactivity, and antisocial actions. Children who externalise their emotions might engage in confrontational behaviours, have difficulties with authority, or struggle with impulse control. This can lead to challenges in school and relationships due to the disruptive nature of their actions. In a systematic review and meta-analysis of 87 studies (98 independent samples) including 159 425 children 12 years or younger, Elrich et al. (2022[77]) found that greater duration of screen time was weakly but significantly correlated with externalising (e.g., aggression, inattention) and internalising (e.g., anxiety, depression) behaviour problems. The authors conclude that the correlations between screen time and child outcomes, such as language skills and academic performance, are comparable to those found in studies of other family and child factors (e.g., socioeconomic status) and internalising or externalising problems. While the effect sizes are small, their population-level impact could be significant, especially given that a large proportion of children under 5 years exceed recommended screen time guidelines (McArthur et al., 2022[87]).

Digital devices and attention deficits

For preschool and school-age children, the impact of screen time on their ability to concentrate and be attentive is emphasised as one of the primary risks that can affect children's learning. The available evidence in this area suggests that there is a correlation between screen time and attention difficulties, although causality is not always clearly established, and the mechanisms are not well understood (Box 4.4).

Box 4.4. Does digital technology affect children's attention and cognitive control?

Two recent systematic reviews on the impact of screen exposure on children's attention abilities and cognitive control suggest an association between excessive screen time[1] and attention difficulties of school-age children[7] (Santos et al., 2022[88]), and preschoolers[2] (Jourdren, Bucaille and Ropars, 2023[89]). Many studies find that high exposure to screens during early childhood is predictive of attention problems later in childhood, regardless of whether children watch TV, videos or play video games.[3] However the studies reviewed frequently do not properly account for important confounders, such as child temperament, parental education and parenting stress nor do they properly address the bidirectional relationship between screen use and attentional functions (Jourdren, Bucaille and Ropars, 2023[89]). For instance, some studies report that children with social-emotional and attention difficulties are exposed to mobile technologies by their parents to calm them. Other studies demonstrate that attention problems tend to precede pathologic gaming behaviours defined as the persistent and recurrent inability to control gaming habits (Ferguson and Ceranoglu, 2014[90]), and that screen time predicts lower scores on developmental screening tests but not the reverse. More research is therefore required to answer this important question.

The underlying mechanisms linking attention skills and screen time exposure are also still not well established. On one hand, some experimental evidence suggests the existence of neurobiological foundations. For instance, Horowitz-Kraus and Hutton (2018[91]) evaluated the connectivity between the language-related area and other brain regions, in children aged 8 to 12, during reading time and screen time. Screen time is negatively correlated with functional connectivity between brain regions related to language and visual and cognitive processing and control of the brain, whereas reading is related to greater connectivity in the same regions. For younger children, Hutton et al. (2020[92]) reported evidence from magnetic resonance imaging showing harmful links between screen time and the microstructural integrity of white matter tracts. These tracts are involved in executive functions, literacy, and other cognitive processes, including attention. Other determinants besides neurobiological factors also matter for the impact of screens on children's attention abilities and cognitive control including confounding factors (e.g. child sex, birth weight, gestational age, etc.) and also less-well-understood factors such as parental education, parental care, maternal primiparity, parenting stress, and child temperament (Jourdren, Bucaille and Ropars, 2023[89]). The context of screen use is also very important; there is significant improvement in children's visual attention after interventions involving interaction with people and exposure to screens (Santos et al., 2022[88]).

Marciano et al. (2025[93]) centred their review on evidence related to adolescents, highlighting that adolescence is a pivotal phase of brain development marked by significant changes in brain networks driven by both biological and environmental influences. During this time, socio-emotional reward processing networks mature earlier than cognitive control regions, leading to an imbalance that makes adolescents more susceptible to social influences and rewards. Cognitive control, the ability to regulate behaviour to align with goals, develops later, with the prefrontal cortex (PFC) playing a key role in this maturation. The PFC and other brain regions involved in cognitive and emotional regulation continue to develop into the mid-20s. This delayed development of cognitive control makes adolescents more sensitive to socio-affective information, such as rewards and peer influences, which can strongly affect their decisions and behaviour. Digital media use is particularly influential during windows of developmental sensitivity, which vary by sex and age, with common susceptibility observed in late adolescence around 19 years (Marciano et al., 2025[93]).

Research on the neural correlates of digital media use in adolescents is in its early stages, but findings suggest that frequent and problematic use is linked to diminished functional and structural connectivity in brain regions responsible for cognitive control, such as the default mode network (DMN) and central

executive network (CEN) (Marciano et al., 2025[93]). Simultaneously, increased activity in reward-related regions, like the striatum and ventral tegmental area (VTA), aligns with adolescents' preference for instant rewards, akin to the gratification of receiving "likes" on social media. Studies also indicate structural changes in areas like the prefrontal cortex, anterior and posterior cingulate cortex, and insula, which may heighten susceptibility to compulsive behaviours. Large-scale studies, such as the Adolescent Brain Cognitive Development (ABCD) study, have linked screen time to greater maturation of sensory-related brain regions but also found associations with externalising symptoms like rule-breaking and aggression. These findings underline the complex relationship between digital media use and adolescent brain development.

1. The studies in these reviews defined screen time in various ways, ranging from traditional activities like watching television and playing video games to broader definitions including computer use, tablets, and smartphones. Some studies used specific formats, such as predefined story video sessions, while others assessed daily touchscreen usage and the type of activity (e.g., gaming, educational programs). Definitions also varied in scope, with some including media and technology use like texting and online activities but excluding TV or video games in certain cases.
2. Jourden et al. (2023[89])'s review included five cross-sectional studies: all reported significant, positive associations between high levels of screen exposure and attention difficulties. High levels of screen exposure were defined in various ways, including time spent watching TV, miscellaneous screen use, or regular use of mobile devices (>1 hour/day) compared to non-regular use. Ten longitudinal studies were included: six found a significant impact of earlier screen exposure on subsequent attentional function and four found no relationship. For example, Christakis et al. (2004[94]) showed that television viewing at ages one and three had a proportional impact on attention problems at age seven. Several other studies, including Cheng et al. (2010[95]), Gueron-Sela and Gordon-Hacker (2020[96]), and Verlinden et al. (2012[97]), found a positive link between screen exposure at 18 months and higher attention difficulties at various later ages. Tamana et al. showed that children exposed to more than two hours of screen time at age three had significantly higher inattention scores at age five. However, four studies found no significant association between screen time and attention problems. Eight of the studies included evaluated the direction of the relationship between screen exposure and attentional difficulties: seven suggested the relationship is bidirectional.
3. Most studies analysed by Santos et al. (2022[88]) found associations between exposure to different types of screen-based devices and attention in children. For instance, Swing et al. (2010[98]) found that watching television and playing video games similarly were correlated with attention outcomes in children from 4 to 8 years old and late in adolescence. Gueron-Sela & Gordon-Hacker (2020[96]) suggest a decrease in attention skills in young children when considering the total screen time exposure. However, a survey conducted with Japanese children (Sugawara et al., 2015[99]) found no relationship between screen time and attention problems, contrasting with other findings.

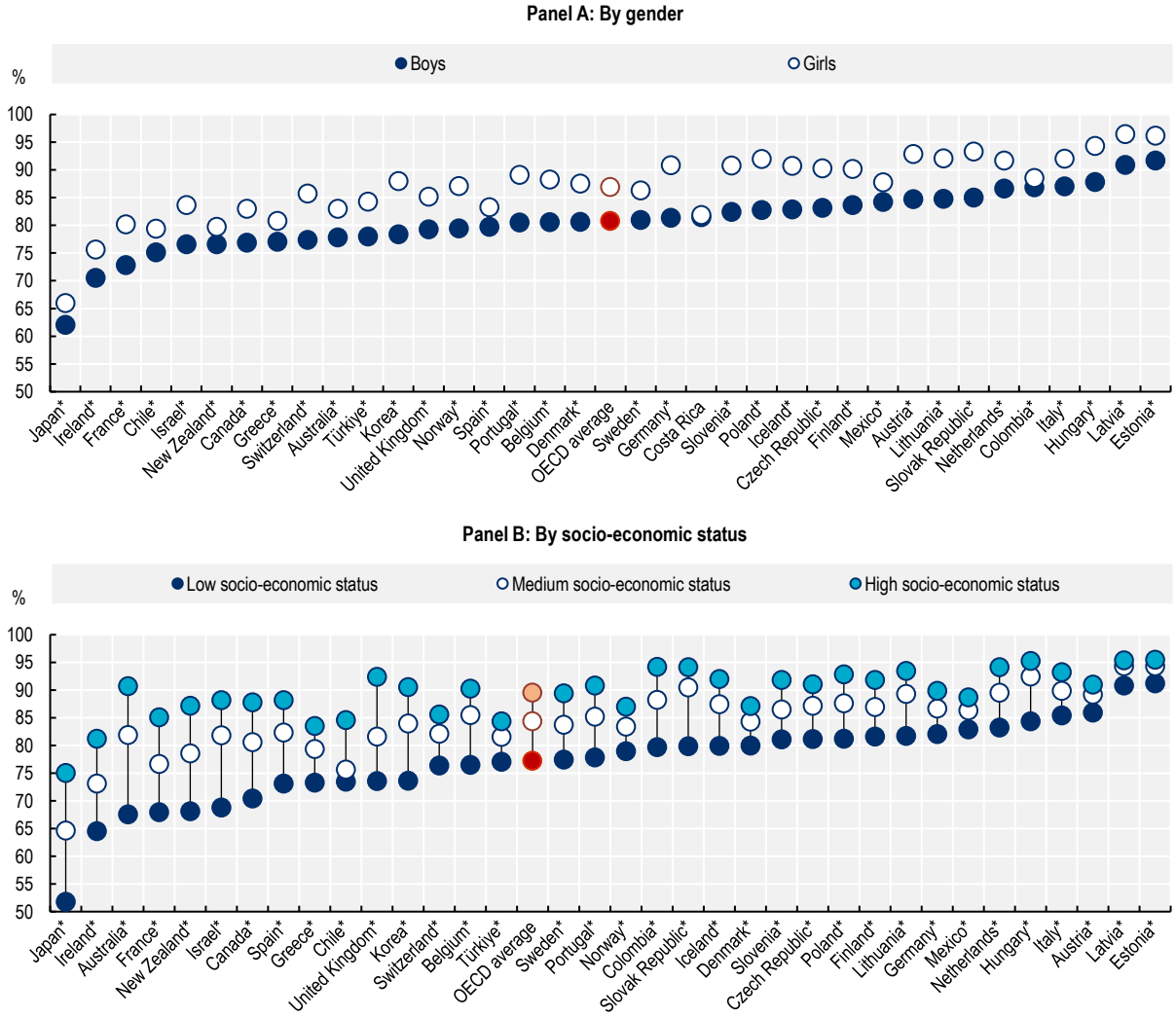
Digital resources for learning inside and outside school

Digital technologies and media offer diverse resources that enhance access to educational content, creating opportunities to positively influence both school-based and family-based learning (Barr, 2019[100]). The resources that offer these opportunities can include educational apps, e-learning platforms, or interactive learning materials. However, adolescents from more advantaged socio-economic backgrounds tend to benefit more from moderate levels of digital use and from engaging in learning-oriented digital activities than their counterparts with lower socioeconomic status (Bohnert and Gracia, 2022[101]).

PISA data show large disparities in the proportion of 15-year-olds who spend two hours or more per week using digital devices to learn something outside of school (e.g., consulting tutorials or using educational applications), depending on gender (Figure 4.1, Panel A) and socio-economic status (Panel B). More girls than boys use digital resources to learn outside of school, with an average difference of 6 percentage points. Teenagers from high socio-economic backgrounds are 16% more likely to use digital resources for learning purposes than their peers from lower backgrounds. In Japan, girls and boys make the least use of digital resources for learning during the week, and the disparities according to socio-economic status are very significant. Conversely, over 96% of girls and 92% of boys use digital resources for learning in Estonia.

Figure 4.1. Most adolescents use digital devices for learning, especially girls and those from high socio-economic backgrounds

Percentage of 15-year-old students who report spending over two hours per week using digital resources for learning activities outside of school



Note: *The difference between boys and girls, and students with high and low socio-economic status is statistically significant at the 5% level. 15-year-old students were asked two questions: "This school year, about how many hours a day do you usually use digital resources in the following situations? (Please think of different kinds of digital resources such as desktop computers, laptops and tablets as well as educational software and other digital learning tools.)" with respect to 1) "For learning activities before and after school" and 2) "For learning activities on weekends". For each question, they were presented with response options ranging from "None", "Up to 1 hour" to "More than 6 hours and up to 7 hours" and "More than 7 hours". The mid-points of the response categories were used to sum total use for learning outside of school per week per student, assuming 5 weekdays and 2 weekend days. Data refer to the percentage of students with values greater than 2 hours per week.
Source: OECD Secretariat calculations based on OECD (2022[102]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/bdhu5p

The use of digital tools for learning at school expanded in many countries following the COVID-19 crisis. On average in the OECD, 15-year-olds spend two hours per day on digital devices for learning at school, on top of the five hours spent in standard teaching. Whether the use of digital tools in the classroom is conducive to better learning outcomes is open to debate; digital tools can be a means of engaging in more interactive learning, yet they can be a source of distraction in the classroom that can be detrimental to learning.

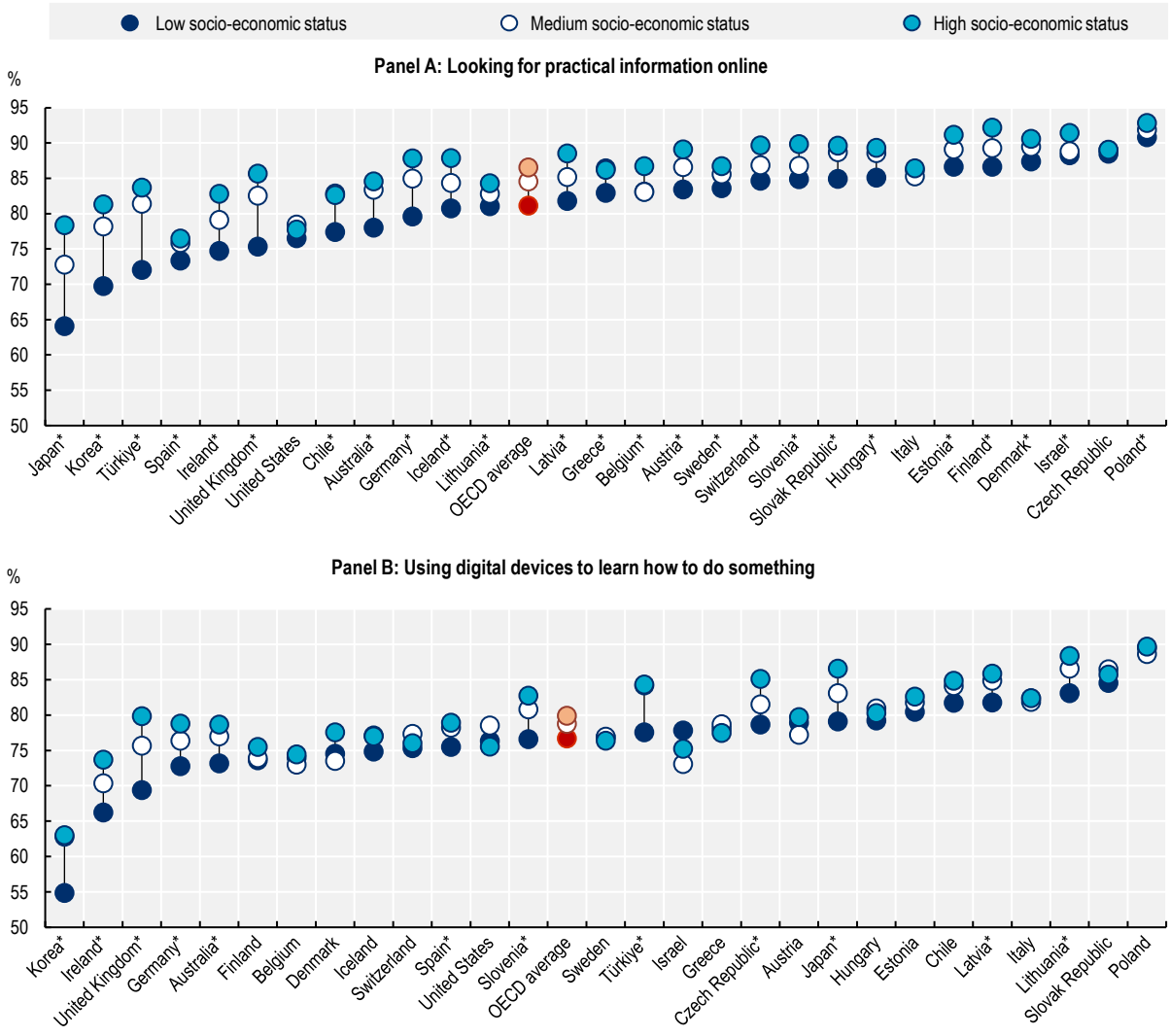
PISA 2022 data suggest a positive association between academic performance and moderate use of digital technology for learning activities. On average across the OECD, 15-year-olds who dedicated up to one hour per day to digital learning activities at school scored 14 points higher in mathematics compared to those who did not, even after adjusting for the socio-economic backgrounds of both students and schools. This positive association is evident in more than half of all countries with available data (OECD, 2023[103]). The relationship between digital devices and learning outcomes turns negative when more than one hour per day is spent on digital devices for learning at school. These relationships are not straightforward to interpret, as top-performing students may be subject to stricter rules regarding digital tool usage (top-performing students are more likely to have up to one hour of digital time for learning or leisure at school) (OECD, 2024[104]). Interestingly, top-performing students are more likely to spend up to five hours on digital leisure activities before and after school, whereas those with the lowest performance in mathematics are more likely have none or only up to one hour of digital leisure time outside of school[8] (OECD, 2024[104]). This suggests that substantial amount of digital time for leisure activities outside of school has become a widespread practice, even among students with good academic results. However, a more detailed analysis that distinguishes digital time by activity type would be essential, as students with stronger academic performance likely exhibit distinct digital activity profiles. A systematic review of 58 cross-sectional studies found that television viewing and video game playing – but not overall screen media use – were inversely associated with the academic performance of children and adolescents (Adelantado-Renau et al., 2019[105]).

Digital devices can be a source of distraction in the classroom, with consequences for learning outcomes. On average across OECD countries, around 30% of 15-year-olds report that, in most or every mathematics lessons, they get, distracted by other students using digital devices. Twenty-five percent of 15-year-olds get distracted by others using digital devices in most or every lesson (OECD, 2023[103]). Those students who reported being distracted by classmates using digital devices during mathematics lessons scored 15 points lower in mathematics in PISA than those who reported being rarely or never distracted, even after socio-economic factors were taken into account for both students and schools.

Children need digital skills to foster their ability to seek information online for homework and also for everyday purposes. PISA data show that 15-year-olds' use of digital tools for searching for practical information varies substantially, both across countries and within countries based on socio-economic status (Figure 4.2). Searching for practical information during a typical week is much less frequent in Japan (around 72% of 15-year-olds do so) and most frequent in Poland (92%). Significant differences according to socio-economic status are noticeable, with an average of 81% of adolescents of low socio-economic status and 87% of adolescents of high socio-economic status looking for practical information online at least weekly (Figure 4.2, Panel A). Socio-economic status influences the use of digital devices for learning during leisure time in some countries. For instance, in Japan and Lithuania, a relatively high percentage of 15-year-old students from high socio-economic backgrounds report using digital devices for this purpose (Figure 4.2, Panel B).

Figure 4.2. 15-year-olds with higher socioeconomic status are more likely to search for information online

15-year-old students who report engaging in digital leisure activities during a typical week, by socio-economic status



Note: *The difference between students with high and low socio-economic status is statistically significant at the 5% level.
15-year-old students were asked "During a typical weekday/weekend day, how much time do you spend doing the following leisure activities?" Panel A: "Look for practical information online (e.g. find a place, book a train ticket, buy a product)" and Panel B: "Read, listen to or view informational materials to learn how to do something (e.g. tutorial, podcast)". For both questions, students were presented with the response options "No time at all", "Less than 1 hour a day", "Between 1 and 3 hours a day", "More than 3 hours and up to 5 hours a day", "More than 5 hours and up to 7 hours a day", "More than 7 hours a day". Data refer to the percent responding to look for practical information online on a typical weekday and/or on a typical weekend day.
Source: OECD Secretariat calculations based on OECD (2022[102]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/swv2he

Digital technologies and the development of soft skills

In addition to school-based learning, the growing presence of digital technologies in childhood can foster the development of "soft skills",[9] including self-questioning, self-monitoring, problem solving and critical thinking. For instance, a literature review by Haddock et al. (2022[106]) reports evidence that, for adolescents, video games can support perceived control and agency, foster initiative, and provide opportunities to virtually experience different identities and situations that can promote self-exploration and goal adoption. Benefits of video games are also identified on learning outcomes such as self-efficacy, knowledge retention, learning motivation, and collaborative skills (Clark, Tanner-Smith and Killingsworth, 2016[107]). Social media use is also found to be linked to key developmental processes in adolescence, namely attachments outside the family, identity, attention, and emotional regulation, and can be a way to enhance adolescents' self-actualization (Shankleman, Hammond and Jones, 2021[108]). Gaining digital skills is also found to have other beneficial outcomes, such as orientation to technology, coping behaviours and civic participation (Livingstone, Mascheroni and Stoilova, 2023[109]).

Research suggests a negative relationship between digital media exposure and children's creativity and imaginative play, particularly with receptive media like television and videos (Richert et al., 2025[110]). Heavy television viewing has been linked to reduced pretend play, and greater time with digital media correlates with decreased mental imagery, even after accounting for factors like memory and vocabulary. Technological distractions, such as background television or parental use of mobile devices ("technoference"), can diminish the quality and quantity of both solitary and parent-child play. One potential mechanism is that media may disrupt the mental focus required for imagination, though this has not been directly tested. However, the content of programmes and games also matters; children inclined toward imaginative play often gravitate to educational programs that may foster creativity, raising questions about the role of media content and child temperament in shaping imagination (Richert et al., 2025[110]).

Access to the Internet, video games, art education platforms and apps, tutorials, etc. offer opportunities for creativity,[10] self-expression, and artistic development. Some evidence suggests that when accompanied by appropriate scaffolding and support, the inclusion of digital technologies in early learning settings provides opportunities for children to demonstrate personal choice and freedom, to exercise their curiosity, as well as to proactively experiment practices and solution when playing, creating content or learning to code (Marsh et al., 2018[111]; Fielding and Murcia, 2022[112]). By fostering interactivity and trial-and-error play, with an attractive and fun design, digital tools help children learning to think in a solution-oriented way and find original problem-solving strategies (Ott and Pozzi, 2012[113]).

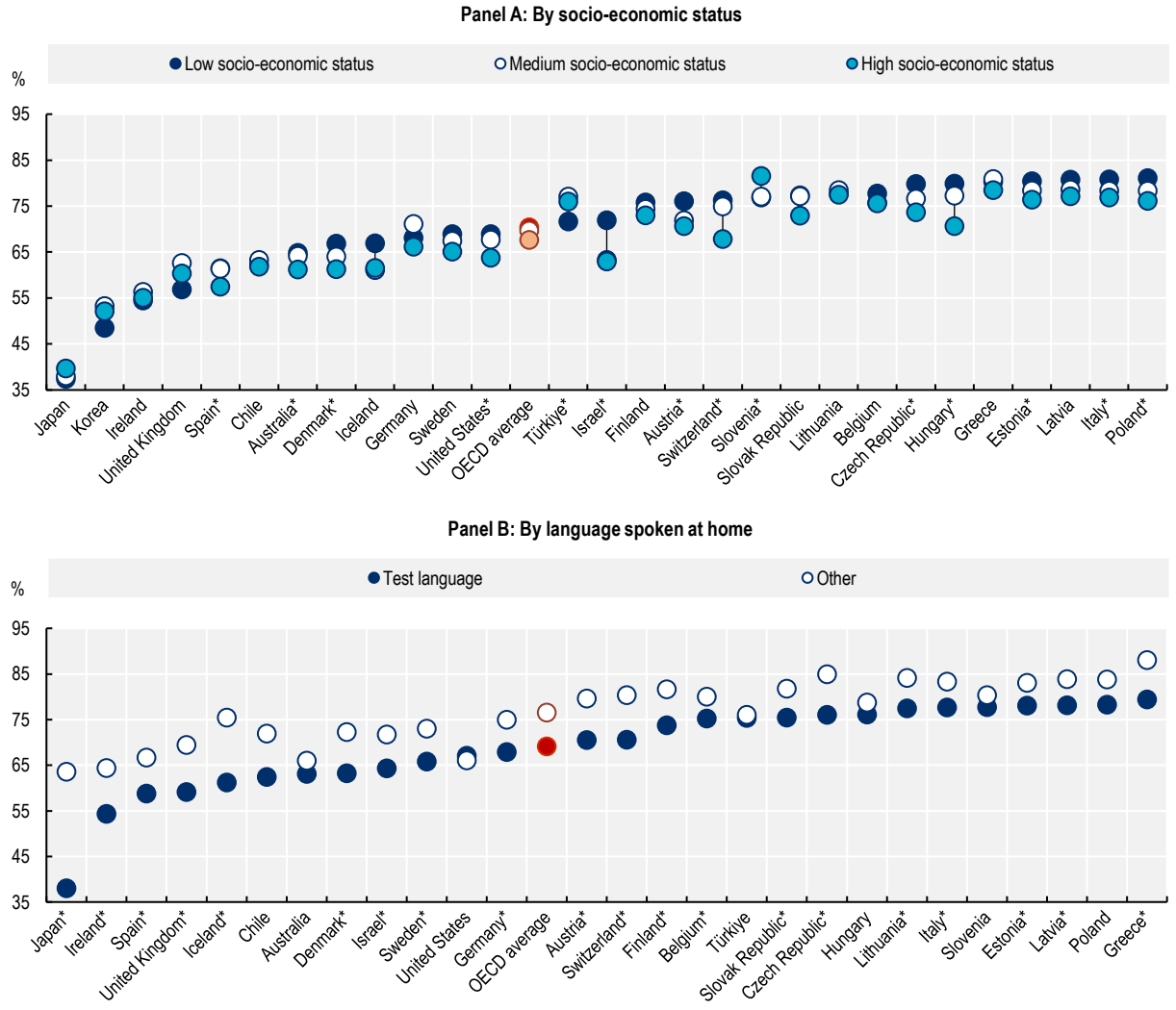
International data on children's creative online activities is scarce. The Global Kids Online Survey asked children aged 9 to 17 how often they had engaged in two creative activities: creating their own videos or music and uploading them to share, and creating a blog, story, or website online. Depending on the country, between 10% and 30% of Internet-using children reported participating in creative online activities weekly (Kardefelt Winther, Livingstone and Saeed, 2019[114]). Finally, digital skills help children to become more creative and innovative. Through digital media and technology, young people can express themselves and share their ideas with the world. Whether it's creating a video, designing a website, or programming an app, digital skills can unleash the children's creativity and enable them to make a positive impact on their communities and the world.

According to PISA data, around seven out of ten 15-year-old students use their digital resources during leisure time to create or edit personal digital content, such as pictures, videos, music, or computer programs. However, there are substantial variations across countries (Figure 4.3). Within countries, differences based on socio-economic status are generally small (Panel A). It is also noticeable that in most countries where differences do exist, children of lower socio-economic status tend to engage in this type of activity more frequently than others – with some exceptions as for instance in Türkiye (Figure 4.3, Panel A). Consistently across countries, children from migrant families (identified here by the fact that the teenager does not speak the language of the PISA test at home) are more likely to create or edit their own

content than others (Figure 4.3, Panel B). This is possibly due to the fact that digital resources offer a particularly valuable opportunity for migrant populations to express their cultural heritage,[11] connect with their community (Katz, 2010[115]), as well as to maintain ties with their home countries while helping them integrate in their new countries[12] (Diminescu, 2018[116]; McAuliffe, Blower and Beduschi, 2021[117]).

Figure 4.3. Most 15-year-olds create their own digital content, especially children with a migrant background

15-year-old students who report creating or editing their own digital content during a typical week



Note: *The difference between students with high and low socio-economic status, and between groups according to the language spoken at home is statistically significant at the 5% level.

15-year-old students were asked "During a typical weekday/weekend day, how much time do you spend doing the following leisure activities? ... Create or edit my own digital content (pictures, videos, music, computer programs)", and presented with the response options "No time at all", "Less than 1 hour a day", "Between 1 and 3 hours a day", "More than 3 hours and up to 5 hours a day", "More than 5 hours and up to 7 hours a day", "More than 7 hours a day". Data refer to the percent responding to create or edit their own digital content on a typical weekday and/or on a typical weekend day.

Source: OECD Secretariat calculations based on OECD (2022[102]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/fl7e3k

Finally, digital tools and the Internet provide children and adolescents with the opportunity to explore things beyond what is accessible in the physical world and to be exposed to diverse perspectives and views which may not be present among their circle of friends and peers. A 2018 Pew Research Center survey of U.S. teens aged 13 to 17 found that about two-thirds of teenagers believe that these platforms facilitate interactions with individuals from various backgrounds, enable exploration of differing viewpoints, and allow for expression of support for causes or issues (Anderson and Jingjing, 2018[118]). Moreover, 77% indicate that they have participated in online groups and forums at some point and that it confronts them with greater diversity, helping them to connect with their friends and interact with others who share similar interests.

4.3. Children's social and emotional well-being and mental health

Strong debate centres around the issue of the impact of the digital environment on child social-emotional development (Table 4.3), especially on rising levels of poor mental health. There are a lot of concerns that digital transformation has dramatically – and negatively – changed the face of modern childhood and made the transition into young adulthood even more arduous. Young people today have disproportionately poorer mental health outcomes than in the past. Evidence for several OECD countries shows a deterioration in youth mental health since the early 2010s, which has gotten worse again since the COVID-19 pandemic (The Lancet Psychiatry Commission on youth mental health, 2024[119]; Stevens, 2024[120]; Cosma et al., 2024[121]). Usage of digital technologies features heavily as a factor coinciding with this decline (Odgers and Jensen, 2020[122]). However, the evidence base linking digital technology use to poorer mental health is not definitive. Research often shows only moderate effects and is mainly correlational, and therefore lacking clear causal relationships. While some studies suggest negative impacts, others indicate some positive effects or no effects for the majority of adolescents.

Table 4.3. Opportunities and risks of the digital environment on children's emotional, psychological and social well-being

Opportunities	Risks
Opportunities for fun, feeling connected and help developing self-identity *Online communities, social networks, and collaborative tools enable young individuals to connect with peers, share ideas, and engage in meaningful social interactions.* *Social media can be useful to temper feelings of loneliness.* *Minority communities (e.g. LGBTQIA+) may have access to an online supportive community*	**Excessive time, and problematic use of digital technologies** *Prolonged use and loss of control over digital social media use or digital gaming can lead to addiction-like behaviours and be associated with higher feelings of depression, stress, loneliness, and lower self-esteem.* **Exposure to inappropriate (harmful) contents, contacts and conducts online.** Can adversely affect children's mental health and well-being by increasing risks of anxiety, depression, low self-esteem, and emotional distress.

Garnering attention is the idea of the "great rewiring of childhood" which posits that digital technologies have rewired children's brains and caused an epidemic of mental illness. According to Haidt (2024[13]), the widespread use of smartphones, social media, and digital technologies has fundamentally altered childhood by reshaping how kids interact, learn, and develop emotionally. This rewiring operates by immersing children in online environments that encourage constant social comparison, fear of missing out, and exposure to unfiltered content, leading to rising rates of anxiety, depression, and social disconnection among Generation Z adolescents (i.e., those born in the early 2000s). Certainly, digital devices can have downsides for child social and emotional well-being, especially when usage becomes excessive, uncontrolled, interferes with daily life and takes children away from their other activities (Nutley and Thorell, 2022[123]). The risks children can encounter online, such as cyberbullying and offensive messages and

content, have known and recognised negative impacts on child and adolescent social-emotional development (section 3.3). Nonetheless, associations are correlational, and when long-term links are identified, they suggest that social media use does not predict or cause depression. Instead, it is suggested that causality may be revered or bidirectional; young people with pre-existing mental health issues tend to use these platforms more frequently or in more problematic ways than their peers, which may further exacerbate their initial well-being issues (Odgers, 2024[14]; Heffer et al., 2019[124]). Furthermore, what is behind the upsurge in poor child and adolescent mental health is more complicated than the changes associated with digital transformation, with many established genetic, environmental and economic factors, and indeed children and young people's level of confidence in the future, coming into play (Odgers, 2024[14]). Overall, while evidence indicates some negative associations between digital technology use and adolescent socio-emotional well-being, these links are modest and do not strongly suggest that technology is the main driver of the rise in youth mental health issues.

Global impact of the digital world on social and emotional well-being

Clear empirical evidence is still lacking to determine whether overall, and in which circumstances, the benefits of children's access to digital technology for their social-emotional well-being and mental health outweigh the negative experiences that children may encounter online. When the use of digital tools is considered globally, some studies point to a low-magnitude negative association with subjective well-being outcomes. However, these associations are not consistently confirmed when looking at individual trajectories based on longitudinal data, which suggests that poorer psychological well-being is likely to be a cause behind problematic use of digital devices more than its main consequence (Dienlin and Johannes, 2020[125]; Orben and Przybylski, 2019[20]).

Five reviews of findings suggest that most research to date has been correlational, and has generated a mix of often conflicting small positive, negative and null associations between the use of digital technologies by adolescents and socio-emotional and mental health outcomes (Dienlin and Johannes, 2020[125]; Odgers and Jensen, 2020[122]; Hancock et al., 2022[126]; Ferguson et al., 2021[127]; Gabrielle, Sonne and Indolo, 2024[128]),(Box 4.5). Although the results argue against population-level harms, more detailed analyses regarding specific platforms, technologies, and demographic groups may yield more nuanced answers. It is also suggested that the influence of digital technologies, if any, varies based on the type of use (Dienlin and Johannes, 2020[125]). For instance, procrastination and passive activities (e.g., web surfing) are linked to more negative effects, while social and active uses aimed at creating meaningful social connections are linked to more positive outcomes. Taken as a whole, digital technology use seems to have a stronger impact on hedonic well-being (e.g., negative effect) than on eudemonic well-being (e.g., life satisfaction). It also appears that both low and excessive use are related to decreased well-being, whereas moderate use is related to increased well-being (Dienlin and Johannes, 2020[125]).

Taking video gaming as an example, the available evidence suggests an association with positive emotional experiences for engaged children. Scientific evidence suggests that video games can help promote mental "healthiness", support perceived control and agency, relieve stress and create contexts that can help satisfy basic psychological needs (e.g.; competence, autonomy, relatedness) (Haddock et al., 2022[106]). However, the evidence suggests great variability in the associations according to the intensity of involvement in video-gaming. For instance, Przybylski (2014[129]) investigated the link between video game engagement and psychosocial adjustment (including prosocial behaviour, life satisfaction, and internalizing and externalizing problems) in a longitudinal sample of 4 899 children aged 10-15 from England, Northern Ireland, Scotland, and Wales. The study found small but statistically significant positive associations between low levels of video game play (less than one hour per day) and better psychosocial adjustment, such as higher life satisfaction and prosocial behaviour, along with fewer peer problems and emotional issues. In contrast, longer periods of video gaming were associated with no or negative outcomes.[13]

The influence of contextual factors emphasises the need for a nuanced, context-specific approach to understanding the impact of social media on adolescent mental health and identifying which factors increase certain adolescents' vulnerability to the negative effects of digital technologies. For example, older adolescents (around age 16 and over) and girls tend to be more susceptible to the harmful effects of social media, particularly when pre-existing vulnerabilities, such as poor-quality offline relationships or a lack of a supportive family environment, are present (Gabrielle, Sonne and Indolo, 2024[128]), (Box 4.5). Adolescents with pre-existing mental health issues, including anxiety or depression, are also especially prone to the detrimental impacts of cyberbullying and online harassment. Conversely, protective factors can help adolescents mitigate these negative consequences. Adolescents who use active coping strategies, such as seeking support from trusted adults or blocking harassers, and have well-developed online social relationships often fare better than those who adopt passive or avoidant strategies (Gabrielle, Sonne and Indolo, 2024[128]; De Coninck, Waechter and d'Haenens, 2023[130]).

Understanding how motivations for using social media shape perceptions of its outcomes is crucial, as these effects may not always align with expectations. For instance, adolescents who use social media to make new friends or feel connected to others may experience higher levels of depression and anxiety compared to those who have different motivations (Gingras et al., 2023[131]). This could be because their expectations for social media to alleviate feelings of isolation are higher than when it is primarily used for accessing information or entertainment.

It is important to recognise that the need to strengthen policies does not hinge on digital media being the sole or primary cause of mental health deterioration to warrant concern. Similarly, digital media does not have to directly improve mental health to be considered beneficial. Even if digital media use is one of many contributing factors, it may still justify policy interventions to regulate usage. Moreover, as highlighted in the detailed review of evidence below, the effects of digital media vary depending on the nature of its use, including the motivations behind it and the types of interactions and engagement occurring on platforms and apps. These dynamics can be difficult to measure accurately with current assessment tools. In particular, extreme cases are especially challenging to capture, such as when a young person experiencing suicidal thoughts gains rapid access to content about suicidality that may encourage harmful actions.

Emphasising the interaction between digital behaviour and pre-existing vulnerabilities is crucial for understanding how digital practices, including problematic Internet and media use, evolve and affect well-being (Gabrielle, Sonne and Indolo, 2024[128]). Additionally, it is essential to integrate insights from professionals working with young people, parents, and, importantly, young people themselves, especially those involved in the most serious cases. These perspectives can help identify vulnerability factors and uncover the underlying dynamics at play.

Box 4.5. Digital tech and adolescent mental health: What do evidence reviews say?

In their meta-analysis of studies on the link between digital technologies and adolescent mental health, Odgers and Jensen (2020[122]) found that the evidence in this area is mainly correlational, with a range of small, often conflicting positive, negative, and null associations. Recent large-scale, preregistered studies – among the most rigorous to date – report small links between time online and adolescents' well-being. Moreover, these associations do not clarify whether digital use causes changes in well-being or vice versa, and the authors considered that, due to their limited size, the estimated associations are unlikely to have meaningful clinical significance. In addition, they point out that most of the evidence has focused on the negative effects, and that it is necessary to investigate further whether digital technologies are a valuable source of social support or are required to build digital and interpersonal (digitally mediated) skills for the economies of the future.

The meta-analysis by (Ferguson et al., 2021[127]) explores what substance lies behind claims that screen media is driving the decline in mental health, in particular the rise in suicide among teen girls in the United States and other countries. It finds that concerns about screen time and mental health are not based in reliable data, concluding that no robust data exist to suggest that screen time is associated with, let alone a cause of mental health problems. Screen media, both smartphones and social media considered together and individually, are found to play little role in mental health concerns and statistically significant effects are likely to be explained by systematic methodological flaws rather than true effects. The authors warn that misplaced attention on managing screen media as a primary strategy could distract attention from addressing well-established causes of mental health decline, such as economic issues, family stress and bullying, and lead to the positive aspects of technology being overlooked or negatively impacted.

Similar conclusions are drawn by Hancock et al. (2022[126]) in a meta-analysis of studies on the link between social media use and psychological well-being. The authors found no overall association with subjective well-being, but identified small yet significant associations on specific aspects, such as slight increases in anxiety, depression, and social well-being. These effects varied based on factors like population cohort, geographic region, study methods, and the type of social media use. Overall, their findings align with large-scale studies, highlighting small links between social media use and well-being, with a trade-off between higher depression and anxiety and enhanced social well-being.

Gabrielle et al. (2024[128]) conducted a review of 45 studies covering 153 285 adolescents (from age 10 to 19), suggesting that increased social media use (measured by frequency and duration per day or week), is associated with a range of negative mental health outcomes in adolescents. However, the effects are small, and several moderating factors highlight the importance of adopting a nuanced, context-specific approach to understanding the impact of social media on adolescent mental health. Specifically, the meta-analysis revealed small but statistically significant associations between increased social media use and heightened depressive symptoms ($r = 0.12$), anxiety ($r = 0.10$), and loneliness ($r = 0.15$). Additionally, a significant negative association was found between social media use and self-esteem ($r = -0.08$).

The analysis also identified several moderators of these effects, including gender, age, and type of social media platform. Older adolescents (age 16 to 19) and girls appear more vulnerable to the negative effects, particularly when combined with pre-existing vulnerabilities such as low-quality offline relationships or unsupportive family environments. The authors further concluded that how adolescents cope with online harassment or cyberbullying significantly influences its impact. Those who engage in active coping strategies, such as seeking help from trusted adults or blocking the perpetrator, may fare better than those who resort to passive or avoidant coping strategies. Adolescents with pre-existing mental health conditions, such as anxiety or depression, may be particularly vulnerable to the negative effects of cyberbullying and online harassment.

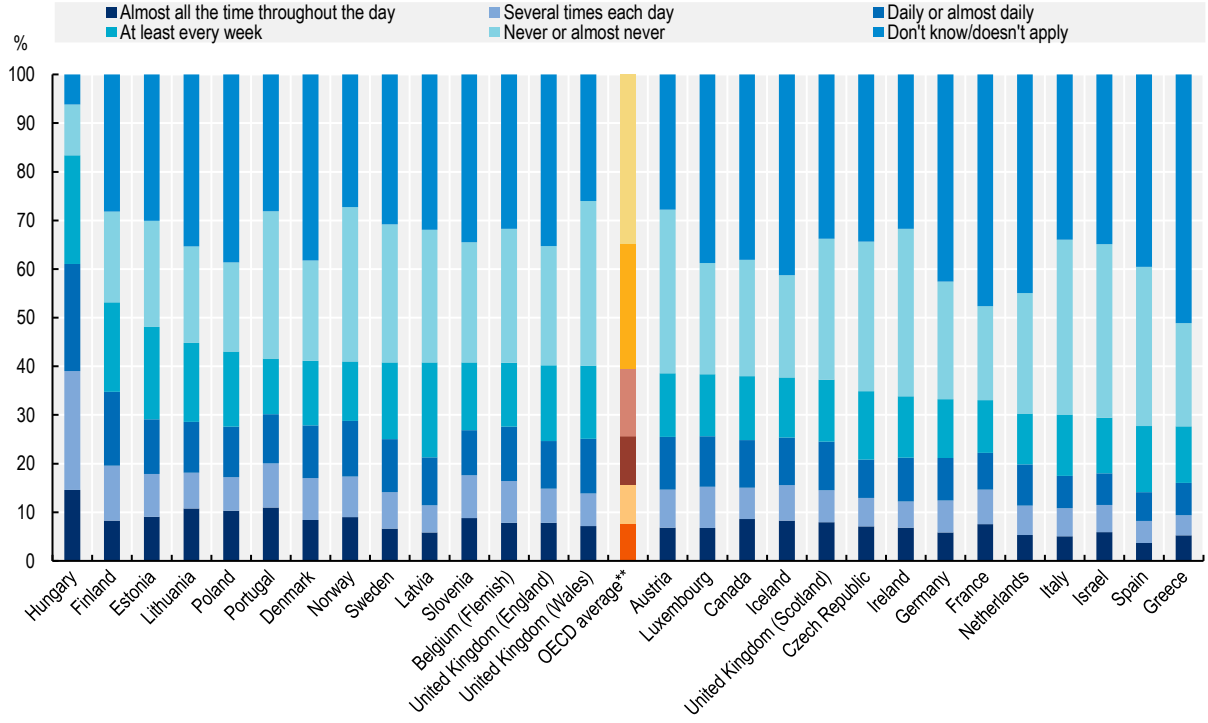
In their review of evidence on digital media and brain development in adolescence, Marciano et al. (2025[93]) underline that the pervasive nature of negative online experiences, coupled with their still-developing affective cognitive control system, leaves adolescents less equipped to manage strong negative emotions, especially if they have mental health disorders. While screen time may correlate with negative outcomes, it is often part of broader underlying issues, such as mental health challenges. Additionally, adolescents' heightened sensitivity to peer influence and group norms amplifies their emotional responses and activates socio-affective brain regions when processing social information.

Digital technologies as a driver of social connectedness?

Children's social and emotional well-being depends to a great extent on the quality of their relationships with friends and families (OECD, 2021[132]). Digital technologies, in particular social media, offer children opportunities to stay in contact with friends and families and to establish new social connections. Children can find support online that may be unavailable in the physical world, through specialised help sites or connections made on social networks. Social media also provides opportunities to connect with peers, share ideas, seek advice and social support, reduce loneliness and engage in quality friendship relationships (Burns and Gottschalk, 2019[4]; Scott et al., 2024[133]; Jones et al., 2023[134]; Angelini, Marino and Gini, 2023[135]; Odgers and Jensen, 2020[122]). Some of these friendships are "only online". Across the OECD, 40% of 11- to 15-year-olds have friends they met online and communicate with at least once a week or more (Figure 4.4).

Figure 4.4. Four in ten children have regular online contact with friends they met online

11-, 13- and 15-year-old school children who report on the frequency of their online contact with friends that they got to know through the Internet but didn't know before



Note: **The OECD average includes all countries depicted in the figure except Belgium and the United Kingdom.
Children were asked "The next question is about 'online contact' and 'online communication'. When we use these terms, we mean 'sending and receiving text messages, emoticons, and photo, video or audio messages through instant messaging (e.g. WhatsApp, Snapchat), social networking sites (e.g. Instagram, TikTok) or video calling (e.g. Zoom). How often do you have ONLINE contact with ... Friends that you got to know through the Internet but didn't know before?" and presented with the response options displayed in the graph.
Source: OECD Secretariat calculations based on WHO (n.d.[136]), *Health Behaviour in School-aged Children (HBSC) World Health Organization Collaborative Cross-National Survey 2021-22*, https://hbsc.org/about/.

StatLink https://stat.link/798epb

Online friendships can enhance adolescents' sense of companionship, especially for socially isolated teens, and may partially compensate for difficulties with offline peer interactions. Some evidence also suggests that social media features are primed for enhancing friendship quality. First, adolescents who see social media as a way to frequently and quickly connect with many people, especially peers, report higher satisfaction with the support they receive from friends and a greater sense of companionship (Angelini, Marino and Gini, 2023[135]; Nesi, Choukas-Bradley and Prinstein, 2018[137]). This could be because the wide visibility and accessibility of online interactions increase opportunities for both giving and receiving support. Additionally, social media helps maintain communication with distant friends and fosters online-exclusive friendships, enhancing feelings of companionship. Second, social media communication is asynchronous, allowing individuals to respond at their own convenience rather than in real-time. This may provide adolescents with greater flexibility to manage conflicts effectively compared to real-world interactions, by allowing for thoughtful responses and reducing the immediacy of face-to-face interactions. (Yau and Reich, 2019[138]).

A review by Charmaraman et al. (2025[139]) notes that while large-scale studies suggest a small negative relationship between social media use and social connection, methodological issues – such as inconsistent definitions and reliance on cross-sectional data – limit conclusions. Emerging research shifts focus from overall "screen time" to specific social experiences like self-presentation, social comparison, and peer feedback, highlighting their varied impacts on different adolescents. Recent experimental studies have shown that adolescents receiving negative peer feedback on social media, such as receiving fewer "likes," experience increased negative emotions and feelings of rejection. Additionally, youth with prior experiences of offline peer victimization may be particularly vulnerable to the impact of such negative feedback (Lee et al., 2020[140]).

At the same time, social media platforms can offer valuable opportunities for young people to connect with peers, receive social support on challenging topics, and help foster a sense of community around marginalised interests and identities (Ito et al., 2020[141]; Charmaraman et al., 2025[139]). A strength of the Internet and digital devices is to facilitate connections with friends and other peers, providing opportunities for communication, collaboration, and shared interests. For instance, a survey conducted in 2018 in the United States, reported that 81% of teens say social media makes them feel more connected to what's going on in their friends' lives, with 37% saying it makes them feel "a lot" more connected (Anderson and Jingjing, 2018[118]). Similarly, about seven in ten teens say these sites make them feel more in touch with their friends' feelings (69%), that they have people who will support them through tough times (68%), or that they have a place to show their creative side (71%).

Recent research suggest also that social media and digital communication may help to overcome loneliness, including for an important number of children who find it easier to be themselves online than face-to-face (Siva, 2020[142]). However, the extent to which the Internet and related media can help people have better interpersonal interactions and reduce loneliness depends on how digital services are used; when they are used to enhance existing social relationships and develop new social connections, they are a valuable tool for reducing loneliness (the "stimulation hypothesis"), but when they are used to escape from the social world and withdraw from social interactions, they will increase feelings of loneliness (the "displacement hypothesis") (Nowland, Necka and Cacioppo, 2018[143]; Masur, 2021[144]). Moreover, whether digital connections can reduce feelings of loneliness and other negative emotions is an open question. Some evidence suggests that the use of digital technologies can help temper negative feelings in a day. However, this recovery may be short-lived, as digital emotional regulation can also be associated with increased negative emotions, loneliness, and greater use of digital technologies by the following day (Scott et al., 2024[133]).

The Internet and social media can provide minority groups, whether due to their origin or sexual orientation, with ways to find information and connect with others in similar situations. A review of evidence suggests that social media may support the mental health and well-being of LGBTQIA+ youths through peer connection, identity management, and social support (Berger et al., 2022[145]). LGBTQIA+ youth frequently use social media to connect with LGBTQIA+ communities. Qualitative studies suggest that these youths explore their identities and seek support from peers on social media platforms, which offer ease of anonymity. Key strategies for managing identities include maintaining anonymity, censoring locations or content, restricting audiences, and using multiple accounts. A systematic review suggests that social media may support the mental health and well-being of LGBTQIA+ youths (from age 13 to 29) through peer connection, identity management, and social support, but findings are limited by weaknesses in the evidence (Berger et al., 2022[145]). The association between social media use and well-being of LGBTQIA+ individuals can be complex, however. Chan (2023[146]) found that LGBTQIA+ social media use can have both positive and negative association with well-being. On the positive side, integrating LGBTQIA+ social media into social routines was found to be associated with lower levels of internalized stigma and higher levels of community connectedness in Hong Kong LGBTQIA+ community, both of which being linked to improved well-being. On the negative side, emotional investment in LGBTQIA+ social media was found to have a negative impact on well-being, with this relationship being mediated by internalized stigma and loneliness (Chan, 2023[146]). Some evidence also suggests that people with mental health needs can peer support via social media and other online communities (Rayland and Andrews, 2023[147]; Naslund et al., 2016[148])

Intensive and problematic digital habits

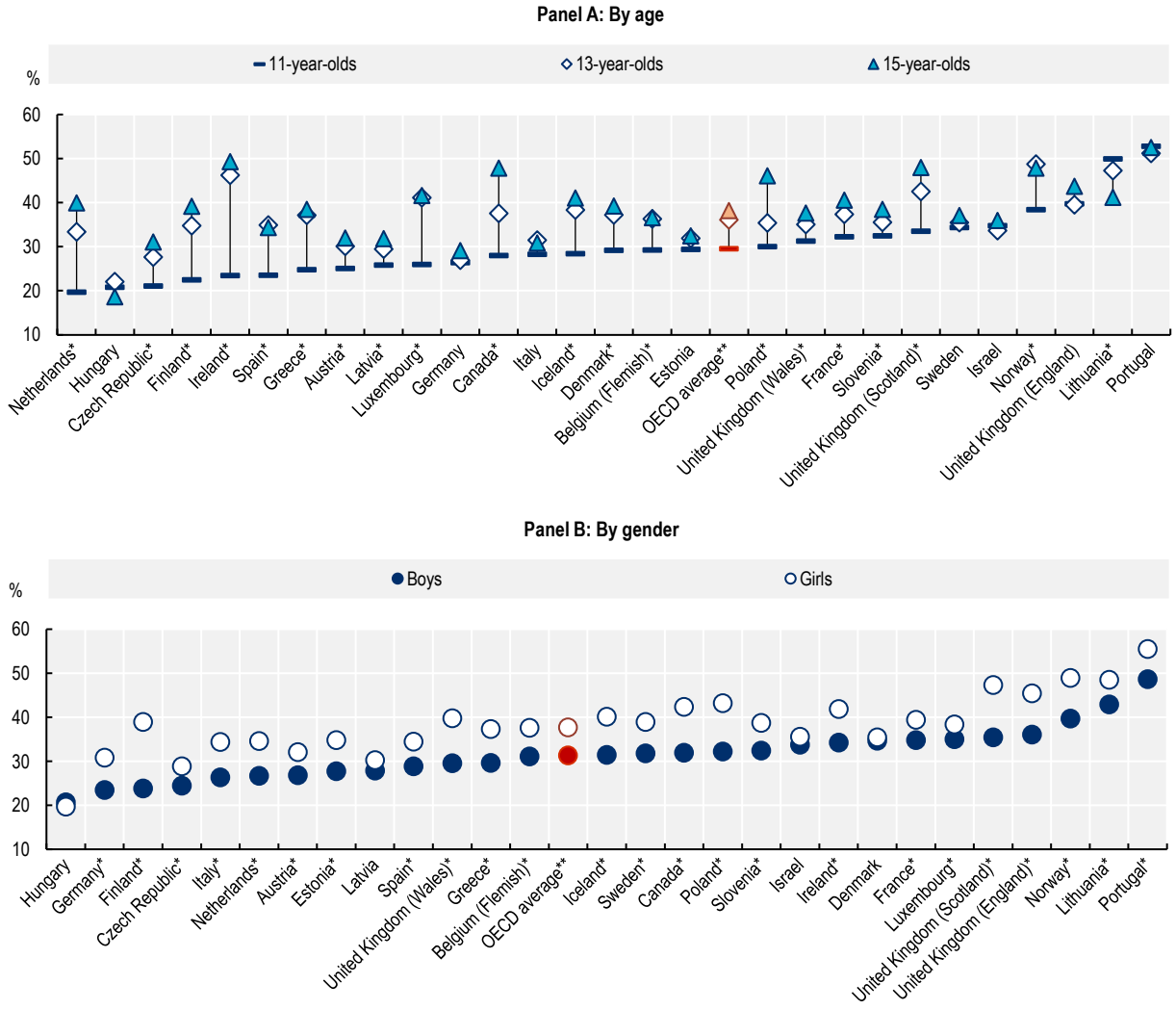
The frequency and duration of adolescents' use digital technologies impact their social and emotional well-being in various ways. Some evidence suggests that moderate use of digital devices appears to be associated with positive feelings and greater life satisfaction for many children, while excessive use is associated with negative mental well-being (OECD, 2018[3]; Internet Matters, 2022[149]). Just as Goldilocks in the fairytale Goldilocks and the Three Bears finds that moderation (in porridge (not too hot, not too cold), and beds (not too hard, not too soft)) is "just right", so too would it seem to be for screen time (Przybylski and Weinstein, 2017[9]). A survey conducted in 2022 on 1 000 UK children (aged 9-15) confirms the inverted U-shaped association between the time spent on digital devices and subjective well-being outcomes: children using digital devices the least report lower scores on positive emotional and social dimensions, while those using them the most report higher scores on all negative dimensions (Internet Matters, 2022[149]). It is suggested that children who spend less time online have fewer opportunities for both positive and negative impacts, while those who spend the most time appear to have the greatest exposure to negative effects. Moreover, the findings suggest that the impact of digital time on children's well-being is less about the quantity of time spent and more about the nature of the activities performed online. For instance, greater social media use was associated with lower on social well-being,[14] particularly for girls, while increased time spent gaming was linked to higher feelings of a lack of control and missing out on physical activity due to digital technology use, especially among boys (Internet Matters, 2022[149]).

How pervasive are adolescents' online lives?

The widespread diffusion of digital devices and services targeting teenagers can lead to intensive use, with many adolescents being constantly connected (Kuss and Griffiths, 2017[150]). Across the OECD, about 35% of teenagers aged 11 to 15 report being in contact with their friends almost constantly throughout the day. This risk increases with age (Figure 4.5, Panel A) and is significantly higher on average for girls (38%) than for boys (31%) (Panel B).

Figure 4.5. Being constantly in contact friends is frequent, especially for older adolescents and girls

11-, 13- and 15-year-old school children who report intensive online communication



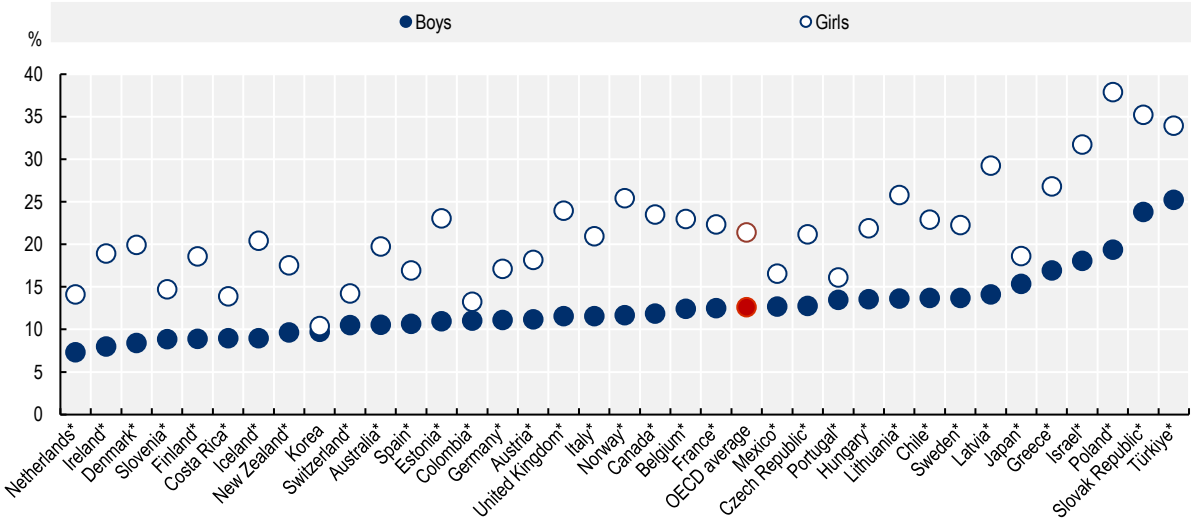
Note: *The difference between 11- and 15-year-olds, and between boys and girls is statistically significant at the 5% level.
**The OECD average includes all countries depicted in the figure except Belgium and the United Kingdom.
Children were asked how often they had online contact with four different friendship categories (Close friend(s); Friends from a larger friend group; Friends that you got to know through the Internet but didn't know before; People other than friends (e.g., parents, brothers/sisters, classmates, teachers)), and presented with the response options "Don't know/doesn't apply", "Never or almost never", "At least every week", "Daily or almost daily", "Several times each day" and "Almost all the time throughout the day". Data refer to the percent of children who respond "Almost all the time throughout the day" for at least one of the four friendship categories.
Source: OECD Secretariat calculations based on WHO (n.d.[136]), *Health Behaviour in School-aged Children (HBSC) World Health Organization Collaborative Cross-National Survey 2021-22*, https://hbsc.org/about/.

StatLink https://stat.link/46nda8

The availability of Internet-enabled mobile phones and tablets may contribute to raising the risk of intensive digital device use, as they typically offer a wide array of applications (e.g., texting, apps, video chat) that facilitate constant connectivity (Haug et al., 2015[151]). A lack of access to digital tools can indeed lead to feelings of frustration, nervousness, and anxiety among a significant minority of 15-year-olds. According to OECD data, about 17% of 15-year-old teenagers report feeling anxious over half the time when they are without their digital devices. In nearly every country, girls (21%) are notably more likely than boys (13%) to experience such anxiety (Figure 4.6).

Figure 4.6. Around one in six 15-year-olds feels nervous without their digital devices on hand

15-year-old students who report feeling nervous or anxious more than half of the time when they don't have their digital device near them



Note: *The difference between boys and girls is statistically significant at the 5% level.
15-year-old students were asked "Think about your use of digital devices. How often do you feel or act the following ways? ... I feel nervous/anxious when I don't have my digital device near me." and presented with the response options "Never or almost never", "Less than half of the time", "About half of the time", "More than half of the time", "All or almost all of the time" and "Not applicable". Data refer to the percent responding: "More than half of the time" and "All or almost all of the time". Students responding "Not applicable" are excluded from the calculations.
Source: OECD Secretariat calculations based on OECD (2022[102]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/c7a2zi

Teenagers often experience a pervasive presence of digital devices. For instance, in 2018, 95% of US adolescents aged 13 to 17 reported having access to a smartphone, and 45% stating they were online "almost constantly" (Anderson and Jingjing, 2018[118]). A Common Sense Media survey carried out in 2016 suggested that half of teenagers from ages 13 to 18 in the United States said they felt addicted to their mobile devices, while three quarters said they felt compelled to immediately respond to texts, social media posts, and other notifications (Felt and & Robb, 2016[152]). Based on data collected via an app installed on adolescent smartphones, a study carried out in 2022 showed that teens in the United States picked up and checked their smartphones an average of 51 times per day, ranging from two to 498 times per day (Radesky et al., 2023[153]). While younger participants (11- to 12-year-olds) tended to pick up their phones less frequently each day, adolescents (age 13 and older) were more likely to check their phone over 100 times per day. Notifications are plentiful, with half of our participants receiving 237 or more per day. Over two-thirds of 11- to 17-year-olds reported that they "sometimes" or "often" find it difficult to stop using

technology, use technology to escape from sorrow or get relief from negative feelings, and miss sleep due to being on their phone or online late at night.

Challenges and consequences of "Problematic Internet Use"

When children are online, they can engage in multiple activities either simultaneously or consecutively, making it difficult to accurately determine the time spent on each activity. Consequently, some research focuses on children's overall Internet use and its impact on well-being, without necessarily differentiating between specific activities. A few reviews focus especially on the relationships between Problematic Internet Use[15] (PIU) and children's well-being outcomes. These studies emphasise the links between excessive or compulsive Internet use and various negative well-being outcomes, such as challenges in daily functioning, strained interpersonal relationships, depressive symptoms, anxiety, loneliness, reduced subjective well-being, lower life satisfaction, and other mental health issues (Aboujaoude and Starcevic, 2015[154]; Cai et al., 2023[155]; Chen and Fan, 2024[156]; Ortuño-Sierra et al., 2022[157]).

A recent meta-analysis found that higher levels of problematic Internet use are associated with increased negative mental health problems and lower levels of subjective well-being (Cai et al., 2023[155]). These findings align with previous studies in the field and support the Internet use displacement hypothesis suggesting that the time spent on the Internet displaces or replaces time that could be spent on other activities, such as face-to-face social interactions, physical activities, or other offline pursuits. Concurrently, some studies suggest that negative mental health issues may be potential risk factors for problematic Internet use (Çikrikçi, 2019[158]; Liu et al., 2022[159]). Longitudinal evidence suggests that adolescents developing problematic Internet use tend to experience poorer mental health, including symptoms of depression, anxiety, and low self-esteem. They also face challenges in interpersonal relationships, such as strained parent-child, peer, and teacher-student dynamics, alongside diminished academic performance and school functioning (low behavioural, emotional and cognitive engagement) (Geng et al., 2023[160]; Coyne et al., 2020[161]; Zhou et al., 2022[162]).

Gender does not consistently alter the association between problematic Internet use and adverse well-being outcomes in adolescents, either positively or negatively (Cai et al., 2023[155]). On one hand, the relationship between problematic Internet use and loneliness seems to be stronger for boys than for girls. One possible explanation for this finding could be related to gender difference in Internet usage: more girls tend to use the Internet for social communication, which can lead to lower levels of loneliness, whereas more boys spend time on online gaming or use the Internet as an escape from real life, further increasing their loneliness (Dufour et al., 2016[163]; Cai et al., 2023[155]; Svendsen, 2024[164]). Regarding the relationships between problematic Internet use and the other adverse mental health outcomes (e.g. depressive symptoms, anxiety, subjective well-being), gender did not show up as having a consistent role. However, some studies have reported that gender does play a role in the relationships between problematic Internet use and depressive symptoms, as well as subjective well-being, indicating that further research on this issue may be warranted (Lei, Chiu and Li, 2019[165]; Lozano-Blasco and Cortés-Pascual, 2020[166]).

Family-based adversity factors, such as child maltreatment and parental conflicts, are also found to significantly increase the risk of developing problematic Internet use over time (Geng et al., 2023[160]). In particular, adolescents may turn to highest levels of problematic Internet use as a consequence of inter-parental conflicts, maltreatment or poor child-parents' relationships. Turning to virtual environments can provide an escape from childhood psychological maltreatment and a toxic family atmosphere. However, this behaviour has been found to be associated with an increased risk of depression and the adoption of maladaptive coping mechanisms (e.g., self-blame, blaming others, rumination, or catastrophising), as well as a heightened vulnerability to Internet gaming addiction (Wu et al., 2022[167]).

Recent evidence also suggests that parental mediation practices regarding Internet use can mitigate the risk of developing problematic Internet use only to a small extent. A meta-analysis suggests that parental

warmth and control showed a small negative association with problematic Internet use, while overall parental efforts to regulate their children's and adolescents' media use do not seem to protect adolescents against problematic Internet use (Lukavská et al., 2022[168]). However, recent evidence suggest that rules established by parents on the content of authorised sites and applications seem more likely to attenuate adolescents' problematic use of Internet than strict rules on screen time (Chen and Fan, 2024[156]). Stringent time restrictions may lead to rebellious behaviours as adolescents seek independence from parental control, or withdrawal symptoms if Internet use is abruptly discontinued. Conversely, restrictions on the content accessed online are perceived as less arbitrary and seem more effective to reduce adolescent problematic Internet use across various mental health profiles (Chen and Fan, 2024[156]).

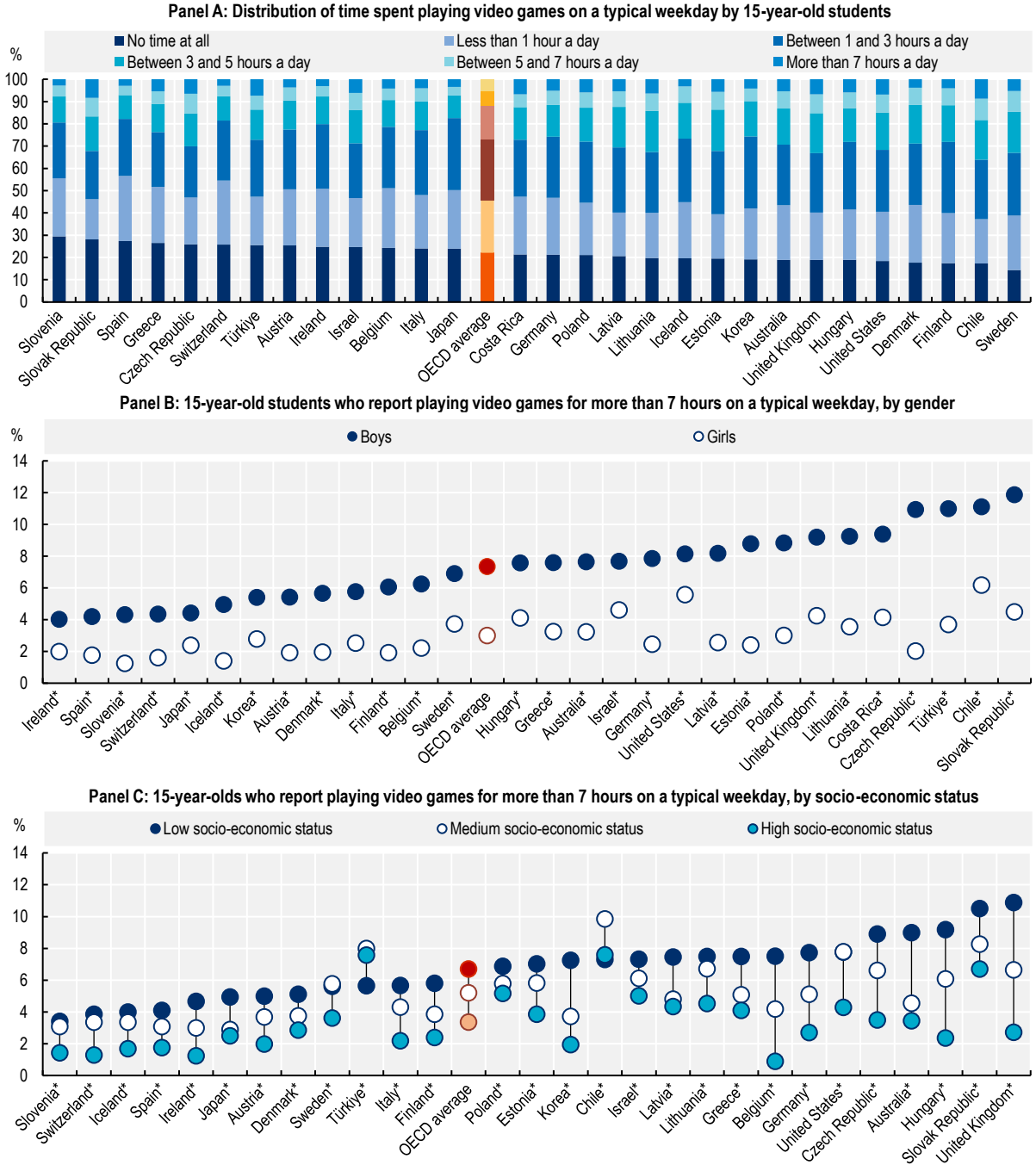
Challenges and consequences of video-gaming

Video games, like social media, are intentionally designed to maximise user engagement, with these strategies becoming increasingly sophisticated over time (Schwarz et al., 2020[169]; Rapp, 2022[170]; Ruiz, León and Heuer, 2024[171]). Children are particularly vulnerable to persuasive design elements in digital devices and games that encourage prolonged engagement (Alsheail, Alexandrovskz and Gerling, 2023[172]). However, problematic video gaming involves more than just excessive online activity; it also involves negative effects on various aspects of functioning, including personal, social, occupational, and familial domains (Gros et al., 2020[173]).

A study on the problematic screen use[16] (specifically, video gaming, social media use and mobile phone involvement) based on the Adolescent Brain Cognitive Development (ABCD) Study, covering 8 753 children aged 10 to 14 between 2018 and 2020 in the United States, shows that problematic use concerns a significant minority of young adolescents, with slightly higher numbers for video gaming than for social media use (Nagata et al., 2022[174]). A bit more than 20% of young adolescents report that they occasionally or frequently feel the need to play video games more and more, and slightly more than 11% feel the same about the use of social media apps. Around 17% of young adolescents report that they have tried to play video games less but can't (15% for social media use) or become stressed or upset if they are not allowed to play video games (12% for social media use). Slightly more than 6% think that they play video games or use social media so much that it has had a negative effect on their schoolwork. Video gaming serves as a means to forget about problems for around a quarter of young teenagers, and social media use has the same function for around 18% of teenagers.

In the OECD, the majority of 15-year-olds (73%) spend no more than three hours playing video games on a typical weekday (Figure 4.7, Panel A). However, a minority of 15-year-olds (27%) spend 3 hours or more, and around 5% spend more than seven hours a day playing video games. On weekends, this proportion rises to 8.5%. In all countries, boys (7% on average, Figure 4.7, Panel B) and teenagers with a low socio-economic status (7%, Figure 4.7, Panel C) are more likely than others of spending extended amounts of time playing video games during the week. On weekends, almost 12% of boys and 11% of 15-year-olds with a low socio-economic status play video games for seven hours or more each day (data not shown). Whether excessive video game and screens usage should be considered a clinical addiction remains open to date (Box 4.6).

Figure 4.7. Boys and adolescents from low socio-economic backgrounds are more likely to spend excessive amounts of time video gaming



Note: *The difference between boys and girls, and students with high and low socio-economic status is statistically significant at the 5% level. 15-year-old students were asked "During a typical weekday, how much time do you spend doing the following leisure activities? ... Play video games (using my smartphone, a gaming console or an online platform or Apps)" and presented with the response options listed in Panel A.
Source: OECD Secretariat calculations based on OECD (2022[102]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/g719u2

Box 4.6. Are video games and screens a source of addiction?

There is currently a lack of consensus on whether screen or Internet addiction should be classified as an addictive disorder. Some authors argue that digital access can lead to adverse consequences similar to those caused by substance addictions (Luker, 2022[175]; Aragay et al., 2023[176]; Kuss and Lopez-Fernandez, 2016[177]). Moreover, there is debate over whether the addiction is to the device itself (e.g., mobile phone, computer, tablet) or to the content consumed (e.g., video games, social networks) (Kardefelt-Winther, 2017[178]). Some suggest that "pathological use of the Internet" constitutes a behavioural addiction, characterised by a loss of control over technology use and connection-seeking behaviour, leading to negative consequences and an inability to curb the impulse or desire to stay connected (Sussman et al., 2018[179]). However, these studies often lump together various uses (video games, social networks, different devices) and symptoms under the same concept of addictive digital behaviours.

Symptomatic "addictive" behaviours include (Luker, 2022[175]): (i) having intense urges for screen time or to play video games, and these urges block out other thoughts; (ii) spending money on video games or screens, even though you can't afford it; (iii) cutting back on social or recreational activities because of preference for screen time or video games; (iv) Continuing to play video games or participate in screen time, even though you know it's causing problems in your life, such as poor performance at school or work, or letting household responsibilities go; (v) Displaying signs of irritability, anxiety or anger when forced to stop playing, even for brief periods of time; (vi) Lying to others about the extent of your use; (vii) Needing more screen time over time to get the same level of enjoyment; (viii) Neglecting your appearance, including lack of interest in grooming or clothing.

Some authors question the adoption of clinical addiction concepts that may stigmatise children for whom clinical impairment may be very low (Bean et al., 2017[180]). Nevertheless, although both Internet/social networks and video games have addictive qualities, video games can cause more significant disruptions in daily life due to their requirement for isolation in a room to hear and talk to other players and extended play sessions, which can interfere with responsibilities like school and social activities (Aragay et al., 2023[176]). According to Aragay et al. (2023[176]), the higher level of interference may contribute to increased video game addiction compared to Internet/social networking practices. Conversely, social networks, accessible via mobile phones, are less disruptive to daily activities but can still lead to behavioural addictions and contribute to problems such as low self-esteem, body image disorders, anxiety, depression, and obsessive-compulsive disorders.

Several systematic reviews examining the link between Internet Gaming Disorder (IGD)[17] and psychiatric comorbidities in children and adolescents suggest that both IGD and SMU are key contributors to the growing mental health challenges faced by children and adolescents (Ghali et al., 2023[181]; Gao, Wang and Dong, 2022[182]; Paulus et al., 2018[183]). These reviews indicate that problematic engagement with online gaming is significantly associated with issues such as anxiety, depression, and other emotional disturbances among these population groups.[18] However, the exact causes of these difficulties are still debated, with factors like internal psychological factors,[19] time spent online, the types of media consumed, and gender differences being explored (Griffiths et al., 2025[184]). Some studies suggest that family dynamics, including poor parenting styles – neglectful, authoritarian, permissive –, contribute to exacerbate problematic Internet use, including problematic video-gaming (Nielsen, Favez and Rigter, 2020[185]). Moreover, certain game genres, particularly immersive ones like Massively Multiplayer Online Role-Playing Games, Multiplayer Online Battle Arenas, Real-Time Strategy Games, are strongly associated with GD (Griffiths et al., 2025[184]). Additionally, structural features of games, such as in-game rewards that trigger dopamine release and the unpredictability of these rewards, play a key role in reinforcing prolonged gaming sessions and maintaining gaming disorders.

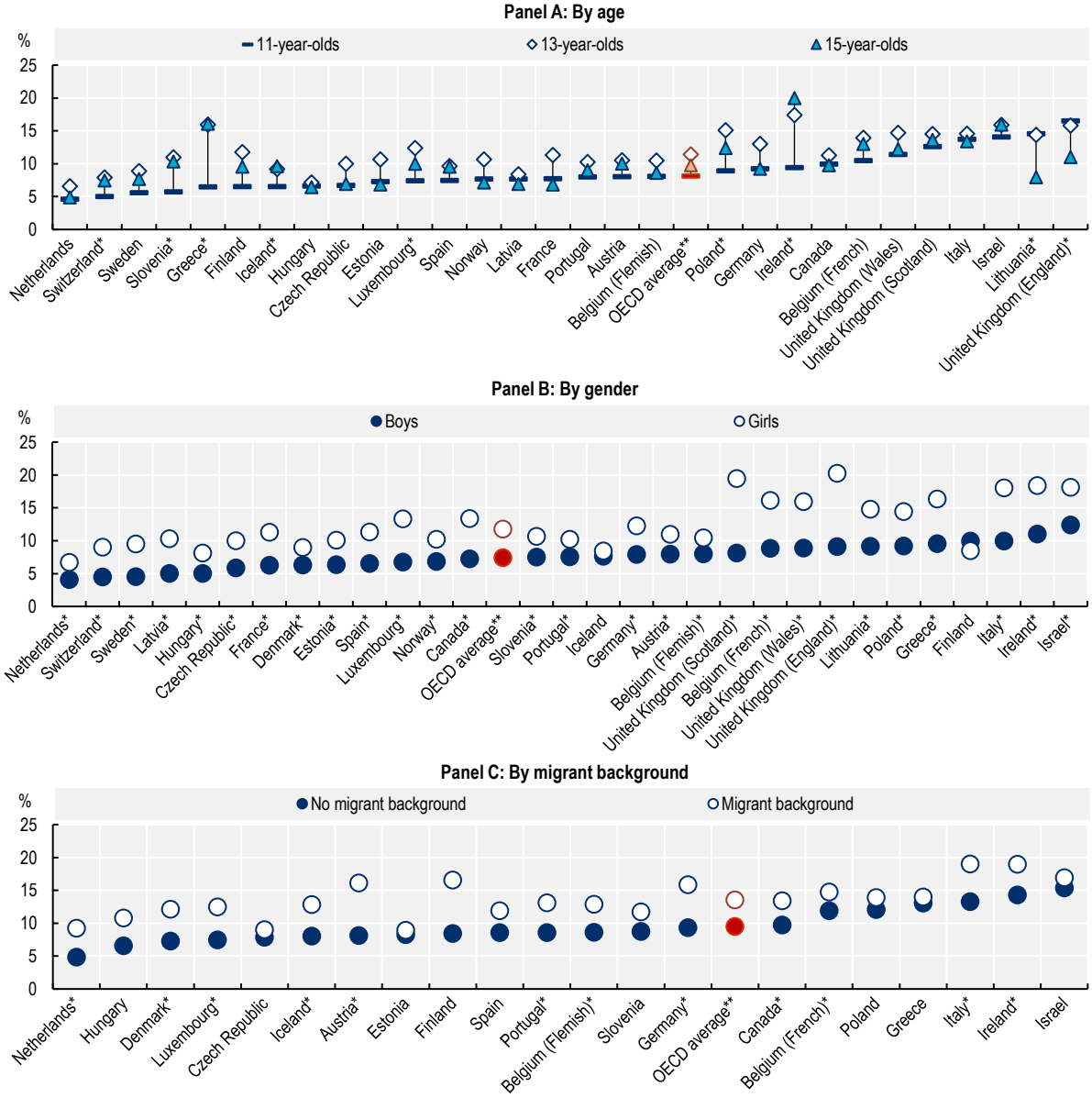
The use of mobile phones is also highlighted in the Adolescent Brain Cognitive Development (ABCD) Study as a source of problematic behaviour (Nagata et al., 2022[174]). For example, around 30% of teenagers aged 10 to 14 say that they interrupt whatever they are doing when they are contacted on their phone, and 45% say that they frequently use their mobile for no particular reason. Around 17% say they are unable to reduce their phone use, and over 11% report stress at the thought of being without their phone. There are also gender differences: girls report higher scores for problematic social media and mobile phone use.

Challenges and consequences of social media

With respect to social media, more and more children report a negative impact. While research indicates a relatively low overall impact on well-being outcomes at the population level, nearly 10% of teenagers across the OECD reported in 2021-22 that their use of social media has had a negative impact on their attitudes and mindset that can be classified as problematic, up from less than 7% in 2017-18 (OECD, 2024[2]). Reporting varies across age groups (Figure 4.8). Once again, girls (12%) are generally more often exposed to this type of problem than boys (7%),[20] and children with a migrant background (14%) are more exposed than natives (10%). These findings are consistent with US-based studies that find that girls report higher problematic social media and mobile phone use while boys report higher problematic video game use (Nagata et al., 2022[174]).

Figure 4.8. Problematic social media use varies across age groups but is a bigger issue for girls

11-, 13- and 15-year-old school children who report having problematic social media use



Note: *The difference between 11- and 15-year-olds, boys and girls, and students with and without migrant background is statistically significant at the 5% level. **The OECD average includes all countries depicted in the figure except Belgium and the United Kingdom.

Children were asked a series of nine questions about whether, over the past year, social media use has had a negative impact on various aspects of their lives, including: whether they (i) can't think of anything else but the moment that they will be able to use social media again, (ii) regularly felt dissatisfied because they wanted to spend more time on social media, (iii) often felt bad when they could not use social media, (iv) tried to spend less time on social media, but failed, (v) regularly neglected other activities (e.g. hobbies, sport) because you wanted to use social media, (vi) regularly had arguments with others because of their social media use, (vii) regularly lied to their parents or friends about the amount of time they spend on social media, (viii) often used social media to escape from negative feelings, (ix) had serious conflict with their parents, brother(s) or sister(s) because of their social media use. Response options for each question were "No" or "Yes". Data refer to the percent of children who respond "Yes" to at least six of the nine questions. "Social media", in this instance, is defined as referring to social network sites and instant messengers.

Source: OECD Secretariat calculations based on WHO (n.d.[136]), *Health Behaviour in School-aged Children (HBSC) World Health Organization Collaborative Cross-National Survey 2021-22*, https://hbsc.org/about/.

StatLink https://stat.link/ges9if

Several literature reviews focus on the impact of problematic social media use[21] on children and/or adolescents mental health and well-being (Sala, Porcaro and Gómez, 2024[186]; Bozzola et al., 2022[187]; Bottaro and Faraci, 2022[188]; Cataldo et al., 2021[189]; Hussain and Griffiths, 2018[190]; Ghali et al., 2023[181]; Coyne et al., 2025[191]). These studies point to children and adolescents who use social media for many hours a day showing higher risk for being exposed to contact and conduct risks depicted in the previous section, such as cyberbullying, online grooming. According to Sala (2024[186]), there is a robust corpus of evidence pointing that "high social media use" (above two hours per day) correlates with negative social and mental health outcomes, including reduced social well-being, happiness, and self-esteem, and increased vulnerability to harassment (Bozzola et al., 2022[187]; Senekal et al., 2023[192]). A dose-response meta-analysis by Liu et al. (2022[159]) revealed that each additional hour of social media use increased the risk of depression by 13%, with stronger effects observed in girls, though boys were also significantly affected. Greater time spent on social media is linked to poor sleep, negative body image (above 3 hours in Kelly (2018[193]), psychological distress, self-rated poor mental health, and suicidal ideation (Vidal et al., 2020[194]).

Several factors could explain a negative link between social media use and depression (Twenge et al., 2025[195]). Social media can displace time spent on activities beneficial to mental health, such as in-person social interactions, especially as norms shift away from face-to-face gatherings. It can amplify social comparison, body image concerns, and appearance dissatisfaction, which may lead to depressive symptoms. The risk of cyberbullying, strongly associated with depression, is also heightened. Social media can reinforce negative thinking patterns as users seek content aligning with their emotions, creating "rabbit holes".[22] Additionally, screen time, including social media use, disrupts sleep by delaying bedtimes, reducing sleep quality, and suppressing melatonin, all of which are linked to depressive symptoms in children and adolescents.

Social media are also found to significantly influence body dissatisfaction and disordered eating through mechanisms like social comparison and internalisation of beauty ideals (Choukas-Bradley et al., 2025[196]). Adolescents and young adults, particularly girls and women, engage in upward comparisons with peers, celebrities, and influencers, reinforcing specific and often sexualised beauty ideals, such as the "slim-thick" ideal. Experimental studies reveal that exposure to edited, idealised images on social media exacerbates body image concerns, especially among individuals prone to social comparison (Fioravanti et al., 2022[197]). Choukas-Bradley et al. (2025[196]) highlight that nonexperimental research confirms social media appearance pressures uniquely contribute to body dissatisfaction and disordered eating, surpassing the influences of family, peers, and traditional media. Additionally, appearance-focused social media use has been linked to heightened self-objectification and body surveillance, emphasising the pervasive and enduring effects of idealised content on mental health.

Meta-analyses indicate a small but significant effect of social media use on mental health, though interpretations of these effect sizes vary widely (Valkenburg, Meier and Beyens, 2022[198]). The majority of studies included in these analyses rely on cross-sectional, self-reported data, limiting the strength of their conclusions. Additionally, the relationship between social media use and mental health differs among individuals. For instance, a recent study on individual susceptibility found that 92% of adolescents reported neutral or positive effects of social media use on their self-esteem, a factor linked to mental health, while 8% reported consistent negative effects (Valkenburg et al., 2021[18]).

Some individuals are more susceptible to media effects due to factors such as personality, developmental stage, and social context, with their responses shaped by cognitive, emotional, and physiological states (Hamilton et al., 2025[199]). Girls are often found to face higher risks of depression and suicidality during adolescence, with some studies indicating "windows of vulnerability" to social media exposure that vary by sex. These periods of increased risk appear to be more pronounced for girls between the ages of 11 and 13, as well as at age 19, while boys are most vulnerable between the ages of 14 and 15 and again at 19 (Orben et al., 2022[8]). Offline vulnerabilities, like social comparison and stress, may amplify online risks.

Youths with minoritised identities, such as LGBTQIA+ individuals and youths of colour, are more likely to experience identity-based online victimization, including by being directly and indirectly targeted by verbal and sexual harassment and threats of physical harm and experiencing vicarious exposure to discrimination based on race, leading to negative mental health outcomes like depression and suicidal ideation (Kruzan et al., 2025[200]; Tao and Fisher, 2022[201]; Nesi et al., 2021[202]). Economically disadvantaged adolescents, who spend more unsupervised time online, also face heightened risks, with stronger links between social media use, conduct problems, and psychological distress (Odgers and Jensen, 2020[122]; George et al., 2020[203]).

The impact of social media use depends not only on the quantity of time spent on social media but also on the type of usage (Coyne et al., 2025[191]). Many studies also report different mental health outcomes deriving from active (i.e., posting, commenting, messaging, or liking) and passive (i.e., browsing other users' photos or scrolling through comments or feeds) use of social media (Sala, Porcaro and Gómez, 2024[186]). Passive use is linked to higher social comparison, lower perceived social support, envy, depressive moods, and anxiety, particularly in individuals with loneliness, stress, or depressive symptoms. In contrast, active use is associated with improved well-being, life satisfaction, and perceived social support, especially among girls. Active use generally shows no strong association with later depressive symptoms (Sala, Porcaro and Gómez, 2024[186]).

In addition, some adolescents report feeling pressured to share, stay connected, and respond immediately to messages, which acts as a barrier to disconnecting from social media (Shankleman, Hammond and Jones, 2021[108]). Moreover, prolonged and unsupervised use of social media appears to increase the risk for children of being exposed to sexting, pornography, grooming, and unwanted sexual content online (Bozzola et al., 2022[187]). Consequently, measures of problematic social media use aim to capture not only excessive time but also compulsive engagement that disrupts daily life, emotional well-being, or interpersonal relationships. The general findings of studies using PSMU measures suggest that PSMU co-occurs with higher levels of depression, anxiety, and stress, as well as with higher prevalence of Attention-deficit/hyperactivity disorder (Hussain and Griffiths, 2018[190]; Ghali et al., 2023[181]; Sala, Porcaro and Gómez, 2024[186]). For instance, Boer et al. (2020[5]) found from cross-national data from over 150 000 adolescents across 29 countries that problematic social media use is associated with lower subjective well-being outcomes, in areas such as life satisfaction, psychological complaints, school satisfaction, perceived school pressure, family support, and friend support.

In addition to the amount of time spent and problematic use, an individual’s experience with social media is likely influenced by the type of content and the context of their interactions (Coyne et al., 2025[191]). For instance, exposure to "positive" content is linked to lower levels of depression, while "negative" content is associated with higher levels of depression. However, negative content tends to have a stronger impact and is more closely connected to depression than positive content (Primack et al., 2018[204]; Skogen et al., 2023[205]). Personal psycho-social characteristics are also key factors affecting how social media are used and its association with well-being outcomes (Sala, Porcaro and Gómez, 2024[186]). For instance, the quality of offline social networks, feelings of loneliness, and personality traits like introversion and extroversion are important factors in online social media use. Extroverted adolescents with high self-esteem and strong offline friendships tend to use social media to reinforce existing relationships, while introverted adolescents with low self-esteem and weaker social networks are more likely to connect with strangers, increasing the risk of unwanted interactions (Pellicane, Cooks and Ciesla, 2021[206]). A longitudinal study also revealed that experiences of acceptance on social media were linked to fewer symptoms of depression and anxiety in LGBTQIA+ participants, but not in their heterosexual counterparts. Similarly, a recent study of early adolescents found that LGBTQIA+ youth were significantly more likely to participate in online support groups to alleviate feelings of isolation (Charmaraman et al., 2024[207]).

Adolescents' motivations for using social media affect their mental health and well-being (Sala, Porcaro and Gómez, 2024[186]; Ariefdjohan et al., 2025[208]). Social media can be used for entertainment, to get

updated information, to get inspired or to nurture an interest or passion, or to learn about a new topic that positively affects mood (Shankleman, Hammond and Jones, 2021[108]). Social media can also be used for self-expression and online disclosure, to engage with relatives and friends, to strengthen friendships, or to expand one's social network, finding like-minded individuals, therefore creating online communities, and boosting a sense of belonging (Bottaro and Faraci, 2022[188]). In such cases, mobile devices are suggested to have increased the use of social networking sites (SNSs), providing online social support that complements in-person interactions. Adolescents benefit from a larger network of online friends and feedback (e.g., likes and comments). Sharing emotions on SNSs has been linked to improved cognitive and affective empathy, while participation in online communities fosters social skills and positive emotional contagion. However, SNSs also pose risks, such as negative emotional experiences when expected feedback (e.g., likes) is lacking, potentially harming self-acceptance and self-worth (Bottaro and Faraci, 2022[188]). Moreover, social media can also be used for social comparison, a mechanism highly involved in identity development and be associated with lower self-esteem and heightened negative emotions, especially when adolescents compare themselves to idealised portrayals of others. Additionally, using SNSs to escape real-world interactions can increase the risk of developing problematic social media use. Across the OECD, according to data from the *Health Behaviour of School-aged Children*, approximately 46% of adolescents aged 11, 13, and 15 (respectively 36% of boys and 55% of girls) using social media reported in 2022 that they often used social media to escape from negative feelings.

Social media's affordances, such as visual content and platform design, are key factors in understanding the impact of social media use on mental health and well-being (Sala, Porcaro and Gómez, 2024[186]). First, the content that users search for or are recommended on social media can have both positive and negative effects on their well-being and mental health. Positive content can inspire users and promote learning about widely different topic, while social media can serve as a platform for discussing and reducing the stigma around mental health issues, creating support networks for those with similar experiences (Popat and Tarrant, 2023[209]; Zhou and Cheng, 2022[210]). Conversely, negative content, such as harmful health advice and distressing news, can negatively affect harm mental health, while disturbing content like pro-eating disorder or self-harm material can negatively influence mood and behaviour with the risk of social contagion (Sala, Porcaro and Gómez, 2024[186]). Additionally, platform features like the "like mechanism" may trigger social comparison and rumination, affecting self-worth and increasing anxiety (Cataldo et al., 2021[189]). Design elements can also promote increased user engagement, to which children are particularly vulnerable, contributing to mental health challenges.

References

Aboujaoude, E. and V. Starcevic (2015), *Mental Health in the Digital Age: Grave Dangers, Great Promise*, Oxford University Press, https://doi.org/10.1093/MED/9780199380183.001.0001. [154]

Adelantado-Renau, M. et al. (2019), "Association Between Screen Media Use and Academic Performance Among Children and Adolescents: A Systematic Review and Meta-analysis", *JAMA Pediatrics*, Vol. 173/11, pp. 1058-1067, https://doi.org/10.1001/JAMAPEDIATRICS.2019.3176. [105]

Alper, M. (2023), *Kids Across the Spectrums: Growing up Autistic in the Digital Age*, The MIT Press, https://mitpress.mit.edu/9780262545365/kids-across-the-spectrums/ (accessed on 6 March 2025). [86]

Alper, M. et al. (2025), "Digital Media and Neurodevelopmental Differences", *Handbook of Children and Screens*, pp. 55-60, https://doi.org/10.1007/978-3-031-69362-5_8. [84]

Alsheail, M., D. Alexandrovskz and K. Gerling (2023), "Designing for Disengagement: Challenges and Opportunities for Game Design to Support Children's Exit From Play", https://arxiv.org/abs/2303.15400v1 (accessed on 10 January 2025). [172]

American Academy of Pediatrics (2016), "Media and Young Minds: Council on Communications and Media - Policy Statement", https://doi.org/10.1542/peds.2016-2591. [60]

Anderson, M. and J. Jingjing (2018), *Teens, Social Media and Technology*, Pew Research Center, https://www.pewresearch.org/internet/2018/05/31/teens-social-media-technology-2018/ (accessed on 9 October 2023). [118]

Andrews, D., B. Égert and C. de la Maisonneuve (2024), "From decline to revival: Policies to unlock human capital and productivity", *OECD Economics Department Working Papers*, No. 1827, OECD Publishing, Paris, https://doi.org/10.1787/8d0d232c-en. [213]

Angelini, F., C. Marino and G. Gini (2023), "Friendship quality in adolescence: the role of social media features, online social support and e-motions", *Current Psychology*, Vol. 42/30, pp. 26016-26032, https://doi.org/10.1007/S12144-022-03564-3/FIGURES/3. [135]

Aragay, N. et al. (2023), "Differences in Screen Addiction in the Past 15 Years", *International Journal of Environmental Research and Public Health 2024, Vol. 21, Page 1*, Vol. 21/1, p. 1, https://doi.org/10.3390/IJERPH21010001. [176]

Araiza-Alba, P. et al. (2020), *Immersive Virtual Reality Implementations in Developmental Psychology*, Center for Open Science, https://doi.org/10.31234/osf.io/ga8sz. [33]

Ariefdjohan, M. et al. (2025), "Youth Anxiety in the Digital Age: Present Status and Future Considerations", *Handbook of Children and Screens*, pp. 129-136, https://doi.org/10.1007/978-3-031-69362-5_18. [208]

Bailey, J. and J. Bailenson (2017), "Considering virtual reality in children's lives", *Journal of Children and Media*, Vol. 11/1, pp. 107-113, https://doi.org/10.1080/17482798.2016.1268779. [34]

Barr, R. (2019), "Growing Up in the Digital Age: Early Learning and Family Media Ecology", *Current Directions in Psychological Science*, Vol. 28/4, pp. 341-346, https://doi.org/10.1177/0963721419838245. [100]

Bean, A. et al. (2017), "Video game addiction: The push to pathologize video games", *Professional Psychology: Research and Practice*, Vol. 48/5, pp. 378-389, https://doi.org/10.1037/PRO0000150. [180]

Belmon, L. et al. (2019), "What are the determinants of children's sleep behavior? A systematic review of longitudinal studies", *Sleep Medicine Reviews*, Vol. 43, pp. 60-70, https://doi.org/10.1016/J.SMRV.2018.09.007. [68]

Berger, M. et al. (2022), "Social Media Use and Health and Well-being of Lesbian, Gay, Bisexual, Transgender, and Queer Youth: Systematic Review", *Journal of Medical Internet Research*, Vol. 24/9, https://doi.org/10.2196/38449. [145]

Biddle, S., E. García Bengoechea and G. Wiesner (2017), "Sedentary behaviour and adiposity in youth: A systematic review of reviews and analysis of causality", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 14/1, pp. 1-21, https://doi.org/10.1186/S12966-017-0497-8/TABLES/3. [49]

Boer, M. et al. (2021), "Social media use intensity, social media use problems, and mental health among adolescents: Investigating directionality and mediating processes", *Computers in Human Behavior*, Vol. 116, p. 106645, https://doi.org/10.1016/J.CHB.2020.106645. [6]

Boer, M. et al. (2020), "Adolescents' Intense and Problematic Social Media Use and Their Well-Being in 29 Countries", *Journal of Adolescent Health*, Vol. 66/6, pp. S89-S99, https://doi.org/10.1016/j.jadohealth.2020.02.014. [5]

Bohnert, P. and P. Gracia (2022), *Digital Engagement, Social Inequalities and Adolescent Well-Being*, https://doi.org/10.31235/osf.io/ks3tj. [101]

Boniel-Nissim, M. et al. (2022), "International perspectives on social media use among adolescents: Implications for mental and social well-being and substance use", *Computers in Human Behavior*, Vol. 129, p. 107144, https://doi.org/10.1016/J.CHB.2021.107144. [7]

Bottaro, R. and P. Faraci (2022), "The Use of Social Networking Sites and Its Impact on Adolescents' Emotional Well-Being: a Scoping Review", *Current Addiction Reports*, Vol. 9/4, pp. 518-539, https://doi.org/10.1007/S40429-022-00445-4. [188]

Bozzola, E. et al. (2022), "The Use of Social Media in Children and Adolescents: Scoping Review on the Potential Risks", *International Journal of Environmental Research and Public Health*, Vol. 19/16, https://doi.org/10.3390/IJERPH19169960. [187]

Brushe, M. et al. (2024), "Screen time and parent-child talk when children are aged 12 to 36 months", *JAMA Pediatrics*, Vol. 178/4, pp. 369-375, https://doi.org/10.1001/JAMAPEDIATRICS.2023.6790. [80]

Burns, T. and F. Gottschalk (eds.) (2019), *Educating 21st Century Children: Emotional Well-being in the Digital Age*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/b7f33425-en. [4]

Cabanas-Sánchez, V. et al. (2019), "Associations of total sedentary time, screen time and non-screen sedentary time with adiposity and physical fitness in youth: the mediating effect of physical activity", *Journal of Sports Sciences*, Vol. 37/8, pp. 839-849, https://doi.org/10.1080/02640414.2018.1530058. [53]

Cai, Z. et al. (2023), "Associations Between Problematic Internet Use and Mental Health Outcomes of Students: A Meta-analytic Review", *Adolescent Research Review*, Vol. 8/1, pp. 45-62, https://doi.org/10.1007/S40894-022-00201-9/FIGURES/6. [155]

Calvert, S. et al. (2020), "Young Children's Mathematical Learning From Intelligent Characters", *Child Development*, Vol. 91/5, pp. 1491-1508, https://doi.org/10.1111/CDEV.13341. [25]

Carson, V. et al. (2016), "Systematic review of sedentary behaviour and health indicators in school-aged children and youth: an update", *Applied physiology, nutrition, and metabolism = Physiologie appliquee, nutrition et metabolisme*, Vol. 41/6 Suppl 3, pp. S240-S265, https://doi.org/10.1139/APNM-2015-0630. [50]

Cataldo, I. et al. (2021), "Social Media Usage and Development of Psychiatric Disorders in Childhood and Adolescence: A Review", *Frontiers in Psychiatry*, Vol. 11, https://doi.org/10.3389/FPSYT.2020.508595. [189]

Cespedes, E. et al. (2014), "Television viewing, bedroom television, and sleep duration from infancy to mid-childhood", *Pediatrics*, Vol. 133/5, https://doi.org/10.1542/PEDS.2013-3998. [57]

Chan, R. (2023), "Benefits and risks of LGBT social media use for sexual and gender minority individuals: An investigation of psychosocial mechanisms of LGBT social media use and well-being", *Computers in Human Behavior*, Vol. 139, p. 107531, https://doi.org/10.1016/J.CHB.2022.107531. [146]

Charmaraman, L. et al. (2025), "Youth Digital Wellbeing and Social Connectedness", *Handbook of Children and Screens*, pp. 223-229, https://doi.org/10.1007/978-3-031-69362-5_31. [139]

Charmaraman, L. et al. (2024), "Sexual Minorities and Loneliness: Exploring Sexuality through Social Media and Gender–Sexuality Alliance (GSA) Supports", *International Journal of Environmental Research and Public Health*, Vol. 21/3, p. 300, https://doi.org/10.3390/IJERPH21030300. [207]

Chen, B. et al. (2020), "Associations between early-life screen viewing and 24 hour movement behaviours: findings from a longitudinal birth cohort study", *The Lancet. Child & adolescent health*, Vol. 4/3, pp. 201-209, https://doi.org/10.1016/S2352-4642(19)30424-9. [45]

Cheng, S. et al. (2010), "Early television exposure and children's behavioral and social outcomes at age 30 months", *Volume 20, Issue SUPPL.2, Pages S482-S489*, Vol. 20/SUPPL.2, https://doi.org/10.2188/jea.JE20090179. [95]

Chen, Y. and T. Fan (2024), "Adolescents' mental health, problematic internet use, and their parents' rules on internet use: A latent profile analysis", *Computers in Human Behavior*, Vol. 156, p. 108232, https://doi.org/10.1016/J.CHB.2024.108232. [156]

Choukas-Bradley, S. et al. (2025), "Social Media Use, Body Image Concerns, and Disordered Eating Among Adolescents", *Handbook of Children and Screens*, pp. 149-156, https://doi.org/10.1007/978-3-031-69362-5_21. [196]

Christakis, D. et al. (2004), "Early television exposure and subsequent attentional problems in children", *Pediatrics*, Vol. 113/4, pp. 708-713, https://doi.org/10.1542/PEDS.113.4.708. [94]

Çikrikçi, Ö. (2019), "An exploration of the associations among positivity, general distress and internet addiction: The mediating effect of general distress", *Psychiatry Research*, Vol. 272, pp. 628-637, https://doi.org/10.1016/J.PSYCHRES.2018.12.147. [158]

Clark, D., E. Tanner-Smith and S. Killingsworth (2016), "Digital Games, Design, and Learning: A Systematic Review and Meta-Analysis", *Review of Educational Research*, Vol. 86/1, pp. 79-122, https://doi.org/10.3102/0034654315582065/ASSET/IMAGES/LARGE/10.3102_0034654315582065-FIG3.JPEG. [107]

Cosma, A. (2023), *A focus on adolescent mental health and wellbeing in Europe, central Asia and Canada. Health Behaviour in School-aged Children international report from the 2021/2022 survey*, World Health Organisation, https://iris.who.int/handle/10665/373201 (accessed on 17 June 2024). [12]

Cosma, A. et al. (2024), "Cross-National Trends in Adolescents Psychological and Somatic Complaints Before and After the Onset of COVID-19 Pandemic", *Journal of Adolescent Health*, https://doi.org/10.1016/J.JADOHEALTH.2024.09.028. [121]

Coyne, S. et al. (2025), "Social Media and Youth Mental Health: A Departure from the Status Quo", *Handbook of Children and Screens*, pp. 121-127, https://doi.org/10.1007/978-3-031-69362-5_17. [191]

Coyne, S. et al. (2020), "Pathological video game symptoms from adolescence to emerging adulthood: A 6-year longitudinal study of trajectories, predictors, and outcomes", *Developmental psychology*, Vol. 56/7, pp. 1385-1396, https://doi.org/10.1037/DEV0000939. [161]

Cucalon-Benito, N., L. Perez-Palao and R. Fernandez-Valero (2023), "Impact of abusive screen use on childhood neurodevelopment", *Medical Research Archives*, Vol. 11/11, https://doi.org/10.18103/MRA.V11I11.4730. [76]

De Coninck, D., N. Waechter and L. d'Haenens (2023), "Predicting Self-Reported Depression and Health Among Adolescents: Time Spent Online Mediated by Digital Skills and Digital Activities", *https://home.liebertpub.com/cyber*, Vol. 26/10, pp. 747-754, https://doi.org/10.1089/CYBER.2023.0079. [130]

de Leeuw, S. and I. Rydin (2007), "Migrant children's digital stories", *European Journal of Cultural Studies*, Vol. 10/4, pp. 447-464, https://doi.org/10.1177/1367549407081948. [214]

de Sá, S. et al. (2023), "The Influence of Smartphones on Adolescent Sleep: A Systematic Literature Review", *Nursing Reports 2023, Vol. 13, Pages 612-621*, Vol. 13/2, pp. 612-621, https://doi.org/10.3390/NURSREP13020054. [63]

Dienlin, T. and N. Johannes (2020), "The impact of digital technology use on adolescent well-being", *Dialogues in Clinical Neuroscience*, Vol. 22/2, pp. 135-142, https://doi.org/10.31887/DCNS.2020.22.2/TDIENLIN. [125]

Diminescu, D. (2018), *How has digital technology changed migrants' lives?*, l'MTech, https://imtech.imt.fr/en/2018/12/20/digital-technology-migrants-lives/ (accessed on 6 December 2024). [116]

Dore, R. et al. (2025), "Digital Media Use and Language Development in Early Childhood", *Handbook of Children and Screens*, pp. 39-45, https://doi.org/10.1007/978-3-031-69362-5_6. [70]

Dufour, M. et al. (2016), "Gender Difference in Internet Use and Internet Problems among Quebec High School Students", *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, Vol. 61/10, p. 663, https://doi.org/10.1177/0706743716640755. [163]

Eirich, R. et al. (2022), "Association of Screen Time With Internalizing and Externalizing Behavior Problems in Children 12 Years or Younger: A Systematic Review and Meta-analysis", *JAMA Psychiatry*, Vol. 79/5, pp. 393-405, https://doi.org/10.1001/JAMAPSYCHIATRY.2022.0155. [77]

Fang, K. et al. (2019), "Screen time and childhood overweight/obesity: A systematic review and meta-analysis", *Child: care, health and development*, Vol. 45/5, pp. 744-753, https://doi.org/10.1111/CCH.12701. [51]

Felt, L. and M. & Robb (2016), *Common Sense Census: Media Use by Tweens and Teens*, Common Sense Media, San Francisco, https://www.commonsensemedia.org/sites/default/files/research/report/csm_2016_technology_addiction_research_brief_0.pdf (accessed on 23 May 2024). [152]

Ferguson, C. (2024), *Does the Mere Presence of a Smartphone Make You Dumber?*. [16]

Ferguson, C. (2017), "Everything in Moderation: Moderate Use of Screens Unassociated with Child Behavior Problems", *The Psychiatric quarterly*, Vol. 88/4, pp. 797-805, https://doi.org/10.1007/S11126-016-9486-3. [10]

Ferguson, C. and T. Ceranoglu (2014), "Attention problems and pathological gaming: Resolving the 'chicken and egg' in a prospective analysis", *Psychiatric Quarterly*, Vol. 85/1, pp. 103-110, https://doi.org/10.1007/S11126-013-9276-0/FIGURES/2. [90]

Ferguson, C. and M. Heene (2021), "Providing a Lower-Bound Estimate for Psychology's "Crud Factor":The Case of Aggression", *Professional Psychology: Research and Practice*, Vol. 52/6, pp. 620-626, https://doi.org/10.1037/PRO0000386. [19]

Ferguson, C. et al. (2021), "Like This Meta-Analysis: Screen Media and Mental Health", *Professional Psychology: Research and Practice*, Vol. 53/2, pp. 205-214, https://doi.org/10.1037/PRO0000426. [127]

Fielding, K. and K. Murcia (2022), "Research linking digital technologies to young children's creativity: An interpretive framework and systematic review", *Issues in Educational Research*, Vol. 32/1. [112]

Fioravanti, G. et al. (2022), "How the Exposure to Beauty Ideals on Social Networking Sites Influences Body Image: A Systematic Review of Experimental Studies", *Adolescent Research Review*, Vol. 7/3, pp. 419-458, https://doi.org/10.1007/S40894-022-00179-4/TABLES/2. [197]

Foreman, J. et al. (2021), "Association between digital smart device use and myopia: a systematic review and meta-analysis", *The Lancet Digital Health*, Vol. 3/12, pp. e806-e818, https://doi.org/10.1016/S2589-7500(21)00135-7. [56]

Gabrielle, T., M. Sonne and N. Indolo (2024), "The Impact of Social Media on Adolescent Mental Health: A Meta-Analysis", *Scientia Psychiatrica*, Vol. 5/3, pp. 551-564, https://doi.org/10.37275/SCIPSY.V5I3.175. [128]

Gao, Y., J. Wang and G. Dong (2022), "The prevalence and possible risk factors of internet gaming disorder among adolescents and young adults: Systematic reviews and meta-analyses", *Journal of Psychiatric Research*, Vol. 154, pp. 35-43, https://doi.org/10.1016/J.JPSYCHIRES.2022.06.049. [182]

Geng, X. et al. (2023), "Problematic use of the internet among adolescents: A four-wave longitudinal study of trajectories, predictors and outcomes", *Journal of Behavioral Addictions*, Vol. 12/2, p. 435, https://doi.org/10.1556/2006.2023.00021. [160]

George, M. et al. (2020), "Young Adolescents' Digital Technology Use, Perceived Impairments, and Well-Being in a Representative Sample", *The Journal of pediatrics*, Vol. 219, pp. 180-187, https://doi.org/10.1016/J.JPEDS.2019.12.002. [203]

Ghali, S. et al. (2023), "A Systematic Review of the Association of Internet Gaming Disorder and Excessive Social Media Use With Psychiatric Comorbidities in Children and Adolescents: Is It a Curse or a Blessing?", *Cureus*, Vol. 15/8, p. e43835, https://doi.org/10.7759/CUREUS.43835. [181]

Gingras, M. et al. (2023), "Adolescents and Social Media: Longitudinal Links Between Types of Use, Problematic Use and Internalizing Symptoms", *Research on child and adolescent psychopathology*, Vol. 51/11, pp. 1641-1655, https://doi.org/10.1007/S10802-023-01084-7. [131]

Gray, J., M. Carter and B. Egliston (2024), "Governing Social Virtual Reality", *Governing Social Virtual Reality*, https://doi.org/10.1007/978-3-031-61831-4. [30]

Griffiths, M. et al. (2025), "Gaming Disorder Among Children and Adolescents", *Handbook of Children and Screens*, pp. 187-194, https://doi.org/10.1007/978-3-031-69362-5_26. [184]

Gros, L. et al. (2020), "Video Game Addiction and Emotional States: Possible Confusion Between Pleasure and Happiness?", *Frontiers in psychology*, Vol. 10, https://doi.org/10.3389/FPSYG.2019.02894. [173]

Guellai, B. et al. (2022), "Effects of screen exposure on young children's cognitive development: A review", *Frontiers in Psychology*, Vol. 13, p. 923370, https://doi.org/10.3389/FPSYG.2022.923370/BIBTEX. [75]

Gueron-Sela, N. and A. Gordon-Hacker (2020), "Longitudinal Links Between Media Use and Focused Attention Through Toddlerhood: A Cumulative Risk Approach", *Frontiers in Psychology*, Vol. 11, p. 569222, https://doi.org/10.3389/FPSYG.2020.569222/BIBTEX. [96]

Haddock, A. et al. (2022), "Positive Effects of Digital Technology Use by Adolescents: A Scoping Review of the Literature", *International Journal of Environmental Research and Public Health*, Vol. 19/21, p. 14009, https://doi.org/10.3390/IJERPH192114009. [106]

Haidt, J. (2024), *The Anxious Generation : How the Great Rewiring of childhood is causing an epidemic of mental illness*, Penguin Press. [13]

Hale, L. and S. Guan (2015), "Screen time and sleep among school-aged children and adolescents: A systematic literature review", *Sleep Medicine Reviews*, Vol. 21, pp. 50-58, https://doi.org/10.1016/J.SMRV.2014.07.007. [62]

Hale, L. et al. (2025), "What Do We Know About the Link Between Screens and Sleep Health?", *Handbook of Children and Screens*, pp. 101-107, https://doi.org/10.1007/978-3-031-69362-5_14. [59]

Hamilton, J. et al. (2025), "Who Is Most at Risk?: Identifying the Risks for Mental Health Problems Related to Social Media", *Handbook of Children and Screens*, pp. 157-164, https://doi.org/10.1007/978-3-031-69362-5_22. [199]

Hancock, J. et al. (2022), "Psychological Well-Being and Social Media Use: A Meta-Analysis of Associations between Social Media Use and Depression, Anxiety, Loneliness, Eudaimonic, Hedonic and Social Well-Being", *SSRN Electronic Journal*, https://doi.org/10.2139/SSRN.4053961. [126]

Harris, J. et al. (2025), "Digital Food Marketing and Children's Health and Well-being", *Handbook of Children and Screens*, pp. 81-90, https://doi.org/10.1007/978-3-031-69362-5_12. [54]

Haug, S. et al. (2015), "Smartphone use and smartphone addiction among young people in Switzerland", *Journal of behavioral addictions*, Vol. 4/4, pp. 299-307, https://doi.org/10.1556/2006.4.2015.037. [151]

Heffer, T. et al. (2019), "The Longitudinal Association Between Social-Media Use and Depressive Symptoms Among Adolescents and Young Adults: An Empirical Reply to Twenge et al. (2018)", *Clinical Psychological Science*, Vol. 7/3, pp. 462-470, https://doi.org/10.1177/2167702618812727/ASSET/IMAGES/LARGE/10.1177_2167702618812727-FIG1.JPEG. [124]

Hetherington, E. et al. (2020), "Longitudinal Predictors of Self-Regulation at School Entry: Findings from the All Our Families Cohort", *Children (Basel, Switzerland)*, Vol. 7/10, https://doi.org/10.3390/CHILDREN7100186. [212]

Horowitz-Kraus, T. and J. Hutton (2018), "Brain connectivity in children is increased by the time they spend reading books and decreased by the length of exposure to screen-based media", *Acta Paediatrica*, Vol. 107/4, pp. 685-693, https://doi.org/10.1111/APA.14176. [91]

Hussain, Z. and M. Griffiths (2018), "Problematic social networking site use and comorbid psychiatric disorders: A systematic review of recent large-scale studies", *Frontiers in Psychiatry*, Vol. 9, p. 429595, https://doi.org/10.3389/FPSYT.2018.00686/BIBTEX. [190]

Hutton, J. et al. (2020), "Associations Between Screen-Based Media Use and Brain White Matter Integrity in Preschool-Aged Children", *JAMA pediatrics*, Vol. 174/1, https://doi.org/10.1001/JAMAPEDIATRICS.2019.3869. [92]

Hutton, J. et al. (2024), "Digital Media and Developing Brains: Concerns and Opportunities", *Current Addiction Reports*, Vol. 11/2, pp. 287-298, https://doi.org/10.1007/S40429-024-00545-3/TABLES/1. [74]

Internet Matters (2022), *Children's Wellbeing Index Report 2022*, Internet Matters, London, https://www.internetmatters.org/resources/childrens-wellbeing-in-a-digital-world-index-report-2022/ (accessed on 21 May 2024). [149]

Ito, M. et al. (2020), *Social Media and Youth Wellbeing: What We Know and Where We Could Go*, https://clalliance.org (accessed on 22 May 2024). [141]

Janssen, X. et al. (2020), "Associations of screen time, sedentary time and physical activity with sleep in under 5s: A systematic review and meta-analysis", *Sleep Medicine Reviews*, Vol. 49, p. 101226, https://doi.org/10.1016/J.SMRV.2019.101226. [61]

Jones, R. et al. (2023), "Digital technologies to support adolescents with depression and anxiety: review", *Bjpsych Advances*, Vol. 29/4, p. 239, https://doi.org/10.1192/BJA.2022.3. [134]

Jourdren, M., A. Bucaille and J. Ropars (2023), "The Impact of Screen Exposure on Attention Abilities in Young Children: A Systematic Review", *Pediatric Neurology*, Vol. 142, pp. 76-88, https://doi.org/10.1016/j.pediatrneurol.2023.01.005. [89]

Kardefelt Winther, D., S. Livingstone and M. Saeed (2019), *Growing up in a connected world*, UNICEF Office of Research - Innocenti, Florence. [114]

Kardefelt-Winther, D. (2017), "Conceptualizing Internet use disorders: Addiction or coping process?", *Psychiatry and clinical neurosciences*, Vol. 71/7, pp. 459-466, https://doi.org/10.1111/PCN.12413. [178]

Katz, V. (2010), "How Children of Immigrants Use Media to Connect Their Families to the Community", *Journal of Children and Media*, Vol. 4/3, pp. 298-315, https://doi.org/10.1080/17482798.2010.486136. [115]

Kaufman, J. et al. (2025), "Immersive Horizons: Navigating the Impacts of Virtual Reality on Children and Families", *Handbook of Children and Screens*, pp. 635-642, https://doi.org/10.1007/978-3-031-69362-5_86. [29]

Kelly, Y. et al. (2018), "Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study", *eClinicalMedicine*, Vol. 6, pp. 59-68, https://doi.org/10.1016/J.ECLINM.2018.12.005. [193]

Kirkorian, H. et al. (2025), "Digital Media, Cognition, and Brain Development in Infancy and Childhood", *Handbook of Children and Screens*, pp. 13-20, https://doi.org/10.1007/978-3-031-69362-5_3. [71]

Kokka, I. et al. (2021), "Exploring the Effects of Problematic Internet Use on Adolescent Sleep: A Systematic Review", *International journal of environmental research and public health*, Vol. 18/2, pp. 1-14, https://doi.org/10.3390/IJERPH18020760. [67]

Kruzan, K. et al. (2025), "Media Influences on Self-Harm, Suicidality, and Suicide", *Handbook of Children and Screens*, pp. 141-147, https://doi.org/10.1007/978-3-031-69362-5_20. [200]

Kuss, D. and M. Griffiths (2017), "Social Networking Sites and Addiction: Ten Lessons Learned", *International Journal of Environmental Research and Public Health*, Vol. 14/3, https://doi.org/10.3390/IJERPH14030311. [150]

Kuss, D. and O. Lopez-Fernandez (2016), "Internet addiction and problematic Internet use: A systematic review of clinical research", *World journal of psychiatry*, Vol. 6/1, p. 143, https://doi.org/10.5498/WJP.V6.I1.143. [177]

Lanca, C. and S. Saw (2020), "The association between digital screen time and myopia: A systematic review", *Ophthalmic and Physiological Optics*, Vol. 40/2, pp. 216-229, https://doi.org/10.1111/OPO.12657. [55]

Lebedíková, M. et al. (2024), *Do smartphones really cause mental illness among adolescents? Ten problems with Jonathan Haidt's book*, https://blogs.lse.ac.uk/parenting4digitalfuture/2024/05/15/haidt/ (accessed on 10 August 2024). [15]

Lee, H. et al. (2020), "Getting Fewer "Likes" Than Others on Social Media Elicits Emotional Distress Among Victimized Adolescents", *Child development*, Vol. 91/6, pp. 2141-2159, https://doi.org/10.1111/CDEV.13422. [140]

Lei, H., M. Chiu and S. Li (2019), "Subjective well-being and internet overuse: A meta-analysis of mainland Chinese students", *Current Psychology*, Vol. 39/3, pp. 843-853, https://doi.org/10.1007/s12144-019-00313-x. [165]

Li, C. et al. (2020), "The Relationships between Screen Use and Health Indicators among Infants, Toddlers, and Preschoolers: A Meta-Analysis and Systematic Review", *International Journal of Environmental Research and Public Health 2020, Vol. 17, Page 7324*, Vol. 17/19, p. 7324, https://doi.org/10.3390/IJERPH17197324. [42]

Liu, S. et al. (2024), "The Use of Digital Technologies to Develop Young Children's Language and Literacy Skills: A Systematic Review", *SAGE Open*, Vol. 14/1, https://doi.org/10.1177/21582440241230850. [69]

Liu, S. et al. (2022), "Core symptoms and symptom relationships of problematic internet use across early, middle, and late adolescence: A network analysis", *Computers in Human Behavior*, Vol. 128, p. 107090, https://doi.org/10.1016/J.CHB.2021.107090. [159]

Livingstone, S., G. Mascheroni and M. Stoilova (2023), "The outcomes of gaining digital skills for young people's lives and wellbeing: A systematic evidence review", *New Media and Society*, Vol. 25/5, pp. 1176-1202, https://doi.org/10.1177/14614448211043189. [109]

Lizandra, J. et al. (2019), "Screen time and moderate-to-vigorous physical activity changes and displacement in adolescence: A prospective cohort study", *European journal of sport science*, Vol. 19/5, pp. 686-695, https://doi.org/10.1080/17461391.2018.1548649. [48]

Lozano-Blasco, R. and A. Cortés-Pascual (2020), "Problematic Internet uses and depression in adolescents: A meta-analysis", *Comunicar*, Vol. 28/63, pp. 109-120, https://doi.org/10.3916/c63-2020-10. [166]

Lukavská, K. et al. (2022), "The associations of adolescent problematic internet use with parenting: A meta-analysis", *Addictive Behaviors*, Vol. 135, p. 107423, https://doi.org/10.1016/J.ADDBEH.2022.107423. [168]

Luker, E. (2022), *Are video games, screens another addiction?*, https://www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/are-video-games-and-screens-another-addiction (accessed on 22 May 2024). [175]

Lund, L. et al. (2021), "Electronic media use and sleep in children and adolescents in western countries: a systematic review", *BMC Public Health*, Vol. 21/1, https://doi.org/10.1186/S12889-021-11640-9. [65]

Madigan, S. et al. (2020), "Associations Between Screen Use and Child Language Skills: A Systematic Review and Meta-analysis", *JAMA Pediatrics*, Vol. 174/7, pp. 665-675, https://doi.org/10.1001/JAMAPEDIATRICS.2020.0327. [73]

Marciano, L. et al. (2025), "Digital Media, Cognition, and Brain Development in Adolescence", *Handbook of Children and Screens*, pp. 21-29, https://doi.org/10.1007/978-3-031-69362-5_4. [93]

Marsh, J. et al. (2018), "Play and creativity in young children's use of apps", *British Journal of Educational Technology*, Vol. 49/5, pp. 870-882, https://doi.org/10.1111/bjet.12622. [111]

Massaroni, V. et al. (2023), "The Relationship between Language and Technology: How Screen Time Affects Language Development in Early Life—A Systematic Review", *Brain Sciences 2024, Vol. 14, Page 27*, Vol. 14/1, p. 27, https://doi.org/10.3390/BRAINSCI14010027. [72]

Masur, P. (2021), "Digital Communication Effects on Loneliness and Life Satisfaction", *Oxford Research Encyclopedia of Communication*, https://doi.org/10.1093/ACREFORE/9780190228613.013.1129. [144]

McArthur, B. et al. (2022), "Global Prevalence of Meeting Screen Time Guidelines Among Children 5 Years and Younger", *JAMA Pediatrics*, Vol. 176/4, p. 373, https://doi.org/10.1001/jamapediatrics.2021.6386. [87]

McAuliffe, M., J. Blower and A. Beduschi (2021), "Digitalization and Artificial Intelligence in Migration and Mobility: Transnational Implications of the COVID-19 Pandemic", *Societies 2021, Vol. 11, Page 135*, Vol. 11/4, p. 135, https://doi.org/10.3390/SOC11040135. [117]

McGorry, P. et al. (2024), "The Lancet Psychiatry Commission on youth mental health - Policy Brief", *The Lancet Psychiatry*, Vol. 11/9, pp. 731-774, https://doi.org/10.1016/S2215-0366(24)00163-9. [11]

Moorman, J., P. Morgan and T. Adams (2019), "The Implications of Screen Media Use for the Sleep Behavior of Children Ages 0–5: a Systematic Review of the Literature", *Current Sleep Medicine Reports*, Vol. 5/3, pp. 164-172, https://doi.org/10.1007/S40675-019-00151-0/METRICS. [64]

Munzer, T. (2024), *How Will Artificial Intelligence (AI) Affect Children?*, https://www.healthychildren.org/English/family-life/Media/Pages/how-will-artificial-intelligence-AI-affect-children.aspx (accessed on 22 July 2024). [23]

Nagata, J. et al. (2022), "Social epidemiology of early adolescent problematic screen use in the United States", *Pediatric Research*, Vol. 92/5, p. 1443, https://doi.org/10.1038/S41390-022-02176-8. [174]

Naslund, J. et al. (2016), "The future of mental health care: peer-to-peer support and social media", *Epidemiology and Psychiatric Sciences*, Vol. 25/2, p. 113, https://doi.org/10.1017/S2045796015001067. [148]

Nathanson, A. (2024), "Sleep and Technology in Early Childhood", *Psychiatric Clinics of North America*, Vol. 47/1, pp. 15-26, https://doi.org/10.1016/j.psc.2023.06.002. [58]

Nesi, J. et al. (2021), "Social media use and self-injurious thoughts and behaviors: A systematic review and meta-analysis", *Clinical psychology review*, Vol. 87, https://doi.org/10.1016/J.CPR.2021.102038. [202]

Nesi, J., S. Choukas-Bradley and M. Prinstein (2018), "Transformation of Adolescent Peer Relations in the Social Media Context: Part 1—A Theoretical Framework and Application to Dyadic Peer Relationships", *Clinical Child and Family Psychology Review*, Vol. 21/3, pp. 267-294, https://doi.org/10.1007/S10567-018-0261-X/TABLES/2. [137]

Nielsen, P., N. Favez and H. Rigter (2020), "Parental and Family Factors Associated with Problematic Gaming and Problematic Internet Use in Adolescents: a Systematic Literature Review", *Current Addiction Reports*, Vol. 7/3, pp. 365-386, https://doi.org/10.1007/S40429-020-00320-0/FIGURES/2. [185]

Notley, T. and A. Aziz (2024), "The unjust burden of digital inclusion for low-income migrant parents", *Policy & Internet*, Vol. 16/2, pp. 428-442, https://doi.org/10.1002/poi3.383. [215]

Nowland, R., E. Necka and J. Cacioppo (2018), "Loneliness and Social Internet Use: Pathways to Reconnection in a Digital World?", *Perspectives on Psychological Science*, Vol. 13/1, pp. 70-87, https://doi.org/10.1177/1745691617713052/ASSET/IMAGES/LARGE/10.1177_1745691617713052-FIG1.JPEG. [143]

Nutley, S. and L. Thorell (2022), "English summary Digital media and mental health problems in children and adolescents: A research overview". [123]

Odgers, C. (2024), "The great rewiring: is social media really behind an epidemic of teenage mental illness?", *Nature*, Vol. 628/8006, pp. 29-30, https://doi.org/10.1038/d41586-024-00902-2. [14]

Odgers, C. and M. Jensen (2020), "Annual Research Review: Adolescent mental health in the digital age: facts, fears, and future directions", *Journal of Child Psychology and Psychiatry*, Vol. 61/3, pp. 336-348, https://doi.org/10.1111/JCPP.13190. [122]

OECD (2024), "Managing screen time: How to protect and equip students against distraction", *PISA in Focus*, No. 124, OECD Publishing, Paris, https://doi.org/10.1787/7c225af4-en. [104]

OECD (2024), "Mental health and digital environments", in *OECD Digital Economy Outlook 2024 (Volume 1): Embracing the Technology Frontier*, OECD Publishing, Paris, https://doi.org/10.1787/596e067d-en. [2]

OECD (2024), *OECD Digital Economy Outlook 2024 (Volume 1): Embracing the Technology Frontier*, OECD Publishing, Paris, https://doi.org/10.1787/a1689dc5-en. [32]

OECD (2024), "Shaping a rights-oriented digital transformation", *OECD Digital Economy Papers*, No. 368, OECD Publishing, Paris, https://doi.org/10.1787/86ee84e2-en. [38]

OECD (2023), *PISA 2022 Results (Volume I): The State of Learning and Equity in Education*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/53f23881-en. [103]

OECD (2022), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html. [102]

OECD (2021), "Children in the digital environment: Revised typology of risks", *OECD Digital Economy Papers*, No. 302, OECD Publishing, Paris, https://doi.org/10.1787/9b8f222e-en. [1]

OECD (2021), *Measuring What Matters for Child Well-being and Policies*, OECD Publishing, Paris, https://doi.org/10.1787/e82fded1-en. [132]

OECD (2018), *Children and Young People's Mental Health in the Digital Age*, OECD, Paris, http://www.oecd.org/els/health-systems/Children-and-Young-People-Mental-Health-in-the-Digital-Age.pdf. [3]

OECD (n.d.), *OECD Child Well-Being Data Portal*, https://www.oecd.org/en/data/datasets/oecd-child-well-being-data-portal.html. [216]

Orben, A. and A. Przybylski (2019), "The association between adolescent well-being and digital technology use", *Nature human behaviour*, Vol. 3/2, pp. 173-182, https://doi.org/10.1038/S41562-018-0506-1. [20]

Orben, A. et al. (2022), "Windows of developmental sensitivity to social media", *Nature Communications 2022 13:1*, Vol. 13/1, pp. 1-10, https://doi.org/10.1038/s41467-022-29296-3. [8]

Ortuño-Sierra, J. et al. (2022), "Problematic Internet Use and wellbeing during adolescence", *European Psychiatry*, Vol. 65/S1, pp. S296-S296, https://doi.org/10.1192/J.EURPSY.2022.755. [157]

Ott, M. and F. Pozzi (2012), "Digital games as creativity enablers for children", *Behaviour & Information Technology*, Vol. 31/10, pp. 1011-1019, https://doi.org/10.1080/0144929x.2010.526148. [113]

Paulus, F. et al. (2018), "Internet gaming disorder in children and adolescents: a systematic review", *Developmental Medicine and Child Neurology*, Vol. 60/7, pp. 645-659, https://doi.org/10.1111/DMCN.13754/ABSTRACT. [183]

Pavlopoulou, G., C. Usher and A. Pearson (2022), "'I can actually do it without any help or someone watching over me all the time and giving me constant instruction': Autistic adolescent boys' perspectives on engagement in online video gaming", *British Journal of Developmental Psychology*, Vol. 40/4, pp. 557-571, https://doi.org/10.1111/BJDP.12424. [85]

Pearson, N. et al. (2014), "Associations between sedentary behaviour and physical activity in children and adolescents: a meta-analysis", *Obesity Reviews*, Vol. 15/8, p. 666, https://doi.org/10.1111/OBR.12188. [44]

Pedersen, J. et al. (2022), "Effects of Limiting Recreational Screen Media Use on Physical Activity and Sleep in Families With Children: A Cluster Randomized Clinical Trial", *JAMA pediatrics*, Vol. 176/8, pp. 741-749, https://doi.org/10.1001/JAMAPEDIATRICS.2022.1519. [47]

Pellicane, M., J. Cooks and J. Ciesla (2021), "Longitudinal effects of social media experiences on depression and anxiety in LGB+ and heterosexual young adults", *Journal of Gay & Lesbian Mental Health*, Vol. 25/1, pp. 68-93, https://doi.org/10.1080/19359705.2020.1776805. [206]

Ponti, M. et al. (2017), "Screen time and young children: Promoting health and development in a digital world", *Paediatrics & Child Health*, Vol. 22/8, p. 461, https://doi.org/10.1093/PCH/PXX123. [36]

Popat, A. and C. Tarrant (2023), "Exploring adolescents' perspectives on social media and mental health and well-being – A qualitative literature review", *Clinical Child Psychology and Psychiatry*, Vol. 28/1, pp. 323-337, https://doi.org/10.1177/13591045221092884/ASSET/IMAGES/LARGE/10.1177_13591045221092884-FIG1.JPEG. [209]

Primack, B. et al. (2018), "The association between valence of social media experiences and depressive symptoms", *Depression and Anxiety*, Vol. 35/8, pp. 784-794, https://doi.org/10.1002/DA.22779. [204]

Przybylski, A. (2014), "Electronic Gaming and Psychosocial Adjustment", *Pediatrics*, Vol. 134/3, pp. e716-e722, https://doi.org/10.1542/PEDS.2013-4021. [129]

Przybylski, A. and N. Weinstein (2017), "A Large-Scale Test of the Goldilocks Hypothesis", *Psychological Science*, Vol. 28/2, pp. 204-215, https://doi.org/10.1177/0956797616678438. [9]

Putnick, D. et al. (2022), "Displacement of peer play by screen time: associations with toddler development", *Pediatric Research 2022 93:5*, Vol. 93/5, pp. 1425-1431, https://doi.org/10.1038/s41390-022-02261-y. [46]

Radesky, J. et al. (2023), *Constant Companion: A Week in the Life of a Young Person's Smartphone Use*, Common Sense Media, San Fransisco, https://www.commonsensemedia.org/sites/default/files/research/report/2023-cs-smartphone-research-report_final-for-web.pdf (accessed on 23 May 2024). [153]

Rapp, A. (2022), "Time, engagement and video games: How game design elements shape the temporalities of play in massively multiplayer online role-playing games", *Information Systems Journal*, Vol. 32/1, pp. 5-32, https://doi.org/10.1111/ISJ.12328. [170]

Rayland, A. and J. Andrews (2023), "From Social Network to Peer Support Network: Opportunities to Explore Mechanisms of Online Peer Support for Mental Health", *JMIR Mental Health*, Vol. 10, p. e41855, https://doi.org/10.2196/41855. [147]

Reed, J., K. Hirsh-Pasek and R. Golinkoff (2017), "Learning on hold: Cell phones sidetrack parent-child interactions", *Developmental psychology*, Vol. 53/8, pp. 1428-1436, https://doi.org/10.1037/DEV0000292. [81]

Richert, R. et al. (2025), "Imagination, Creativity, and Play", *Handbook of Children and Screens*, pp. 47-53, https://doi.org/10.1007/978-3-031-69362-5_7. [110]

Rosen, L. et al. (2014), "Media and technology use predicts ill-being among children, preteens and teenagers independent of the negative health impacts of exercise and eating habits", *Computers in Human Behavior*, Vol. 35, pp. 364-375, https://doi.org/10.1016/J.CHB.2014.01.036. [211]

Ruiz, N., G. León and H. Heuer (2024), "Design Frictions on Social Media: Balancing Reduced Mindless Scrolling and User Satisfaction", *Proceedings of Mensch und Computer 2024 (MuC '24), September 1â•fi4, 2024, Karlsruhe, Germany*, Vol. 1, https://doi.org/10.1145/3670653.3677495. [171]

Sala, A., L. Porcaro and E. Gómez (2024), "Social Media Use and adolescents' mental health and well-being: An umbrella review", *Computers in Human Behavior Reports*, Vol. 14, p. 100404, https://doi.org/10.1016/J.CHBR.2024.100404. [186]

Santos, R. et al. (2022), "The Association between Screen Time and Attention in Children: A Systematic Review", *Developmental Neuropsychology*, Vol. 47/4, pp. 175-192, https://doi.org/10.1080/87565641.2022.2064863. [88]

Sarfraz, S. et al. (2023), "Early Screen-Time Exposure and Its Association With Risk of Developing Autism Spectrum Disorder: A Systematic Review", *Cureus*, Vol. 15/7, https://doi.org/10.7759/CUREUS.42292. [83]

Schwarz, A. et al. (2020), "Design Features Associated with User Engagement in Digital Games for Healthy Lifestyle Promotion in Youth: A Systematic Review of Qualitative and Quantitative Studies", *Games for health journal*, Vol. 9/3, pp. 150-163, https://doi.org/10.1089/G4H.2019.0058. [169]

Scott, R. et al. (2024), "Daily use of digital technologies to feel better: Adolescents' digital emotion regulation, emotions, loneliness, and recovery, considering prior emotional problems", *Journal of Adolescence*, Vol. 96/3, pp. 539-550, https://doi.org/10.1002/JAD.12259. [133]

Selwyn, N. and P. Jandrić (2020), "Postdigital Living in the Age of Covid-19: Unsettling What We See as Possible", *Postdigital Science and Education*, Vol. 2/3, pp. 989-1005, https://doi.org/10.1007/S42438-020-00166-9/METRICS. [27]

Senekal, J. et al. (2023), "Social media and adolescent psychosocial development: a systematic review", *South African Journal of Psychology*, Vol. 53/2, pp. 157-171, https://doi.org/10.1177/00812463221119302. [192]

Shankleman, M., L. Hammond and F. Jones (2021), "Adolescent Social Media Use and Well-Being: A Systematic Review and Thematic Meta-synthesis", *Adolescent Research Review*, Vol. 6/4, pp. 471-492, https://doi.org/10.1007/S40894-021-00154-5/METRICS. [108]

Shin, D., A. Rasul and A. Fotiadis (2022), "Why am I seeing this? Deconstructing algorithm literacy through the lens of users", *Internet Research*, Vol. 32/4, pp. 1214-1234, https://doi.org/10.1108/INTR-02-2021-0087/FULL/XML. [28]

Siderius, L. et al. (2023), "Digital child health: opportunities and obstacles. A joint statement of European Academy of Paediatrics and European Confederation of Primary Care Paediatricians", *Frontiers in Pediatrics*, Vol. 11, p. 1264829, https://doi.org/10.3389/FPED.2023.1264829/BIBTEX. [35]

Siriudomsait, J. (2023), "AI-Psychology Connection: Unmasking AI's Impact on Teenage Body Image and Mental Health", *Scholar for Tomorrow*, https://www.scholaroftomorrow.org/blog/ai-psychology-connection-unmasking-ai-s-impact-on-teenage-body-image-and (accessed on 17 December 2024). [26]

Siva, N. (2020), "Loneliness in children and young people in the UK", *The Lancet Child and Adolescent Health*, Vol. 4/8, pp. 567-568, https://doi.org/10.1016/S2352-4642(20)30213-3. [142]

Skogen, J. et al. (2023), "Commonly reported negative experiences on social media are associated with poor mental health and well-being among adolescents: results from the "LifeOnSoMe"-study", *Frontiers in public health*, Vol. 11, https://doi.org/10.3389/FPUBH.2023.1192788. [205]

Staiano, A. et al. (2025), "Screen Media, Obesity, and Nutrition", *Handbook of Children and Screens*, pp. 73-80, https://doi.org/10.1007/978-3-031-69362-5_11. [52]

Stevens, G. (2024), "Editorial: Adolescent mental health in a rapidly changing world", *Journal of Child Psychology and Psychiatry*, Vol. 65/12, pp. 1551-1553, https://doi.org/10.1111/JCPP.14065. [120]

Stiglic, N. and R. Viner (2019), "Effects of screentime on the health and well-being of children and adolescents: a systematic review of reviews", *BMJ Open*, Vol. 9/1, p. e023191, https://doi.org/10.1136/BMJOPEN-2018-023191. [40]

Sugawara, M. et al. (2015), "Trajectories of early television contact in Japan: Relationship with preschoolers' externalizing problems", *Journal of Children and Media*, Vol. 9/4, pp. 453-471, https://doi.org/10.1080/17482798.2015.1089298. [99]

Sugiyama, M. et al. (2023), "Outdoor Play as a Mitigating Factor in the Association Between Screen Time for Young Children and Neurodevelopmental Outcomes", *JAMA Pediatrics*, Vol. 177/3, p. 303, https://doi.org/10.1001/jamapediatrics.2022.5356. [82]

Suni, E. and N. Vyas (2023), "Can School Performance Be Improved With Good Sleep?", https://www.sleepfoundation.org/children-and-sleep/sleep-and-school-performance (accessed on 2 May 2024). [39]

Sussman, C. et al. (2018), "Internet and Video Game Addictions: Diagnosis, Epidemiology, and Neurobiology", *Child and adolescent psychiatric clinics of North America*, Vol. 27/2, pp. 307-326, https://doi.org/10.1016/J.CHC.2017.11.015. [179]

Svendsen, C. (2024), "Disconnected in a connected world: Gender differences in loneliness and the impact of technology", *Master thesis*, Long Island University, Boston, https://digitalcommons.liu.edu/cgi/viewcontent.cgi?article=1034&context=brooklyn_fulltext_master_theses (accessed on 10 December 2024). [164]

Swing, E. et al. (2010), "Television and video game exposure and the development of attention problems", *Pediatrics*, Vol. 126/2, pp. 214-221, https://doi.org/10.1542/PEDS.2009-1508. [98]

Takahashi, I. et al. (2023), "Screen Time at Age 1 Year and Communication and Problem-Solving Developmental Delay at 2 and 4 Years", *JAMA Pediatrics*, Vol. 177/10, pp. 1039-1046, https://doi.org/10.1001/JAMAPEDIATRICS.2023.3057. [78]

Tao, X. and C. Fisher (2022), "Exposure to Social Media Racial Discrimination and Mental Health among Adolescents of Color", *Journal of youth and adolescence*, Vol. 51/1, pp. 30-44, https://doi.org/10.1007/S10964-021-01514-Z. [201]

The Lancet Psychiatry Commission on youth mental health (2024), "The Lancet Psychiatry Commission on Youth Mental Health – Policy Brief", *The Lancet Psychiatry*. [119]

Tiches, K. (2023), *Children & Artificial Intelligence*, Boston Children's Digital Wellness Lab, Boston, https://digitalwellnesslab.org/research-briefs/children-artificial-intelligence/ (accessed on 22 July 2024). [24]

Tremblay, M. et al. (2025), "Digital Screen Media Use, Movement Behaviors, and Child Health", *Handbook of Children and Screens*, pp. 63-72, https://doi.org/10.1007/978-3-031-69362-5_10. [43]

Twenge, J. et al. (2025), "Social Media and Depressive Symptoms", *Handbook of Children and Screens*, pp. 137-140, https://doi.org/10.1007/978-3-031-69362-5_19. [195]

UNICEF (2023), *Generative AI: Risks and Opportunities for Children. Wow can we empower and protect children in the face of Artificial Intelligence?*, Innocenti – Global Office of Research and Foresight, https://www.unicef.org/innocenti/generative-ai-risks-and-opportunities-children (accessed on 22 July 2024). [21]

UNICEF (2020), "Policy guidance on AI for children". [22]

Valkenburg, P., I. Beyens and L. Keijsers (2024), "Investigating Heterogeneity in (Social) Media Effects: Experience-Based Recommendations", *Meta-Psychology*, Vol. 8, https://doi.org/10.15626/mp.2022.3649. [17]

Valkenburg, P. et al. (2021), "Social Media Use and Adolescents' Self-Esteem: Heading for a Person-Specific Media Effects Paradigm", *Journal of Communication*, Vol. 71, pp. 56-78, https://doi.org/10.1093/joc/jqaa039. [18]

Valkenburg, P., A. Meier and I. Beyens (2022), "Social media use and its impact on adolescent mental health: An umbrella review of the evidence", *Current Opinion in Psychology*, Vol. 44, pp. 58-68, https://doi.org/10.1016/J.COPSYC.2021.08.017. [198]

Veldman, S. et al. (2023), "Correlates of screen time in the early years (0–5 years): A systematic review", *Preventive Medicine Reports*, Vol. 33, pp. 2211-3355, https://doi.org/10.1016/J.PMEDR.2023.102214. [66]

Verlinden, M. et al. (2012), "Television Viewing and Externalizing Problems in Preschool Children: The Generation R Study", *Archives of Pediatrics & Adolescent Medicine*, Vol. 166/10, pp. 919-925, https://doi.org/10.1001/ARCHPEDIATRICS.2012.653. [97]

Vidal, C. et al. (2020), "Social media use and depression in adolescents: a scoping review", *International review of psychiatry (Abingdon, England)*, Vol. 32/3, p. 235, https://doi.org/10.1080/09540261.2020.1720623. [194]

WHO (n.d.), *Health Behaviour in School-aged Children (HBSC) cross-national survey*, World Health Organization, Regional Office for Europe, https://hbsc.org/about/. [136]

Wu, Y. et al. (2022), "Childhood psychological maltreatment and internet gaming addiction in Chinese adolescents: Mediation roles of maladaptive emotion regulation strategies and psychosocial problems", *Child abuse & neglect*, Vol. 129, https://doi.org/10.1016/J.CHIABU.2022.105669. [167]

Yamada-Rice, D. et al. (2017), "Children and Virtual Reality: Emerging Possibilities and Challenges". [31]

Yang, S. et al. (2023), "Associations of screen use with cognitive development in early childhood: the ELFE birth cohort", *Journal of Child Psychology and Psychiatry*, Vol. 65/5, pp. 680-693, https://doi.org/10.1111/jcpp.13887. [79]

Yau, J. and S. Reich (2019), ""It's Just a Lot of Work": Adolescents' Self-Presentation Norms and Practices on Facebook and Instagram", *Journal of research on adolescence : the official journal of the Society for Research on Adolescence*, Vol. 29/1, pp. 196-209, https://doi.org/10.1111/JORA.12376. [138]

Zeng, N., S. Ye and N. Mena (2023), "Editorial: The use of digital technologies in the promotion of children's health", *Frontiers in Pediatrics*, Vol. 11, p. 1304068, https://doi.org/10.3389/FPED.2023.1304068/BIBTEX. [37]

Zhang, Y. et al. (2022), "Screen time and health issues in Chinese school-aged children and adolescents: a systematic review and meta-analysis", *BMC Public Health*, Vol. 22/1, pp. 1-12, https://doi.org/10.1186/S12889-022-13155-3/TABLES/4. [41]

Zhou, M. et al. (2022), "Internet addiction and child physical and mental health: Evidence from panel dataset in China", *Journal of affective disorders*, Vol. 309, pp. 52-62, https://doi.org/10.1016/J.JAD.2022.04.115. [162]

Zhou, Z. and Q. Cheng (2022), "Relationship between online social support and adolescents' mental health: A systematic review and meta-analysis", *Journal of adolescence*, Vol. 94/3, pp. 281-292, https://doi.org/10.1002/JAD.12031. [210]

Notes

[1] The potential negative impacts of the digital environment on children's health and well-being are categorized as cross-cutting risks within the typology of risks in the digital environment, and are particularly concerning, as they can significantly affect children's lives in multiple ways (OECD, 2021[1]).

[2] Screen time is typically defined as the amount of time a person spends using screen-based devices – such as smartphones, tablets, computers, televisions, or gaming consoles – for activities like entertainment (watching videos, gaming, or social media), educational or work-related tasks (studying, working, or attending online classes), and communication (video calls, texting, or emailing).

[3] While there are indications of rising mental distress among adolescents in several countries, this trend is not uniform across nations or population groups. Additionally, it remains unclear whether this reflects a genuine increase in mental distress or is a result of greater disclosure and diagnosis, driven by reduced stigma and increased awareness of mental health issues.

[4] A systematic review is a comprehensive and rigorous synthesis of research evidence on a particular topic or question. It follows a structured and transparent process to identify, select, critically appraise, and analyse relevant studies from existing literature. The advantage of these reviews is that they enable a rigorous selection of findings from studies of varying designs and qualities and highlight associations that do not always reflect causal effects.

[5] Digital marketing, encompassing online promotions on platforms such as social media, websites, and gaming platforms, has been a key strategy for food brands targeting youth since the 1990s (Harris et al., 2025[54]). These brands use advertisements, branded games, company apps, and social media accounts to engage young audiences. Their strategies include celebrity endorsements, user-generated content, and viral marketing through peer networks. Recent innovations include influencer promotions, product placements in online entertainment, and immersive experiences in gaming and the metaverse, such as Roblox. Studies show that digital food marketing predominantly promotes unhealthy products like fast food, sugary drinks, and snacks, significantly influencing children's and adolescents' food preferences, purchase requests, and consumption (Harris et al., 2025[54]). Exposure to these digital campaigns has been found to have similar effects on youth diets as traditional TV advertising, driving positive attitudes toward unhealthy foods and increasing their consumption.

[6] There are no clear cut-off points for defining excessive screen time, as studies use different time categories, and what is considered excessive varies depending on the outcomes and the child's age. For instance, Massaroni's review report that prolonged screen time of more than 4 hours per day in children aged 2 to 4 years has been linked to deficient expressive vocabulary. Additionally, children aged 12 to 35 months exposed to 2 hours of television daily have a significantly higher risk of cognitive and motor developmental delays. Preschoolers around 5 years old with more than 1 hour of screen time daily showed greater vulnerability in areas such as cognitive, communicative, social, physical, and emotional development compared to those with less than 1 hour of screen time (Massaroni et al., 2023[72]).

[7] Research reviewed in Santos et al. (2022[88]) indicates that most studies found that exceeding daily screen time recommendation to limit school-age children to no more than two hours of daily television and video game use combined is linked to higher rates of attention problems in children. Early grade children were particularly susceptible, with video games showing a stronger association with attention issues than television. For instance, Rosen et al. (2014[211]) found that for children aged 4-8, daily technology use was

broadly associated with attention problems, while for pre-adolescents (9-12), only video games and technological toys were linked to such issues. Hetherington et al. (2020[212]) observed that even one hour of screen time daily was excessive for 5-year-olds, with inattention increasing with additional exposure, regardless of the type of media. These findings, based on parent and teacher reports, highlight difficulties in maintaining focus and staying on task associated with excessive screen use.

[8] Nevertheless, a recent study points to an association between the decline in mean PISA scores over time and the use of digital devices (Andrews, Égert and de la Maisonneuve, 2024[213]). This study suggests that the decline in PISA test scores since 2009 can be primarily attributed to two factors: digital device use and the COVID-19 pandemic. Non-class-related digital device use in schools contributes to an almost 8-point drop in PISA scores, including a 5-point decline from 2009 to 2018 and nearly a 3-point decrease from 2018 to 2022. At the same time, school policies aimed at promoting responsible internet use have partially mitigated this trend, reducing the negative effects of digital device use by 1 PISA point between 2009 and 2022. Lastly, the impact of the COVID-19 pandemic accounts for nearly a 4-point decrease in overall PISA scores after 2018. However, this study highlights a correlation without providing certainty about the existence of causal relationships. The paper does not rule out the possibility that trends in the use of digital devices and PISA test scores could be driven by unobserved factors.

[9] "Soft skills" refer to a set of personal attributes and interpersonal abilities that enable individuals to interact effectively and harmoniously with others in various contexts. Unlike "hard skills," which are specific technical skills or knowledge related to a particular job or task, soft skills are more about how people behave, communicate, and work with others. Examples of soft skills include communication skills, teamwork, adaptability, problem-solving, time management, leadership, emotional intelligence, and interpersonal skills. These skills are often considered essential for success in the workplace and in personal relationships (OECD, 2021[132]).

[10] Creativity consists of imaginative thinking or behaviour which is purposeful and leads to an original outcome which is of value in relation to the original objective.

[11] Migrant children may use digital storytelling to express their cultural heritage and navigate their identities. The European research project *Children in Communication about Migration* highlighted how refugee youth utilised media production for personal expression and identity formation (de Leeuw and Rydin, 2007[214]). their children's cultural identity and engagement by providing access to digital content in their primary language(s) and cultural background(s). They also help their children use digital tools to communicate with family members across different languages, fostering both linguistic development and cultural connections (Notley and Aziz, 2024[215]).

[12] Migrants use tools like WhatsApp, Facebook, and Skype to stay connected with family and communities back home while building networks in their host countries. Social media also helps in real-time decision-making, such as adjusting travel routes based on shared experiences from other migrants. Platforms like YouTube assist in learning new languages and acquiring professional skills to adapt to their new environments (Diminescu, 2018[116]; McAuliffe, Blower and Beduschi, 2021[117]).

[13] Moderate video game play (1-3 hours per day) showed no significant differences compared to non-players, while heavy play (over 3 hours daily) was linked to more negative psychosocial outcomes, suggesting a potential dosage effect. The results suggest that responsible video game use can offer benefits for child well-being, akin to traditional forms of play. Nevertheless, the effects are minor,

accounting for at most 2% of the observed variability in well-being outcomes. This suggests that 98% of the variability is attributable to factors unrelated to video gaming and its intensity.

[14] Social well-being is defined as the ability to participate in broader communities, such as schools, clubs, or societies; being an active citizen; collaborating effectively with others; engaging in healthy interactions within online communities; maintaining positive and sustainable online identities; managing risks such as grooming and exploitation; fostering and sustaining good relationships with significant individuals both online and offline; and communicating effectively with persons children know.

[15] Problematic Internet use (PIU) is generally defined as excessive or compulsive Internet engagement that leads to negative consequences, such as interference with daily life or mental health issues. Measurement of PIU varies, but it often involves self-reported surveys or scales assessing the frequency and impact of Internet use, such as the time spent online, emotional dependence, and the extent to which online activities disrupt personal, academic, or social life. These assessments are typically based on established diagnostic criteria or standardised questionnaires, such as the Young's Internet Addiction Test, Caplan's Generalized Problematic Internet Use Scale, Internet Addiction Test, and the Chen Internet Addiction Scale.

[16] In this study, problematic screen use is analysed through three categories: video gaming, social media, and mobile phone use. Each category is assessed using specific diagnostic tools, such as the Video Game Addiction Questionnaire, the Social Media Addiction Questionnaire, and the Mobile Phone Involvement Questionnaire. The research identifies problematic screen use as patterns of behaviour that include excessive or compulsive engagement, interference with daily functioning, and the experience of associated negative consequences like reduced physical activity or social detachment (Nagata et al., 2022[174]).

[17] Internet Gaming Disorder (IGD) is defined in both the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 5th Edition) and ICD-11 (International Classification of Diseases, 11th Revision) with criteria that focus on problematic gaming behaviour and its negative impact on an individual's daily life. in the DSM-5 as a condition for further research, with diagnostic criteria focusing on symptoms such as preoccupation with gaming, withdrawal symptoms, tolerance, unsuccessful attempts to cut back, and continued gaming despite negative consequences. The disorder is suspected when at least five of these criteria are met over a 12-month period, causing significant impairment in personal, social, or academic functioning. ICD-11, in contrast, officially classifies Gaming Disorder as a mental health condition, with criteria that include impaired control over gaming, prioritisation of gaming over other activities, and continuation despite harmful effects. To be diagnosed, the symptoms must persist for at least 12 months and significantly impact daily life.

[18] Ghali et al. review (2023[181]) covers children aged 6-12 years and adolescents aged 13-18 years across 20 selected studies on the subject. These studies used a substantial sample size of 48 652 participants, encompassing both online and in-person questionnaires administered to children, teenagers, and their parents in educational institutions, healthcare facilities, and online platforms. The other two reviews include children and adolescents aged 8 to 18.

[19] Paulus et al. (2018[183]) highlighted that deficient self-regulatory and decision-making abilities as a consequence of dysexecutive problems, mood and reward system dysregulation, and avoidant behaviour (escapism, deficient coping with negative emotions), low self-esteem, poor self-efficacy, and neurobiological factors may contribute to explain Internet gaming behaviours and its consequences on individuals well-being and mental health outcomes. Griffiths et al. (2025[184]) also highlight that gaming disorders appear to be positively associated with neuroticism, as individuals prone to depression, stress,

and anxiety may use gaming as a perceived safe escape from real-life challenges. Low conscientiousness, characterised by impulsivity and disorganisation, is negatively linked to gaming disorders, while impulsivity itself shows a consistent positive relationship.

[20] Additional data suggests that adolescents from one-parent families (12%) are more likely to report problematic use compared to those from two-parent families (9%) (OECD, n.d.[216]).

[21] Problematic social media use (PSMU) is commonly defined as excessive or compulsive engagement with social media platforms that disrupts daily functioning, emotional well-being, or interpersonal relationships. It is typically measured using self-reported scales or questionnaires, such as the Bergen Social Media Addiction Scale or the Social Media Disorder Scale, which assess factors like time spent on social media, inability to reduce usage, negative emotional responses when unable to use, and the impact on work, studies, or relationships.

[22] The term "rabbit holes" originates from Alice's Adventures in Wonderland by Lewis Carroll, where Alice follows a rabbit into a hole and ends up in a fantastical and confusing world. In modern usage, "rabbit holes" refers to deep, often unexpected, explorations or distractions that consume time and focus. Online, rabbit holes frequently occur when you click on one link, then another, and another, exploring an endless stream of information. Social media algorithms, search engines, and video platforms can facilitate this behaviour, drawing users into extended engagement cycles.

5. Enhancing child well-being in the digital age: A four pillar policy

This chapter explores the key challenges that a whole-of-government policy approach must address to strengthen children's safety in the digital environment and equip them (and their caregivers) to navigate its various spaces responsibly. It highlights the need to: (i) establish effective regulatory frameworks and foster the development of technologies and services that prioritise child safety; (ii) enhance digital literacy and skills among children, with schools and teachers playing a crucial role in empowering them; (iii) provide guidance for parents and caregivers to help them navigate the benefits and risks of children's digital engagement; and (iv) incorporate children's perspectives and experiences into policy design to ensure their needs are accurately understood and that support measures are effectively implemented.

Digital technologies are rapidly transforming how children and adolescents learn, play, interact with others. The growing accessibility, portability, and affordability of digital tools, along with their portability and affordability, have made them an integral part of children's lives, even for the youngest age groups. In response, ensuring that digital policies for children are both effective and fit for purpose has become a key priority in most OECD countries. These efforts focus on protecting children, empowering them, and promoting their active participation in the digital environment through comprehensive national laws, regulations, and policies. Significant new policy developments are occurring at the national level, including the creation of integrative frameworks addressing various child-related digital topics (Better Internet for Kids, 2024[1]; OECD, 2024[2]; 2024[3])

Significant policy developments take place in OECD countries to strengthen children's online safety and protection, foster digital education of children and adults, as well as to address issues such as cyberbullying, misinformation, disinformation, and protect the privacy of children's data online (Box 5.1; OECD (2024[3])). The focus of these policies varies across countries, as does their cross-cutting nature. In some countries, children and the digital environment are addressed within broader frameworks, such as a national digital strategy, rather than through separate, dedicated policies. Furthermore, not all aspects of protection, empowerment, participation, and well-being may be comprehensively addressed.

To support countries in developing these policies, the OECD Recommendation on Children in the Digital Environment outlines principles to guide governments in designing frameworks that safeguard children, empower them, promote their well-being, and encourage active participation in the digital world while mitigating associated risks (OECD, 2021[4]; 2022[5]). It recommends adopting a whole-of-society effort to leverage the expertise of various stakeholders – including digital service providers, academics, health professionals, educators, child development experts, parents and children themselves. It also calls for a strong multilateral commitment and a whole-of-government approach to ensure that government actions are coordinated and mutually reinforcing, rather than fragmented, stand-alone, or potentially inconsistent efforts.

The Recommendation recognises key actors – such as governments, digital service providers,[1] parents, carers, guardians, and children – who play an active role in shaping policies, practices, and services for children in the digital environment. Empowering these actors to create a safer and beneficial digital environment for children, as stipulated in the Recommendation, highlights the need for strengthened actions in four key areas: (i) the implementation of effective regulatory frameworks and the development of technologies and services that prioritise child well-being, with particular attention to the potential impact of digital technologies on children's physical health, mental health, and developmental outcomes; (ii) promoting digital literacy and skills among children, emphasising the important role of schools and teachers in empowering children in the digital space and educating them about the benefits and risks of digital technologies; (iii) providing guidance to parents and educators to better understand and manage the benefits and risks to child well-being associated with excessive use or misuse of digital devices; (iv) enhancing cooperation among stakeholders, including children, whose views and experiences in navigating the digital world are critical to designing effective support measures. The overarching goal is to foster a secure online environment where children can benefit from digital opportunities while minimising risks. The Recommendation recognises the essential role played by digital service providers in fostering such an environment.

Building on the Recommendation and drawing from the latest literature and empirical evidence reviewed in the preceding chapters, this chapter delves deeper into the challenges of establishing an institutional framework that fosters a culture of safety and well-being in the digital environment. It highlights the need for better regulations and increased cross-sectoral government action, particularly in light of the widespread use of social media by children, advancements in technology, including artificial intelligence, and immersive experiences that offer greater opportunities but also may expose children to heightened risks. It emphasises the need for more effective measures to prevent an undue burden on parents and

children in ensuring protection and fostering healthy digital practices. It also underscores the need for clearer guidance to assist educators, parents, and caregivers in supporting children as they manage their time and content with digital technologies, develop their digital skills, and express the desire for protection and support without being excluded from specific areas of the digital environment, such as social media. These efforts should be grounded in evidence, drawing on research findings and the expertise of educators, health professionals, and parents, who offer crucial insights into recognising children's vulnerabilities and suggesting strategies to address harm or practices that jeopardise their well-being.

An important takeaway from the literature review in the previous chapter is that the impact of different uses of digital devices on children's well-being largely depends on factors – either protective or those that create vulnerabilities – that often originate from offline environments. For example, adolescents who have been previously victimised or have mental health issues are at a higher risk of negative interactions online, such as bullying and exposure to harmful content (Odgers and Jensen, 2020[6]). Offline resources also matter, as youth from low-income backgrounds may experience a greater negative impact from online issues in their offline lives. In contrast, adolescents from higher socio-economic environments often have better online experiences, receive more guidance from adults and use the Internet more for informational and social purposes and less for entertainment and playful reasons (Cino et al., 2022[7]; Mascheroni and Olafsson, 2014[8]). Children with stronger social friendships offline are less likely to develop problematic use of social media (Lee, 2009[9]; Benvenuti et al., 2023[10]; Schneider, Amichai-Hamburger and Lonigro, 2020[11]). One consequence of this is that children's online risk often mirrors offline vulnerabilities.

The intertwined nature of children's lives in the digital and physical realms underscores the need, as highlighted in Chapter 2, to understand the interplay between personal factors and those in children's offline environments. These factors can either encourage problematic use of digital tools and services or, conversely, foster the development of skills needed to navigate the digital world with confidence and resilience in the face of negative online experiences. Addressing this requires collaboration among stakeholders, including digital service providers, parents, guardians, carers, educators, children themselves (OECD, 2021[4]), as well as professionals in the health, mental health, education, and child development sectors (Holly et al., 2023[12]). Coordinating perspectives from these diverse groups is key to building a shared understanding of needs and challenges, while promoting cooperation across traditional policy boundaries (OECD, 2021[4]; Dirwan and Thévenon, 2023[13]). Establishing such collaboration is also essential for designing digital services that protect children while meeting their needs, as well as those of educators, parents, and caregivers who support them. Equally important is preparing children for safe and constructive use of digital services and preventing potential problems arising from online risks or vulnerabilities rooted in the offline world.[2]

This chapter discusses how policies across four key pillars of an integrated approach are, or could be, implemented to address challenges related to child well-being. Consistently with the OECD Recommendation on Children in the Digital Environment (OECD, 2021[4]), it begins by highlighting the critical role of legal and governmental policy frameworks in defining the responsibilities of Digital Service Providers for providing and safe and beneficial digital environment for children. The chapter then explores how teachers, schools, and the broader education system, along with parents, caregivers, and the active involvement of children, can contribute to designing digital services that align with children's needs and rights. Lastly, it highlights the challenges of providing support within children's living environments to empower children, address vulnerabilities, and promote healthy practices in the digital environment.

Box 5.1. National policy plans on children and the digital environment

Many OECD countries have implemented plans or initiatives to protect children online and equip them with the skills needed to navigate the digital world. Policies on safe digital protection include Germany's amended Youth Protection Act (Jugendschutzgesetz, JuSchG), Ireland's Online Safety and Media Regulation Act 2022 and Coimisiún na Meán's work programme, and various laws in France aimed at combating school bullying, regulating the exploitation of children's images, and enhancing parental controls, Hungary's Digital Child Protection Strategy. Countries such as Latvia and Lithuania have developed digital literacy programmes for younger and older people from marginalised communities (delivered by youth and senior organisations) to support both integration into the labour market and broader social cohesion (OECD, 2022[14]).

In many countries Ministries of Education have a leading role in implementing actions to support the digital transformation in education and enhance children's literacy. It includes, for instance, the Austria's Acht-Punkte-Plan (Eight-Point-Plan/Strategy for a Digital School), Italy's National Plan for Digital Education (PNSD), Ireland's Digital Strategy for Schools, the Slovenian Digital Education Action Plan 2027, or Spain's National Plan for Digital Skills. In Italy, the Ministry of Education is also the coordinator of the Safer Internet Centre, which develops an annual work programme involving ministries and authorities to promote a better Internet for children which includes key performance indicators. improving access to high-quality digital teaching material. In Ireland, the Digital Strategy for Schools to 2027 is a comprehensive initiative designed to empower students to become confident and competent digital learners, critically engaged and capable of participating as global citizens in an increasingly digital world. Additionally, the Department of Education introduced the Keeping Childhood Smartphone Free policy, which serves as a guide for parents and parents' associations to discuss Internet safety and smartphone access for primary school children with their school community. In Québec (Canada), the Ministry of Education has developed a Digital Competency Framework to help education stakeholders foster digital skills. The website, competencenumerique.ca was developed in relation to the Digital Reference Framework as a resource to help individuals develop digital competences.

Significant efforts are being made to address and prevent cyberbullying. For example, in Canada, the Ontario Ministry of Education from 2021 has implemented a Policy/Program Memorandum on Bullying Prevention and Intervention. A framework was established for school boards to encourage anti-bullying and cyberbullying measures, with funding allocated to initiatives offering targeted support for student groups at higher risk of victimisation. In France, the CyberNAH programme was developed with the mission of combatting cyberbullying. Measures include digital monitoring to anticipate viral cases of cyberbullying and strengthening capacities of schools to manage cyberbullying cases among others. The pHARe plan, adopted in 2023, bolsters the global fight against bullying in schools, both in person and online. In the French community of Belgium, a school climate observatory was established to monitor and provide schools with resources to improve the school climate and reduce (cyber)bullying, and a reference program was created for schools to address (cyber)bullying. In Greece, the "Living in Harmony Together – Breaking the Silence" regulations were introduced to prevent and deal with violence and bullying in schools. In Luxembourg, the Bee Secure programme co-ordinates a number of measures to combat cyberbullying including campaigns, classroom interventions, a helpline and a stop line.

Governments are also concerned with combating mis- and disinformation and datafication (OECD, 2024[2]). For instance, in Estonia, there are concerns about youth radicalisation and polarisation, highlighting the need for critical thinking skills to recognise fake information. The lack of awareness of parents and children about the consequences of datafication – i.e. the process of converting various aspects of life into digital data – is also a concern. In Iceland, the Icelandic Media Commission has led

efforts to raise awareness about misinformation and disinformation, identifying young people aged 15-17 as the least critical of online information. Similarly, in Sweden, the National Agency for Education found that students need more support to develop a critical perspective on online messaging and information. In Israel, there are concerns that children may inadvertently share information about themselves or others that could endanger them.

Source: Better Internet for Kids (2024[1]), *Policy Monitor Report 2024*, https://www.betterinternetforkids.eu/bikmap and OECD (2024[2]), *What Does Child Empowerment Mean Today?: Implications for Education and Well-being*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/8f80ce38-en.

5.1. Pillar 1: The legal and policy governance framework

The digital environment is complex and fast moving, and the responsibility for delivering a safe and beneficial digital environment for children primarily lies with the digital service providers who design and deliver the digital spaces children use, and with governments who set policies and practices that can both empower and protect children (OECD, 2021[4]; 2022[5]). In this space, governments play a pivotal role in protecting children in the digital world (OECD, 2021[4]). Their primary responsibility is to establish regulations and standards that Digital Service Providers must comply with. Additionally, they can incentivise the integration of protective measures into the design of digital services and devices (OECD, 2024[3]). These efforts are crucial to ensure that the responsibility for protecting children in the digital environment does not fall on children, their caregivers and educators.

Establishing legal and governance frameworks that oversee access to digital tools, platforms and applications, as well as safeguarding privacy rights and outlining appropriate actions in case of misconduct, is essential for ensuring fundamental safety in the digital realm. This is particularly important for children, who often lack experience and awareness of the risks present in both offline and online environments. Creating such a foundation aligns with the OECD Recommendation on Children in the Digital Environment, which emphasises coherent policy, enforceable legal measures, and evidence-based responses for a safe and beneficial digital environment for children, as well as the broader Going Digital Integrated Policy Framework (OECD, 2020[15]), which provides a holistic approach for designing and implementing digital policies in a holistic way, including with respect to children.

Legal frameworks establish an important basic set of obligations for protecting children and addressing the harms they can experience in the digital realm. Additionally, legal provisions can help promote responsible business practices by defining the circumstances under which Digital Service Providers can be held accountable for illegal activities or harmful information originating from third parties using their digital services. These provisions are also essential for setting obligations regarding data privacy protection, developing functionalities that help children and their caregivers protect against harm, and ensuring that solutions are developed to meet their needs (Livingstone, Lievens and Carr, 2020[16]). Equally important is tracking how consistently these providers apply technological tools to help parents protect their children (e.g. content information, pins, scheduling, etc.).

An overview of initiatives in this area highlights that during the 2010s, legislative responses to child safety concerns in the digital realm were diverse. Laws are often tailored to address specific risks, and oversight responsibilities are delegated to relevant ministries or departments, mirroring their offline counterparts (OECD, 2020[17]). However, as underlined in this report, this approach compartmentalises issues into separate disciplinary domains, overlooking the interdisciplinary nature of digital challenges. For example, the issues of sexting and cyberbullying imply a response from justice, health, and education (at a minimum) and impact on children's privacy rights. By keeping legislative responses separate, there is a risk of duplicating efforts, leaving gaps in coverage, and reducing effectiveness due to unaddressed issues. Some countries have responded by establishing unified oversight bodies to address digital risks more cohesively,

but challenges persist due to fragmented policy actions and sectoral approaches, resulting in disjointed responses and potential oversights (OECD, 2020[17]).

Strengthening the governance structure is also an important challenge. Despite a recognised commitment to shared responsibility among stakeholders, including industry and civil society, dedicated multi-stakeholder bodies are rare (OECD, 2020[17]; Better Internet for Kids, 2024[1]). Nonetheless, such entities play a significant role in shaping effective policies and programmes where they exist. Regulatory efforts targeting social media platforms and cross-border industries face hurdles, although the promotion of industry codes of conduct show promise in fostering collaboration between government and industry (OECD, 2020[17]). Digital and media literacy are identified as essential skills for children's safety online, with various initiatives focusing on community awareness and educational support. However, policy measures often prioritise risk mitigation over promoting positive digital content. Consistent approaches to monitoring and evaluating policy effectiveness remain elusive, underscoring the need for evidence-based policymaking and international cooperation to address the inherently global nature of child protection challenges (OECD, 2021[4]).

There is a growing international consensus on the necessity of digital safety by design for children (OECD, 2024[3]). Promoting safety by design to protect children online involves integrating protective measures into the design and functionality of digital products and services from the outset. This approach aims to create a safer online environment for children by proactively addressing potential risks but faces significant challenges, including the need to adapt to rapid technological innovation, coordinate diverse stakeholders, and cover implementation costs. To this end, the OECD Guidelines for Digital Service Providers recommend that companies regularly implement measures to prevent children from accessing harmful or inappropriate content and services that could affect their health, well-being, or rights (OECD, 2021[18]). These measures should be consistently reviewed and updated to keep pace with technological advances, changing usage patterns, and emerging risks. Additionally, when age-based restrictions are legally required to limit children's access to certain services, these restrictions should be proportionate, privacy-preserving, and effectively enforced (OECD, 2021[18]).

OECD (2024[3]) outlines the key components for digital safety by design to contribute to a safer digital environment for children, including:

- Employing Age Assurance Mechanisms, which involves implementing systems to identify child users, enabling age-appropriate experiences (OECD, 2024[19]).
- Implementing Child-Centred Design, which means focusing on children’s evolving needs and safety in product development to create accessible, engaging, and inherently safe digital services.
- Preventing and Detecting Harm, which requires to proactively mitigate risks using technical measures like content filters, detection systems, real-time monitoring tools (including children’s usage time limits), and default safety settings, while ensuring regulatory compliance.
- Protecting Children’s Privacy and Personal Data, which involves safeguarding children’s privacy and personal data through privacy-by-design principles and user-friendly settings.
- Providing Child-Friendly Information, which aims at providing clear, accessible, and age-appropriate guidance about digital services, associated risks, and protection measures.
- Facilitating Complaints and Redress, which involves establishing accessible and age-appropriate channels for children to report issues, facilitate complaints and receive timely resolutions, fostering trust.
- Encouraging Child Participation, which requires involving children in online safety discussions, design processes, and policymaking to reflect their needs and perspectives.
- Promoting a Culture of Safety and Well-being, in order to ensure children’s safety and well-being when designing services and implementing innovation.

Fostering a culture of safety and well-being is key to encouraging digital service providers to redesign social media, video, and gaming features that may contribute to problematic usage patterns among children. For instance, digital platforms often employ functionalities that automatically provide users with personalised, brief content – such as short videos – designed to maintain engagement and keep them online, thereby heightening the risk of excessive screen time and compulsive digital content use (Montag et al., 2019[20]). Furthermore, many techniques used by digital apps, such as endless scrolling, “like” buttons, loot boxes, and notifications, mirror strategies employed in the gambling industry, leveraging variable rewards to tap into human instincts and sustain user engagement (Qustodio, 2020[21]). As a result, Qustodio (2020[21]) estimated that in early 2020, children aged 4-15 years old spent 86 minutes per day on video service in the United States, 75 minutes per day in the United Kingdom and 63 minutes per day in Spain. These service features may also contribute to children losing track of time online – a common occurrence highlighted by a 2018 report showing that 62% of 15-year-old students across OECD countries frequently lose track of time while using digital devices.

To mitigate such risks, specific platform designs, like notification on the time spent online, can help trigger users’ self-discipline and prevent addictive behaviours (Flayelle et al. (2023[22]), Box 5.2). However, many of the protective measures introduced by governments and technology companies place a high burden of responsibility on children and their caregivers to understand and then correctly apply the recommended controls (Pasquale et al., 2022[23]). For example, the detailed terms, conditions, and cookie preference pop-ups that users are now invited to review each time they go online assume high and often unrealistic levels of digital literacy. Moreover, children’s self-control capabilities differ significantly from those of adults and are not appropriate protective measure for children of all ages. Other approaches, such as “time spent online” warnings in video games, may be less effective for children with limited capacity to set their own boundaries, or easily ignored if the risks of prolonged use of digital media are unknown.

Stricter restrictions on the content accessible to children may be required to effectively protect them from harm, as has been done by some digital service providers to reduce excessive or prolonged use (Holly et al., 2023[12]). For example, YouTube disabled autoplay for younger users, Google turned off targeted advertising and tracking for minors, and Facebook, Instagram, and TikTok made similar adjustments. Additionally, some video games and platforms, such as Tencent, have introduced "fatigue systems" that slow down or halt progression after a certain amount of continuous playtime to combat excessive use.

The establishment of codes and standards for digital service providers is also essential to help them assess the risks specific to children and implement appropriate protections. For example, industry codes and standards to protect Australians from illegal and restricted online content are designed to tackle harmful material, such as child sexual abuse content and pro-terror material, by requiring tech companies and online services (like cloud storage providers, messaging platforms, and AI-based apps) to implement safeguards (Box 5.2). These measures aim to prevent misuse of their products for distributing harmful content and offer users tools to limit exposure. The standards also cover emerging technologies, such as generative AI, with strict penalties for non-compliance, ensuring both Australian and global companies adhere to these protections under Australia’s Online Safety Act.

Codes of conduct and standards may be considered insufficient to protect children if they are not accompanied by rapid and effective changes in the design, filters, and moderation implemented by digital service providers. For this reason, some jurisdictions, such as Australia, have recently considered banning social networks allowing children children under the age of 16 to open accounts (Parliament of Australia, 2024[24]). The implementation of such a ban presents several challenges, including enforceability, the ease with which it can be circumvented (e.g., through VPNs), and concerns about children’s rights to participate in digital activities, as well as their desire to be protected rather than excluded from digital platforms (Australian Human Rights Commission, 2024[25]). Moreover, it fails to equip teenagers with the skills needed to navigate the digital environment safely. Some experts worry that such a blanket ban could allow digital technology providers to deprioritise the development of protective measures tailored for younger

users in online spaces, arguing that if teenagers are excluded, their safety becomes irrelevant (Wilson, 2024[26]; Australian Child Rights Taskforce, 2024[27]). However, the ban serves as a strong political statement of intent and can be leveraged to pressure digital service providers into taking more substantive actions to address existing issues.

Box 5.2. Online safety measures to protect children in Australia, France, Ireland, and the United Kingdom

Data protection regulators in Australia, France, Ireland, and the United Kingdom are actively promoting measures to be implemented by service providers to protect children online. In all four countries, regulators are focusing on ensuring that children's data is protected, particularly by enforcing transparent consent processes for cookies and other tracking technologies, along with holding companies accountable for improper data collection practices.

Protective measures also aim to prevent children from accessing or being exposed to age-inappropriate online content, including pornography, and to provide all users with effective information, tools, and options to restrict their access to and exposure to such material.

Australia has introduced world-leading industry codes and standards under its Online Safety Act, aimed at enhancing online child protection and tackling harmful content, including child sexual abuse and pro-terror material. These codes and standards, These codes set out clear guidelines for companies to follow, including content moderation and reporting mechanisms, with the aim of protecting users, including children. For instance, they require tech giants and other online services – such as cloud storage providers (e.g., Apple iCloud, Google Drive) and messaging platforms – to implement measures preventing misuse for harmful content distribution.

The standards also address generative AI apps and marketplaces, including those used to create or manipulate images, ensuring safeguards against generating exploitative content. Non-compliance carries steep penalties of up to AUD 49.5 million per violation. This initiative not only impacts companies operating in Australia but also compels global compliance, marking a significant step in regulating harmful online practices worldwide.

In France, the French data protection authority, CNIL, provides recommendations for enforcing online protection for children (CNIL, 2021[28]). One key area of focus is ensuring proper parental consent is obtained before processing children's data, particularly for platforms that provide services to minors under 13. CNIL has pushed for platforms to use clear, transparent mechanisms to obtain consent for cookies and other tracking technologies, ensuring that children are adequately protected from unauthorised data collection. The CNIL's Recommendation 6 focuses on improving how minors are informed about their data rights and privacy by enhancing design. It emphasises that information for minors should be clear, simple, and engaging, using accessible language and interactive elements like icons or videos. It also highlights the importance of avoiding misleading design practices, such as dark patterns, that manipulate users. The recommendation calls for transparent interfaces and easy-to-use privacy settings, empowering minors to manage their data rights effectively.

In Ireland, the Data Protection Commission (DPC) has similarly scrutinised cookie consent mechanisms (Data Protection Commission, 2020[29]). In one major sweep, the DPC found widespread issues with cookie banners, including improper consent collection practices such as implied consent. Websites were often found to set cookies without proper user engagement, presenting default "accept" buttons with no clear options to reject cookies. The DPC emphasises that for consent to be valid, it must be freely given, specific, and informed. The DPC recommends several measures in the context of data

processing and privacy, including content filters, detection systems, and also advocates for the establishment of children's usage time limits, particularly for platforms like social media, gaming, and video services. Additionally, default safety settings should be in place to limit exposure to harmful content and to automatically enforce privacy protections.

In the United Kingdom, the Information Commissioner's Office (ICO) has implemented guidelines emphasising that children's consent for online services must be explicitly obtained, particularly for those under the age of 13 (Information Commissioner's Office, 2024[30]). The ICO has fined several companies for not securing adequate parental consent before processing children's data. The ICO also targets misleading or inadequate cookie pop-ups, ensuring companies provide clear and specific information about how data is being collected. Since the Code's implementation in 2021, notable changes by platforms like Instagram and YouTube have been made. The ICO continues to provide guidance, ensure compliance, and push for further changes on social media and video-sharing platforms, with a focus on location tracking, profiling, and content recommendation systems. The ICO also recommends setting default safety features like private profiles, limiting data collection for targeted ads, and using age assurance technology to protect children online. They emphasise the need for platforms to incorporate these safeguards into their services to prevent risks like inappropriate content exposure and excessive use. Additionally, usage time limits and parental supervision tools, such as Instagram's "Take a Break"[1] feature are encouraged to help teens manage their time on the app.

These national initiatives align with the EU's regulatory framework, which includes complementary instruments such as the Audiovisual Media Services Directive,[2] a sector-specific legislation that mandates video-sharing platforms to protect minors from harmful content, and the Digital Services Act,[3] a horizontal framework that governs all online platforms.

1. Instagram's "Take a Break" feature encourages users, particularly teens, to take a pause after prolonged use of the platform. It prompts users to step away after spending a set amount of time on Instagram, reminding them to take care of their well-being. The tool offers customisable time limits and provides tips on activities to engage in during the break. This initiative aims to help users manage their screen time and promote healthier online habits.
2. The Audiovisual Media Services Directive (AVMSD) is a European Union framework that regulates traditional TV, on-demand streaming platforms, and video-sharing services to ensure fair competition, protect viewers, and promote European cultural content. It mandates the promotion of European works, safeguards minors from harmful material, combats hate speech, and sets rules for advertising, including restrictions on targeting children with unhealthy products. The directive also addresses video-sharing platforms, requiring measures to protect users from harmful content, and emphasizes accessibility for people with disabilities, fostering cultural diversity and consumer protection across the EU.
3. The Digital Services Act (DSA) is an EU regulation that establishes a comprehensive framework for governing online platforms, enhancing accountability, transparency, and user protection across the digital ecosystem. It introduces obligations for platforms to manage illegal content, prevent harmful practices, and prioritise user safety while upholding fundamental rights such as freedom of expression. The DSA also imposes stricter rules on large platforms with significant reach, requiring them to assess systemic risks, provide transparency in algorithms, and ensure fair terms for businesses. By harmonising regulations across the EU, the DSA aims to create a safer and more equitable online environment.

The development of Artificial Intelligence (AI) has immense potential to enhance well-being, ranging from improving the analysis of medical data to supporting learning and making knowledge more accessible to children of all ages. However, AI also poses significant risks to their well-being and inclusion, including the amplification of bias and discrimination, the erosion of privacy, exposure to fraud, and access to false or harmful content (Box 5.3). Additionally, the use of AI in social media algorithms has been linked to increased risks of depression, anxiety, and self-harm. It may also inadvertently encourage adolescents to adopt unethical behaviours.

In response, AI-driven systems like recommender algorithms, which may unintentionally amplify harmful or illegal content, should be properly regulated and evaluated. For example, OECD guidelines encourage governments to implement diligent evaluation and policy measures to mitigate risks from these systems

while fostering accountability, transparency in AI algorithm and fairness (OECD, 2024[31]; OECD AI Policy Observatory, 2024[32]). Industry standards can also be developed to comply with relevant laws and obligations, and potentially using advanced technologies like AI for risk mitigation (Čorba et al., 2024[33]; OECD, 2024[31]). Gaps in national AI legislation, particularly where legal tools of production and distribution are used for illegal content, must also to be addressed. In addition to enforcing current legal frameworks, new offenses should be established to address AI-generated abuse, and children – vulnerable adopters of technology – must be central to the ethical AI debate.

Reducing algorithmic biases through the use of diverse and inclusive datasets that capture the perspectives and needs of different cultures and regions is necessary for safeguarding the rights and interests of children (Dignum et al., 2021[34]; UNICEF, 2021[35]). Implementing transparent AI models and giving children and parents more control over their data can also contribute to fostering trust and better security online. Additionally, AI development should be accompanied by continuous ethical oversight to address the risks related to misuse, misinformation, and harmful content. Regular audits and collaborative action among governments, international organisations, and digital service providers (as promoted by the OECD AI Policy Observatory) are essential to address emerging risks, ensure compliance with child protection standards, and to establish comprehensive guidelines. These measures aim to ensure that AI serves positively in children's lives, promoting both their safety and empowerment.

Managing children's access to Virtual Reality devices will be needed, especially since this access is determined by the decisions of service providers. For instance, until 2023, guidelines from VR experience providers (e.g., Meta) and equipment manufacturers generally advised against VR use for children under 12 or 13 years old. However, younger children were already engaging with VR during that time. As of September 2023, Meta has lowered the minimum age for some headsets to 10 years with a parent-managed account. Given the development of Virtual Reality, important steps can be taken to strengthen children's protection, making the previously envisaged measures even more necessary (Box 5.3).

Box 5.3. Protecting children from risks of Artificial Intelligence and Virtual Reality

Artificial Intelligence

The development of AI algorithms entails a high risk of mass exposure to disinformation or inappropriate content as recent advances in generative AI have significantly lowered the barriers to creating and distributing convincing content, while making it increasingly challenging to differentiate between what is genuine and what has been manipulated (OECD, 2024[36]; Feuerriegel et al., 2023[37]). At the same time, AI is extensively used to identify potentially harmful content (e.g., explicit, triggering, violent, abusive, and radicalising content) on social media platforms. Generative AI models, especially those trained in natural language processing and image recognition, can be used to (Helmus, 2022[38]; Benzie and Montasari, 2022[39]; McGovern, 2021[40]; Nakov et al., 2021[41]; Dignum et al., 2021[34]):

- Identify patterns typical of disinformation, such as manipulated text, deepfakes, or misleading visuals.
- Support fact-checking by cross-referencing claims with verified databases, generating counter-narratives to disinformation, and automating the verification process by scanning large volumes of reliable data.
- Help on content moderation by filtering harmful content in real time, flagging disinformation through cross-referencing with verified sources, and assisting human moderators with AI-generated summaries for more efficient review.

- Predict the spread of disinformation by analysing sharing patterns, flag disinformation campaigns early, and monitor trends in harmful content to alert stakeholders of emerging threats.

Virtual Reality

Platforms and digital service providers can protect children in VR by implementing age-appropriate content controls, safety features, and technical adjustments (Dignum et al., 2021[34]). Stricter age assurance and parental controls, such as monitoring usage time and restricting content, are critical for preventing underage access to inappropriate material (Kelly, 2022[42]). Safety features, including AI-powered moderation, human oversight, and "safe zones" where children can report abuse or exit unsafe situations quickly, help detect and prevent harassment or abuse in real time (Freeman et al., 2022[43]; Dignum et al., 2021[34]). Content filters can automatically flag and block violent, explicit, or otherwise unsuitable material. Technical adjustments, like child-specific headset calibrations and mandatory breaks and time reminders, minimise physical harms such as motion sickness, while safety-focused design, such as limiting violent avatars and in-game purchases, ensures VR spaces remain suitable for younger users (ANSES, 2021[44]).

Education, transparency, and collaboration are equally important in fostering a safe VR environment. In-app safety tutorials and digital literacy programs can teach children and parents to navigate VR responsibly, identify risks, and report concerns. Platforms must ensure transparency by offering clear reporting systems and complying with privacy laws (Kelly, 2022[42]). Collaborating with researchers and regulators enables platforms to audit safety measures, fund research on VR's impact on children, and establish effective safety standards (Fiani, 2023[45]). By promoting safe social interactions, limiting anonymity, and enabling features like "friend-only" settings, platforms can significantly reduce risks and create safer, age-appropriate virtual environments (Sabri et al., 2023[46]).

Cross-sectoral collaboration is key to foster a shared understanding of challenges involved with the digital environment for children and to develop integrative "whole-of-government" policy frameworks with the aim of more effectively addressing the complex related issues (OECD, 2021[4]; Dirwan and Thévenon, 2023[13]). In Europe, nearly one-third of countries have national action plans in place for children and the digital environment, while others report various separate initiatives. Good examples of whole integrative policy frameworks include Norway's National Strategy for a Safe Digital Upbringing (2021), and the Slovak Republic's National Strategy on the Protection of Children in the Digital Environment. These plans outline the challenges, objectives, and stakeholders involved in creating protective and supportive measures, as well as the specific population groups that will be targeted. They also establish the principles for coordinating efforts among various ministries (such as, in Norway, the Ministries of Health and Care Services, Justice and Public Security, Ministry of Local Government and Modernization, Culture, and the Ministry of Education and Research). The involvement of all these ministries is crucial to address the multiple aspects of children's well-being and to engage all relevant actors in the various environments where children live.

For a strategic action plan to be effectively implemented, it is essential to establish institutional procedures and tools that facilitate objective-setting for stakeholders within a coordinated action framework (Dirwan and Thévenon, 2023[13]). This includes setting institutional timelines, implementing coordination and monitoring tools, and incorporating data for reporting on the actions taken and their outcomes across different areas. It also requires clearly identifying the administration or ministerial department with the leading role. For instance, in Norway, the *Norwegian Media Authority* oversees and coordinates efforts for a safe digital childhood across ministries. However, this type of leadership and coordination role is not well established in all countries. In Europe, only six countries have a central body, ministry, or agency that is mandated to lead policy development on child digital matters (Better Internet for Kids, 2024[1]).

Coordination of delivery mechanisms is also similarly distributed across multiple areas of responsibility. Only seven European countries have a clearly defined coordination function in place that involves all relevant stakeholders and addresses cross-cutting policy issues relating to children and the digital environment. In most cases, coordination occurs more informally, and there is no formal implementation action plan with defined timelines, assigned responsibilities, or key performance indicators. Consequently, establishing monitoring, accountability, and a clear-cut governance framework remains a significant challenge for many countries seeking to enhance their efforts in promoting children's well-being in the digital environment.

5.2. Pillar 2: Teachers, schools and education systems

Teachers, schools, and education systems play an important role in preparing children to navigate the digital environment, develop digital skills and citizenship,[3] circumvent risks, and minimise the impact of negative experiences online on their well-being (Burns and Gottschalk, 2019[47]). Teachers and educators can help to equip children with digital literacy skills, teach them how to use digital technologies for learning, and share advice on responding to harmful content or contacts online. The education sector places significant importance on this role, as OECD research shows that, across countries, teachers consistently rank Information and Communication Technology skills for teaching as their second-most critical professional development need, following training on teaching students with special needs. Additionally, teachers express low confidence in using digital technologies to support student learning (OECD, 2020[48]).

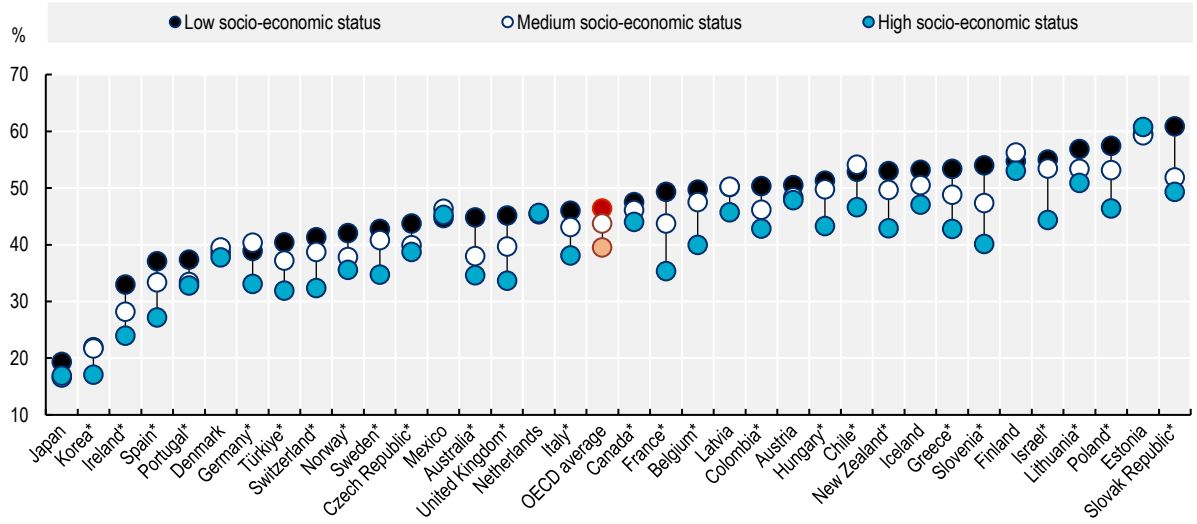
The OECD Recommendation on Children in the Digital Environment emphasises the importance of assisting teachers in recognising the opportunities and benefits for children in the digital environment, while also evaluating and addressing risks (OECD, 2022[5]; 2021[4]). Additionally, it underscores the significance of involving educational bodies as key stakeholders in multi-stakeholder dialogues concerning children's needs in the digital space.

To further these efforts, schools have a role to play in establishing consistent goals and policies, and in educating students and raising awareness among parents about the risks associated with the digital environment. Schools can also help to prevent cyber risks faced by adolescents (Paat and Markham, 2021[49]; Cassidy, Brown and Jackson, 2012[50]). Guidance on how to detect and respond to cases of cyberbullying and other digital harms can be incorporated into school curricula, encouraging the adoption of school-based processes and action plans to address such incidents in collaboration with school psychologists or social workers. Furthermore, students could receive regular reminders about Internet safety tips, including evidence preservation, blocking, tracking, responsible online communication, and preventive measures. School administrators can also promote empathy, trust, open communication, and support for students who experience cyber trauma, thereby encouraging victims to report incidences of cyber harm (Van Ouytsel et al., 2016[51]).

Another challenge schools face is ensuring that personal digital tools, such as mobile phones, do not disrupt the learning environment for students. This concern is amplified by the fact that a substantial minority of teenagers do not disable notifications on their digital devices during class time. According to PISA data, on average, nearly half (44%) of 15-year-olds across OECD countries usually keep notifications active on their digital devices during class. Children from low socio-economic backgrounds are more likely to keep their notifications active, possibly because they attend schools without specific policies regarding mobile phone use (Figure 5.1).

Figure 5.1. Nearly half of 15-year-olds keep notifications active on digital devices during class

15-year-old students who report to turn off notifications on their digital devices half of the time or less during class, by socio-economic status



Note: *The difference between students with high and low socio-economic status is statistically significant at the 5% level.
15-year-old students were asked "Think about your use of digital devices. How often do you feel or act the following ways? (If you don't have or use a digital device, please select 'not applicable') ... I turn off notifications from social networks and apps on my digital devices during class", and presented with the response options "Never or almost never", "Less than half of the time", "About half of the time", "More than half of the time", "All or almost all of the time", and "Not applicable". Data refer to the percent responding "Never or almost never", "Less than half of the time" or "About half the time". Students who responded "Not applicable" are excluded from the analysis.
Source: OECD Secretariat calculations based on OECD (2022[52]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/5weuh4

Building confidence in using digital technologies is a key factor in reducing the risk of being distracted by them. PISA 2022 analyses show that 15-year-old students with higher self-perceived competence in Information and Communication Technology[4] are less likely to report being easily distracted (OECD, 2024[53]). However, not all students have the same level of mastery over digital devices or time management skills.

One proposed measure to minimise distractions and enhance learning in schools is banning smartphones. However, the suitability and effectiveness of such bans in improving educational outcomes remain a topic of ongoing debate. Evidence from PISA 2022 indicates that many schools have implemented guidelines to address distractions caused by digital device use, such as general usage rules, teacher-enforced regulations, collaborative rules with students, or programs promoting responsible Internet behaviour. However, these policies show little correlation with reducing the likelihood of students becoming distracted during class (OECD, 2023[54]; 2024[53]).

Cross-national data suggest that banning cell phones in class may help reduce distractions: for instance, in PISA 2022 data, students are less likely to report being distracted by using digital devices in mathematics lessons when the use of cell phones on school premises is banned (OECD, 2023[54]). However, evidence from PISA data also suggests that such bans can be difficult to enforce. Across OECD countries, an average of 29% of students in schools with mobile phone bans still reported using smartphones several times a day, while an additional 21% used them every day or almost every day at school. Furthermore, data analysis reveals that the likelihood of students being distracted during mathematics lessons is higher in countries where the percentage of students using smartphones is significantly lower in schools that prohibit phone use compared to those that allow it. This suggests that phone bans may be more effective

in reducing distractions when enforced more consistently (OECD, 2023[54]). Smartphones can be banned from classrooms through various methods. Schools may implement policies that require students to leave their phones in lockers or designated areas before entering the classroom, with teachers enforcing strict rules against usage during lessons. Some schools use technology to block phone signals or limit Wi-Fi access in classrooms, preventing students from connecting to the Internet. Another approach is to adopt "no phone zones" by creating physical spaces where phone use is prohibited. Additionally, schools may encourage students to use their phones only for educational purposes, with clear guidelines on appropriate usage, or enforce penalties like confiscation for non-compliance. Some schools may authorise the use of smartphones during breaks or lunch time, while others may forbid it during the whole school day.

Enforcing mobile phone bans to impact students' behaviour in and outside the classroom is challenging. Past experiences, such as those in New York City, suggest that blanket bans may create new problems (Selwyn, 2019[55]). Initially, a ban of mobile phones from schools was introduced and later revoked due to practical difficulties in enforcing it during break times and lunch periods. Students and parents expressed the need for students to contact family members during these times. Consequently, limiting smartphone restrictions within the classroom was considered more efficient than banning them entirely from schools, with schools and teachers trusted to exercise professional judgment on how to manage the exclusion of cell phones from classroom. This experience suggests that leaving room for local adjustment on how to manage the ban on cell phones is necessary for the most effective application possible (Grigic Magnusson et al., 2023[56]; Smale, Hutcheson and Russo, 2021[57]). In addition, although many teachers, parents, and students support restrictions on smartphone use at school, it is argued that "phone-free" policies should clearly define their purpose and context. This would ensure that devices can still be used to support medical needs or learning, while allowing flexibility for individuals who have valid reasons to access their phones (Rahali, Kidron and Livingstone, 2024[58]).

Ensuring that banning mobile phones at school does not inadvertently lead students to engage in unhealthy digital device use in the evening (at home) is also crucial, is also important, as Chapter 4 demonstrated that prolonged use before bedtime can affect sleep quality. This risk is suggested by PISA data, which show that when mobile phones are banned at school, students are less likely to turn off notifications from social networks and apps on their devices before going to sleep – even after controlling for differences in the socio-economic status and students' test performance (OECD, 2023[54]). This challenge underscores the importance of considering the interconnections between the various environments in which children live (i.e., school and home), as outlined in Chapter 2. It highlights the need to assess the potential consequences of school-imposed restrictions on students' lives outside of school and stresses the importance of incorporating feedback from parents, guardians, and caregivers to refine these measures.

Whether banning phones from schools has the desired impact on students' school performance and well-being is an open question. In a review of evidence, Rahali et al. (2024[58]) highlight several studies indicating that restricting smartphone use can improve students' academic performance, particularly among disadvantaged students or those with suboptimal performance. However, the findings are mixed, with some methods being questioned and certain studies showing no benefits or even negative effects. Similar mixed evidence exists the impact of banning mobile phones in schools on students' well-being: some studies show positive effects on well-being and mental health, while others find no impact or even negative consequences due to increased anxiety from phone restrictions (Campbell and Edwards, 2024[59]). Similarly, the effect of mobile phone bans on bullying and cyberbullying is inconclusive. While some studies report reduced bullying following bans, others suggest that incidents of online victimisation and harassment may be greater in schools with phone restrictions, possibly because students perceive the bans as punitive, affecting the overall school climate (Campbell and Edwards, 2024[59]). Given the limited number of studies, the evidence lacks sufficient depth to determine which policies are most effective for overall student well-being or for children of different age groups (Rahali, Kidron and Livingstone, 2024[58]).

5.3. Pillar 3: Parents, carers and guardians

The responsibility for ensuring a safe and beneficial digital environment for children primarily lies with digital service providers, who design and manage the online spaces children engage with, and with governments, which create policies and practices aimed at both empowering and protecting children (OECD, 2021[4]; 2022[5]). At the same time, parents, carers, and guardians play a critical role as partners in implementing these protections. For this reason, it is essential that digital services are designed to meet the needs of both children and the adults responsible for their care.

Parenting behaviours for managing children's digital media use should evolve with age (Reich and Madigan, 2025[60]). At younger ages, rigid rules and strong oversight are crucial, while adolescents benefit from more flexible rules and open discussions. As children grow, they need increased digital autonomy alongside guidance on maintaining healthy media habits that promote learning, creativity, and connection. Throughout all stages, it is important for parents to engage in conversations about digital media use and model healthy habits.

The ever-evolving landscape of technology can sometimes leave parents, caregivers, and guardians feeling ill-equipped to fully grasp the intricacies and risks involved (OECD, 2020[17]). In response to this, parents and caregivers need support in actively mediating[5] children's use of digital devices and services, helping them develop the skills and understanding necessary to navigate and critically engage with digital technologies and online environments (Koch, Laaber and Florack, 2024[61]). To exercise this role, parents need transparent information on how digital services engage with their children, including on aspects such as privacy settings, data processes and retention policies, terms of service, and community standards (OECD, 2021[18]; Council of Europe, 2018[62]; OHCHR, 2021[63]).

To achieve this goal, the OECD Guidelines for Digital Service Providers highlight that these providers should offer information that is clear, understandable, accessible, and written in plain, age-appropriate language how their children's and parents' personal data is collected and used (OECD, 2021[18]). It also underlines that data collection and sharing should be limited to what is necessary to provide the service in the child's best interests. Additionally, children's data should not be used in ways that harm their wellbeing, which requires prohibiting the profiling of children or automated decision-making unless there is a compelling reason for it and adequate safeguards to protect children (OECD, 2021[18]). The UN Committee on the Rights of the Child also recommend prohibiting the profiling or targeting of children for commercial purposes based on their digital characteristics (OHCHR, 2021[63]). It also calls for banning practices like neuromarketing, emotional analytics, immersive advertising, and virtual or augmented reality ads from engaging with children to promote products or services.

Last but not least, clear and transparent processes must be established on what parents and children can do if they consider there is a problem or injustice (OHCHR, 2021[63]). For example, parents of very young children should have the right to object to routine digital surveillance of their child in commercial settings and educational and care settings. The UN Committee on the Rights of the Child also recommend that effective judicial and non-judicial remedial mechanisms for violations of children's rights in the digital environment should be widely known and easily accessible to all children and their representatives. These mechanisms must be free of charge, safe, confidential, responsive, child-friendly, and provided in accessible formats (OHCHR, 2021[63]).

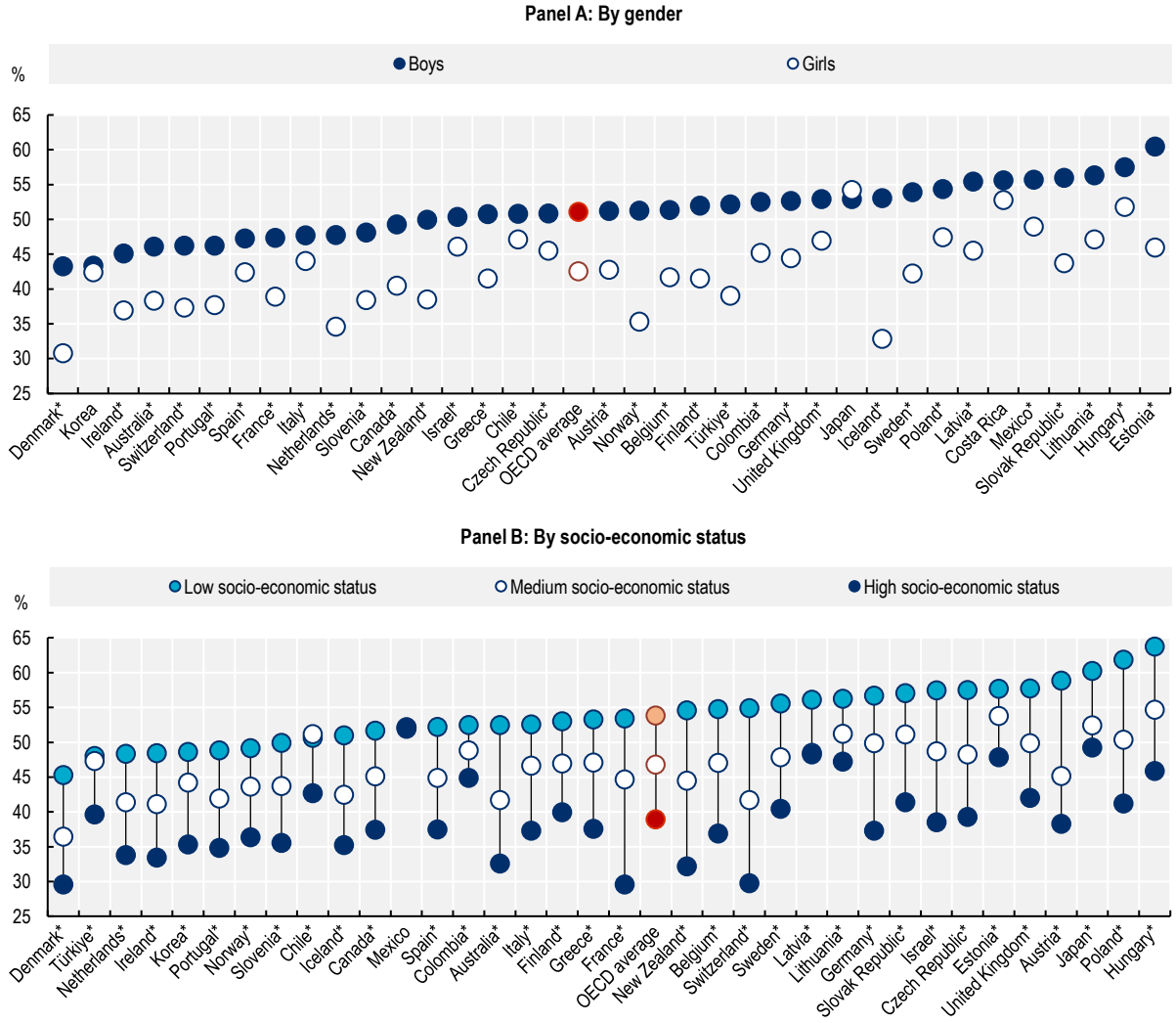
Providing support to parents and caregivers with limited digital literacy is essential to help them understand the risks to children's well-being in the digital environment, access remedies for harm, and guide children in developing responsible digital practices (OECD, 2021[4]). A number of countries have programmes in place to meet the digital literacy needs of parents, and to raise their awareness of the specific risks that their children may face in the digital environment (Better Internet for Kids, 2024[1]). For instance, in France, the Ministry of Education established "La Mallette des parents" as part of its policy to educate parents about school teaching programmes, and issues such as cyberbullying, safeguarding children's privacy,

and the use of digital devices in the classroom. In Germany, the media guide SCHAU HIN! supports parents and guardians with age-appropriate, up-to-date recommendations for children's media use that are suitable for everyday use. Parents and guardians can also attend media courses to learn how to deal with digital media and support children and young people.

Managing children's screen time and access to content is one of the key challenges for parents. It is also a significant source of difficulty or conflict between parents and children, alongside issues such as bedtime/sleep, eating habits, and homework (Livingstone et al., 2015[64]). Promoting good digital practices involves that parents can control when children use digital devices, limit the amount of time spent on them, and select the content and type of services their children can access to. For example, given the disruptive effect of prolonged digital device use before bedtime (Chapter 4), parents play a crucial role in assisting digital device usage at night. This is especially important as nearly half of 15-year-olds report that they do not typically turn off notifications at bedtime (Figure 5.2). Consistently across OECD countries, boys (51% on average) are more likely than girls (43%) to report that they rarely turn off notifications before going to sleep (Panel A). Adolescents with low socio-economic status are also less likely (54%) to do so than their socio-economically advantaged peers (39%) (Panel B).

Figure 5.2. Nearly half of 15-year-olds keep notifications active on digital devices before going to sleep

15-year-old students who report turning off notifications on their digital devices half of the time or less before going to sleep



Note: *The difference between boys and girls, and students with high and low socio-economic status is statistically significant at the 5% level. 15-year-old students were asked "Think about your use of digital devices. How often do you feel or act the following ways? (If you don't have or use a digital device, please select 'not applicable') ... I turn off notifications from social networks and apps on my digital devices when going to sleep." and presented with the response options "Never or almost never", "Less than half of the time", "About half of the time", "More than half of the time", "All or almost all of the time", and "Not applicable". Data refer to the percent responding "Never or almost never", "Less than half of the time" or "About half the time". Students who responded "Not applicable" are excluded from the analysis.
Source: OECD Secretariat calculations based on OECD (2022[52]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html.

StatLink https://stat.link/yfqvmp

Limiting screen time can be more problematic than controlling the content children engage with. A key issue for parents is finding the right balance between control, restriction, and guidance in navigating the digital space. Many children express a desire for such a balance, seeking more support and encouragement in their digital activities, especially when they perceive parents' and caregivers' approaches to be punitive, overly restrictive, or not adjusted to their evolving capacities (Livingstone et al., 2015[64]). Moreover, while restrictive measures are associated with the lowest levels of risk exposure, they also appear to limit children's online opportunities to learn, explore, develop digital skills or gain resilience to risk (Livingstone et al., 2015[64]). Active mediation appears most promising in terms of minimising risks without minimising opportunities, but the evidence for such dual effectiveness is not yet strong. Nor have such a balance been studied in relation to much younger children.

Research evidence suggests that parents' awareness and simple actions can significantly help parents managing their children's access to digital technologies and content (Muppalla et al., 2023[65]). Since prolonged screen use in early childhood often persists into later years and is linked to unhealthy behaviours, such as insufficient sleep, incorporating screen-use guidelines in birth kits for new parents can help highlight the associated risks and encourage parents to select high quality content of screen media (Swider-Cios, Vermeij and Sitskoorn, 2023[66]). Additionally, health visitors can offer advice grounded in medical evidence. Possible additions to interventions could also include the use of an electronic monitoring device to restrict screen time and manage access to media content, the conditional use of screens on physical activity, or education via mass or small media (such as newsletters, brochures, or billboards) (Muppalla et al., 2023[65]).

In response to the physical and mental health risks associated with children spending excessive time on digital devices or watching TV, many countries have introduced recommendations encouraging parents and caregivers to limit their children's screen time, in line with the World Health Organisation's Guidelines on Physical Activity, Sedentary Behaviour, and Sleep for Children Under 5 Years of Age (World Health Organisation (2019[67]), Box 5.4). These types of recommendations offer the benefit of outlining simple principles that everyone can understand, making them accessible for families who lack the time or expertise to implement more sophisticated screen-time management strategies or exercise detailed control over different types of digital tool use. However, there are significant limitations. Indiscriminate application may intensify conflicts between parents and children regarding screen time, potentially harming the overall quality of parent-child relationships. Moreover, the most restrictive recommendation may be impractical given current behaviours. For instance, the recommendation suggested in France to prohibit teenagers from using smartphones with Internet access by age 13 (Benyamina and Mouton, 2024[68]) will be difficult to enforce in a context where already 40% of 10-year-olds own a smartphone, with the percentage increasing to 98% among 15-year-olds.

An approach supported by several professional health associations proposes recommendations that go beyond setting time limits. These recommendations include principles and tips to help parents and caregivers mitigate the risks of the digital world and promote good screen time practices (Box 5.4). Rather than focusing on the catch-all notion of "screen time", it is suggested to consider whether, when and why particular digital activities help or harm individual children. The approach taken by the Canadian Paediatric Society is particularly interesting in how it combines recommendations to minimise screen time, mitigate screen time risks, and to engage all family members in developing and sharing good digital practices. This approach aligns with the previously reviewed evidence, which suggests that discussions and restrictions on the content of accessible platforms and apps may be more effective than time restrictions alone, and that parent-child interactive engagement is necessary to gain the benefits of time spent on digital devices (Vedechkina and Borgonovi, 2021[69]) (Chapter 4).

Box 5.4. Selected examples of guidelines for managing screen time for children

The World Health Organization (WHO) provides specific guidelines for screen time for children, which are part of their broader recommendations on physical activity, sedentary behaviours, and sleep (World Health Organisation, 2019[67]). The recommendations vary with child age and are as follow:

- For infants (less than 1 year old) and 1-year-olds: Screen time is not recommended. The focus should be on physical activity and interactive floor-based play.
- For 2-year-olds, screen time should be limited to no more than 1 hour per day; less is better. Engaging in activities that involve physical movement and interaction with caregivers is encouraged.
- For children aged 3-4 years: Screen time should be limited to no more than 1 hour per day; less is better. Activities that involve physical activity and social interaction are preferred.

Many OECD countries have also issued recommendations that vary in nature, reflecting diverse approaches to balancing the benefits and risks associated with the time spent with screens. The recommendations primarily focus on limiting screen time to promote health sleep and physical development in children. In some countries, guidelines issued by associations of health professionals go beyond mere time restrictions and address how to mitigate the risks of the digital world and promote good practices.

Australia and Germany are examples where the main focus of the recommendation lies in promoting physical activity and development. In Australia, national guidelines for screen time are included in the Australian Department of Health's Physical Activity and Sedentary Behaviour Guidelines which recommend that children under 2 years old should avoid all screens except for video chatting; children aged 2 to 5 years should be limited to less than one hour per day; For children aged 5 to 17 years, screen time should be limited to no more than two hours of recreational screen time per day, in addition to using screens for educational purposes.

In Germany, the German Federal Ministry of Heath recommends that children have minimum screen time: no screen time for infants and toddlers; as little as possible, maximum of 30 minutes/day for preschool children; maximum of 60 minutes/day for primary school children and up to a maximum of two hours for adolescents. In the United Kingdom, there is no specific hourly limit, but guidelines emphasize the importance of ensuring that screen time does not interfere with sleep, physical activity, and time spent on other important activities (Health Promotion Knowledge Gateway - European Commission, 2021[70]).

Canada takes a broader approach, where the Canadian Paediatric Society provides recommendation to minimise screen time but also to mitigate risks and promote better use of screen time (Canadian Pediatric Society, 2022[71]). Specific recommendations for families include:

- Minimise screen time: Under 2 years: Screen time is not recommended, except for video-chatting with caring adults; Ages 2 to 5 years: Limit screen time to about 1 hour or less per day; limit recreational screen time to no more than two hours per day for older children. More broadly it is recommended to ensure that screen time is not a routine part of childcare for children under 5 years, and maintain screen-free times, particularly during family meals and book-sharing. Avoid screens at least 1 hour before bedtime to prevent stimulation and melatonin suppression.
- Mitigate screen time risks by being present and engaged during screen use, co-viewing with children to promote digital media literacy and help them recognize and question advertising and stereotypes; prioritising educational, age-appropriate, and interactive programming, and

encourage creative activities using screen devices; monitoring media use by creating playlists or selecting appropriate channels, limiting exposure to advertising and commercial content.

- Enhance family mindfulness about screen use by: conducting a self-assessment of screen habits and developing a family media plan; prioritising shared family media use over solitary screen time for children; and encouraging older siblings to mentor younger children's digital use.

In France, a balance between quantitative and qualitive recommendations is provided by the Haut Conseil de la Santé Publique which recommends that:

- Before the age of 3, screens should be banned unless there is parental interaction. 3D screens should be banned for children under the age of 5. For older children, screen time recommendations are similar to those in other countries, focusing on balancing screen use with other healthy activities
- Keep screens out of children's bedrooms and do not allow them to watch television an hour before going to sleep.
- Support screen consumption according to screen type, age category, and content.
- Strike a balance between authorisation and prohibition, and limit screen time to allow time for other activities.
- Be able to spot the warning signs of excessive screen use and seek help and advice when needed.

The issue of smartphone use among adolescents is addressed by an expert commission established by the French President. It recommends that children under the age of 11 should not be given mobile phones (Benyamina and Mouton, 2024[68]). It suggests that children should only use devices without Internet access until they reach the age of 13. To enforce this recommendation, the Commission proposes requiring users to declare their date of birth when purchasing a smartphone or subscribing to a mobile phone plan. Alternatively, smartphones sold in France could be labelled with "not suitable for under 13s".

In the United Kingdom, the Royal College of Paediatrics and Child Health considers that there is insufficient evidence to confirm that screen time is inherently harmful to child health at any age (RCPCH, 2024[72]). As a result, the College considers that it is not possible to recommend age-appropriate time limits. However, the College suggests a series of questions to help families make informed decisions about their screen time use. These questions include:

- Is your family's screen time under control?
- Does screen use interfere with what your family want to do?
- Does screen use interfere with sleep?
- Are you able to control snacking during screen time use?

In the United States, the American Academy of Child & Adolescent Psychiatry offers a series of guidelines aimed at helping families mitigate risks and maximise the benefits of children's engagement with digital devices (AACAP, 2024[73]). Families are encouraged to consider the following guidelines.

- Until 18 months of age limit screen use to video chatting along with an adult (for example, with a parent who is out of town).
- Between 18- and 24-months screen time should be limited to watching educational programming with a caregiver.
- For children 2-5, limit non-educational screen time to about 1 hour per weekday and 3 hours on the weekend days.
- For ages 6 and older, encourage healthy habits and limit activities that include screens.

- Turn off all screens during family meals and outings.
- Learn about and use parental controls.
- Avoid using screens as pacifiers, babysitters, or to stop tantrums.
- Turn off screens and remove them from bedrooms 30-60 minutes before bedtime.

It is also recommended to establish a screen-time plan, where children can share their ideas and concerns.

In the United States, a report from an expert committee of the National Academies of Sciences, Engineering, and Medicine concludes that there is a lack of strong evidence that social media causes population-level changes in adolescent health. Instead, it influences individuals differently, balancing risks, benefits, and neutral impacts (National Academies, 2023[74]). Due to limited robust evidence, the committee proposed a research agenda to explore these relationships further. Interim recommendations include platform design changes for greater transparency, expanded education for youth and adults, and measures to address online harassment and bullying.

Most recently, the American Psychological Association's guide on healthy teen video viewing emphasises the importance of balance in video consumption, noting that the content teens watch can significantly impact their well-being (American Psychological Association, 2024[75]). It highlights how video content can support personal growth but also pose risks, particularly through platform features like autoplay and algorithm-driven recommendations. Parents are encouraged to set clear rules, engage in discussions about content, and model positive viewing habits to foster critical thinking and healthier choices in teens. The guide also underscores the role of education and policy in promoting media literacy and safeguarding youth from harmful content. Schools can teach video literacy as part of broader media education, while regulators and platforms should enhance moderation and age-appropriate labelling. Collaboration between parents, educators, and policymakers is key to ensuring teens develop a constructive relationship with video content.

The provision of parental control functions in the settings of the digital tools used by children is a useful way to enable parents to set boundaries in what children can access and to support children in progressively exploring the features and information available online. But there are also risks in their use, such as false sense of security, controlling behaviour by family members or others, and children not taking responsibility for some aspects of their learning and life necessary to mature (Wood, 2024[76]; Stoilova, Bulger and Livingstone, 2024[77]). Moreover, parental controls may be perceived as shifting responsibility onto parents regarding their child's use and potential exposure to risks, with parents who may not be able to make meaningful changes to the service other than binary decisions about access or not. This can be seen as companies outsourcing the responsibility for their services, whereas the key priority should be designing services with built-in safety measures, rather than relying on parental controls (OECD, 2024[3]). Moreover, while there is little support for advocating parental controls as a stand-alone strategy, parents value them when embedded in a broader approach to parental mediation and parent – child relations (Stoilova, Bulger and Livingstone, 2024[77]).

Last, research indicates that parents' mobile device use is linked to distracted parenting, often leading to children seeking attention through high-risk behaviours (Reich et al., 2025[78]). Observational studies show that when a parent's cell phone is present, there is less affection, responsiveness, and language interaction with their children. Therefore, family media plans could address both children's and parents' media use, including by setting device-free zones, such as the dinner table, to promote healthier interactions.

5.4. Pillar 4: Incorporate children's views

The OECD Recommendation on Children in the Digital Environment underscores the importance of effective child participation, calling on all actors to uphold children's right to freely express their views and participate in digital matters according to their age and maturity (OECD, 2021[4]; 2022[5]). Consulting children helps ensure that decisions are appropriate for their age and maturity level while also increasing the likelihood that measures, such as restrictions on digital device access, are understood and accepted, thereby reducing the risk of non-compliance. Finally, both parents and children often struggle to understand the available tools, the risks they face, and their responsibilities. Involving children (and parents) in the design of digital devices and in the communication about how to use them safely is a practical way to enhance transparency, understanding, and effective protection for children (Milkaite and Lievens, 2020[79]; OHCHR, 2021[63]).

Child participation can take various forms, such as engaging children individually in matters that affect them personally, like seeking redress for harm in the digital environment or enabling them to make informed decisions about their privacy settings (OECD, 2022[5]). It also includes consulting children in policy development or research and incorporating their views into the outcomes. Additionally, child participation can involve including youth voices in the design and development of digital services.

Including young people in consultations about digital matters is increasingly common, but countries vary in how actively they involve children in shaping digital environment policies. Some countries have dedicated structures for active participation, while others consider children's interests indirectly through surveys or existing data. A survey in Europe found that slightly more than half of the countries directly involve children in developing digital environment policies, using methods like hearings, consultations, and specific surveys (Better Internet for Kids, 2024[1]). In countries like Ireland, Italy, Norway, and Slovenia, children are actively engaged in designing policies through specially designed structures. For instance in Ireland, the regulator, Coimisiún na Meán, established a Youth Advisory Committee, which includes representatives from nine national organisations and nine individuals under 25, to advise on policies such as the draft online safety code. At European level, the Better Internet for Kids' Youth Programme offers young people an engaging platform to share their views on making the Internet safer and better for children and youth.

A significant challenge with child consultations is their tendency to favour more advantaged children, often resulting in low reach among children from disadvantaged backgrounds (Dirwan and Thévenon, 2023[13]; Gottschalk and Borhan, 2023[80]). When consulting children, it is then crucial to provide ample opportunities for participation from socially disadvantaged or underrepresented backgrounds. This entails addressing the varying needs and potential obstacles disadvantaged children may face in participating, such as geographical distance, the material cost of participation, or, especially for non-native speakers, the lack of proficiency in the consultation's language.

Adolescents express a desire for online protection with safe access to digital media. An international consultation of 709 children and young people aged 9-22 years across 27 countries revealed that they seek spaces for creativity, experimentation, and exercising agency (Third and Moody, 2021[81]). During this consultation, children and young people called on States and other duty bearers to ensure that they have truthful information in their language, as well as transparent and child-friendly information about how digital services work. Simultaneously, they want digital platforms to cease commercial exploitation, data collection, and exposure to misinformation and harmful content. They also demand more information about how their data is collected, stored, and used, greater protection of their privacy, and less surveillance by commercial entities and parents. They expressed the desire for parents and carers to afford them greater trust and autonomy to use digital technologies responsibly, to be better informed about the benefits and harms relating to digital technologies, to develop their own digital literacies, and to model appropriate technology use for children.

References

AACAP (2024), *Screen Time and Children*, American Academy of Child & Adolescent Psychiatry, https://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Children-And-Watching-TV-054.aspx. [73]

American Psychological Association (2024), *APA Recommendations for Healthy Teen Video Viewing*, https://www.apa.org/topics/social-media-internet/healthy-teen-video-viewing (accessed on 6 January 2025). [75]

ANSES (2021), *Opinion on on the "health effects associated with exposure to virtual and/or augmented reality technologies"*, French Agency for Food, Environmental and Occupational Health & Safety, https://www.anses.fr/en/system/files/AP2017SA0076EN.pdf (accessed on 17 December 2024). [44]

Australian Child Rights Taskforce (2024), *Open letter regarding proposed social media bans for children*, https://apo.org.au/node/328608 (accessed on 5 March 2025). [27]

Australian Human Rights Commission (2024), *Proposed Social Media Ban for Under-16s in Australia*, https://humanrights.gov.au/about/news/proposed-social-media-ban-under-16s-australia?mc_cid=78865662a3 (accessed on 9 January 2025). [25]

Benvenuti, M. et al. (2023), "Teens online: how perceived social support influences the use of the Internet during adolescence", *European Journal of Psychology of Education*, Vol. 39/2, pp. 629-650, https://doi.org/10.1007/s10212-023-00705-5. [10]

Benyamina, A. and S. Mouton (2024), *Enfants et écrans: À la recherche du temps perdu*, Rapport de la commission d'experts sur l'impact de l'exposition des jeunes aux écrans., https://www.codeps13.org/documentation/nouveaute-cote-doc/rapport--enfants-et-ecrans--a-la-recherche-du-temps-perdu (accessed on 13 June 2024). [68]

Benzie, A. and R. Montasari (2022), "Artificial Intelligence and the Spread of Mis- and Disinformation", *Artificial Intelligence and National Security*, pp. 1-18, https://doi.org/10.1007/978-3-031-06709-9_1. [39]

Better Internet for Kids (2024), "The Better Internet for Kids (BIK) Policy Monitor Report 2024", https://www.betterinternetforkids.eu/bikmap (accessed on 13 June 2024). [1]

Burns, T. and F. Gottschalk (eds.) (2019), *Educating 21st Century Children: Emotional Well-being in the Digital Age*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/b7f33425-en. [47]

Campbell, M. and E. Edwards (2024), *We looked at all the recent evidence on mobile phone bans in schools – this is what we found*, The Conversation. [59]

Canadian Pediatric Society (2022), *Screen time and preschool children: Promoting health and development in a digital world*, Position Paper, https://cps.ca/en/documents/position/screen-time-and-preschool-children (accessed on 13 June 2024). [71]

Cassidy, W., K. Brown and M. Jackson (2012), "'Under the radar': Educators and cyberbullying in schools", *School Psychology International*, Vol. 33/5, pp. 520-532, https://doi.org/10.1177/0143034312445245. [50]

Cino, D. et al. (2022), "Predictors of children's and young people's digital engagement in informational, communication, and entertainment activities: findings from ten European countries", *Journal of Children and Media*, Vol. 17/1, pp. 37-54, https://doi.org/10.1080/17482798.2022.2123013. [7]

CNIL (2021), *La CNIL publie 8 recommandations pour renforcer la protection des mineurs en ligne*, https://www.cnil.fr/fr/la-cnil-publie-8-recommandations-pour-renforcer-la-protection-des-mineurs-en-ligne (accessed on 12 December 2024). [28]

Čorba, J. et al. (2024), *Evolving with innovation: The 2024 OECD AI Principles update*, https://oecd.ai/en/wonk/evolving-with-innovation-the-2024-oecd-ai-principles-update (accessed on 13 December 2024). [33]

Council of Europe (2018), *Guidelines to respect, protect and fulfil the rights of the child in the digital environment*, Council of Europe, https://rm.coe.int/guidelines-to-respect-protect-and-fulfil-the-rights-of-the-child-in-th/16808d881a (accessed on 15 December 2024). [62]

Data Protection Commission (2020), *Report by the Data Protection Commission on the use of cookies and other tracking technologies*, Data Protection Commission, Dublin, https://www.dataprotection.ie/en/news-media/press-releases/report-dpc-use-cookies-and-other-tracking-technologies. [29]

Dignum, V. et al. (2021), *Policy guidance on AI for children*, UNICEF Innocenti Global Office of Research and Foresight, https://www.unicef.org/innocenti/reports/policy-guidance-ai-children (accessed on 13 December 2024). [34]

Dirwan, G. and O. Thévenon (2023), "Integrated policy making for child well-being: Common approaches and challenges ahead", *OECD Papers on Well-being and Inequalities*, No. 16, OECD Publishing, Paris, https://doi.org/10.1787/1a5202af-en. [13]

Feuerriegel, S. et al. (2023), "Research can help to tackle AI-generated disinformation", *Nature*, Vol. 7/7, pp. 1818-1821, https://doi.org/10.1038/s41562-023-01726-2. [37]

Fiani, C. (2023), *Ensuring Child Safety in Social VR: Navigating Different Perspectives and Merging Viewpoints*, http://mkhamis.com/data/papers/fiani2023chiworkshop.pdf (accessed on 17 December 2024). [45]

Flayelle, M. et al. (2023), "A taxonomy of technology design features that promote potentially addictive online behaviours", *Nature Reviews Psychology*, Vol. 2/3, pp. 136-150, https://doi.org/10.1038/s44159-023-00153-4. [22]

Freeman, G. et al. (2022), "Disturbing the Peace: Experiencing and Mitigating Emerging Harassment in Social Virtual Reality", *Proceedings of the ACM on Human-Computer Interaction*, Vol. 6/CSCW1, https://doi.org/10.1145/3512932. [43]

Gottschalk, F. and H. Borhan (2023), "Child participation in decision making: Implications for education and beyond", *OECD Education Working Papers*, No. 301, OECD Publishing, Paris, https://doi.org/10.1787/a37eba6c-en. [80]

Grigic Magnusson, A. et al. (2023), "Complexities of Managing a Mobile Phone Ban in the Digitalized Schools' Classroom", *Computers in the Schools*, Vol. 40/3, pp. 303-323, https://doi.org/10.1080/07380569.2023.2211062. [56]

Health Promotion Knowledge Gateway - European Commission (2021), *Recommendations on sedentary time for children and adolescents*, https://knowledge4policy.ec.europa.eu/health-promotion-knowledge-gateway/physical-activity-sedentary-behaviour-table-3a_en (accessed on 13 June 2024). [70]

Helmus, T. (2022), "Artificial Intelligence, Deepfakes, and Disinformation: A Primer", *Perspective*, https://www.rand.org/pubs/perspectives/PEA1043-1.html (accessed on 16 October 2024). [38]

Holly, L. et al. (2023), "Optimising adolescent wellbeing in a digital age", *BMJ*, Vol. 380, p. e068279, https://doi.org/10.1136/BMJ-2021-068279. [12]

Information Commissioner's Office (2024), *Protecting children's privacy online: Our Children's code strategy*, https://ico.org.uk/for-organisations/uk-gdpr-guidance-and-resources/childrens-information/childrens-code-guidance-and-resources/protecting-childrens-privacy-online-our-childrens-code-strategy/ (accessed on 12 December 2024). [30]

Kelly, G. (2022), *Privacy of Virtual Reality: Our Future in the Metaverse and Beyond*, Common Sense Media, San Francisco, https://www.commonsensemedia.org/research/privacy-of-virtual-reality-our-future-in-the-metaverse-and-beyond (accessed on 17 December 2024). [42]

Koch, T., F. Laaber and A. Florack (2024), "Socioeconomic status and young people's digital maturity: The role of parental mediation", *Computers in Human Behavior*, Vol. 154, p. 108157, https://doi.org/10.1016/j.chb.2024.108157. [61]

Lee, S. (2009), "Online Communication and Adolescent Social Ties: Who benefits more from Internet use?", *Journal of Computer-Mediated Communication*, Vol. 14/3, pp. 509-531, https://doi.org/10.1111/j.1083-6101.2009.01451.x. [9]

Livingstone, S., E. Lievens and J. Carr (2020), "Handbook for policy makers on the rights of the child in the digital environment", http://hdl.handle.net/1854/LU-8683764 (accessed on 12 June 2024). [16]

Livingstone, S. et al. (2015), *How parents of young children manage digital devices at home: The role of income, education and parental style*, LSE: EU Kids Online. [64]

Mascheroni, G. and K. Olafsson (2014), *Net Children Go Mobile: risks and opportunities. Second Edition.*, Department of Communication and Performing Arts Faculty of Political and Social Sciences, https://publires.unicatt.it/en/publications/net-children-go-mobile-risks-and-opportunities-second-edition-10 (accessed on 8 August 2024). [8]

McGovern, A. (2021), *Artificial intelligence system could help counter the spread of disinformation*, https://news.mit.edu/2021/artificial-intelligence-system-could-help-counter-spread-disinformation-0527 (accessed on 16 October 2024). [40]

Milkaite, I. and E. Lievens (2020), "Child-friendly transparency of data processing in the EU: from legal requirements to platform policies", *Journal of Children and Media*, Vol. 14/1, pp. 5-21, https://doi.org/10.1080/17482798.2019.1701055. [79]

Montag, C. et al. (2019), "Addictive Features of Social Media/Messenger Platforms and Freemium Games against the Background of Psychological and Economic Theories", *International Journal of Environmental Research and Public Health*, Vol. 16/14, p. 2612, https://doi.org/10.3390/ijerph16142612. [20]

Muppalla, S. et al. (2023), "Effects of Excessive Screen Time on Child Development: An Updated Review and Strategies for Management", *Cureus*, Vol. 15/6, p. e40608, https://doi.org/10.7759/CUREUS.40608. [65]

Nakov, P. et al. (2021), "Automated Fact-Checking for Assisting Human Fact-Checkers", *IJCAI International Joint Conference on Artificial Intelligence*, pp. 4551-4558, https://doi.org/10.24963/ijcai.2021/619. [41]

National Academies (2023), *Social Media and Adolescent Health*, Consensus Study report - National Academies Sciences, Engineering and Medecine, https://nap.nationalacademies.org/resource/27396/Highlights_for_Social_Media_and_Adolescent_Health.pdf (accessed on 6 January 2025). [74]

Odgers, C. and M. Jensen (2020), "Annual Research Review: Adolescent mental health in the digital age: facts, fears, and future directions", *Journal of Child Psychology and Psychiatry*, Vol. 61/3, pp. 336-348, https://doi.org/10.1111/JCPP.13190. [6]

OECD (2024), *Age assurance for children's safety and well-being online: A project proposal*, OECD - 93rd Session of the Digital Policy Committee. [19]

OECD (2024), "Assessing potential future artificial intelligence risks, benefits and policy imperatives", *OECD Artificial Intelligence Papers*, No. 27, OECD, Paris, https://doi.org/10.1787/3f4e3dfb-en. [31]

OECD (2024), *Facts not Fakes: Tackling Disinformation, Strengthening Information Integrity*, OECD Publishing, Paris, https://doi.org/10.1787/d909ff7a-en. [36]

OECD (2024), "Managing screen time How to protect and equip students against distraction", *PISA in Focus*, No. 124, OECD Publishing, Paris, https://doi.org/10.1787/7c225af4-en. [53]

OECD (2024), "Towards Digital Safety by Design for Children", *OECD Digital Economy Papers*, No. 363, OECD Publishing, Paris, https://doi.org/10.1787/c167b650-en. [3]

OECD (2024), *What Does Child Empowerment Mean Today? Implications for Education and Well-Being*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/8f80ce38-en. [2]

OECD (2023), *PISA 2022 Results (Volume II): Learning During – and From – Disruption*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/a97db61c-en. [54]

OECD (2022), *Companion Document to the OECD Recommendation on Children in the Digital Environment*, OECD Publishing, Paris, https://doi.org/10.1787/a2ebec7c-en. [5]

OECD (2022), *Delivering For Youth: How Governments Can Put Young People at the Centre of the Recovery*, https://doi.org/10.1787/92c9d060-en. [14]

OECD (2022), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html. [52]

OECD (2021), *OECD Guidelines for Digital Service Providers*, OECD, https://legalinstruments.oecd.org/public/doc/272/5803627d-b49b-4894-8dbe-35f67fd10007.pdf (accessed on 15 December 2024). [18]

OECD (2021), *OECD Recommendation on Children in the Digital Environment*, https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0389 (accessed on 12 June 2024). [4]

OECD (2020), "Going Digital integrated policy framework", *OECD Digital Economy Papers*, No. 292, OECD Publishing, Paris, https://doi.org/10.1787/dc930adc-en. [15]

OECD (2020), "Insights and Interpretations TALIS 2018 Teaching and Learning International Survey". [48]

OECD (2020), "Protecting children online: An overview of recent developments in legal frameworks and policies", *OECD Digital Economy Papers*, No. 295, OECD Publishing, Paris, https://doi.org/10.1787/9e0e49a9-en. [17]

OECD AI Policy Observatory (2024), *OECD AI Principles overview*, https://oecd.ai/en/ai-principles (accessed on 13 December 2024). [32]

OHCHR (2021), *General comment No. 25 (2021) on children's rights in relation to the digital environment*, https://www.ohchr.org/en/documents/general-comments-and-recommendations/general-comment-no-25-2021-childrens-rights-relation (accessed on 13 June 2024). [63]

Paat, Y. and C. Markham (2021), "Digital crime, trauma, and abuse: Internet safety and cyber risks for adolescents and emerging adults in the 21st century", *Social Work in Mental Health*, Vol. 19/1, pp. 18-40, https://doi.org/10.1080/15332985.2020.1845281. [49]

Parliament of Australia (2024), *Online Safety Amendment (Social Media Minimum Age) Bill 2024*, https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/bd/bd2425/25bd39 (accessed on 9 January 2025). [24]

Pasquale, L. et al. (2022), "Digital Age of Consent and Age Verification: Can They Protect Children?", *IEEE Software*, Vol. 39/3, pp. 50-57, https://doi.org/10.1109/MS.2020.3044872. [23]

Qustodio (2020), *Connected More than Ever*, https://qweb.cdn.prismic.io/qweb/e59c2e0f-ef4f-4598-b330-10c430e2ec71_Qustodio+2020+Annual+Report+on+Children%27s+Digital+Habits.pdf (accessed on 30 January 2024). [21]

Rahali, M., B. Kidron and S. Livingstone (2024), *Smartphone policies in schools*, Digital Futures for Children - London School of Economics, Lodon, https://www.digital-futures-for-children.net/smartphone-policies (accessed on 13 December 2024). [58]

RCPCH (2024), *Build screen time around family activities, not the other way round, parents told*, Royal College of Paediatrics and Child Health, https://www.rcpch.ac.uk/news-events/news/build-screen-time-around-family-activities-not-other-way-round-parents-told (accessed on 20 December 2024). [72]

Reich, S. et al. (2025), "Media and Parenting: Current Findings and Future Directions", *Handbook of Children and Screens*, pp. 379-385, https://doi.org/10.1007/978-3-031-69362-5_52. [78]

Reich, S. and S. Madigan (2025), "Introduction to the Section on Parenting in the Digital Age", *Handbook of Children and Screens*, pp. 371-377, https://doi.org/10.1007/978-3-031-69362-5_51. [60]

Sabri, N. et al. (2023), "Challenges of Moderating Social Virtual Reality", *Conference on Human Factors in Computing Systems - Proceedings*, https://doi.org/10.1145/3544548.3581329/SUPPL_FILE/3544548.3581329-TALK-VIDEO.MP4. [46]

Schneider, B., Y. Amichai-Hamburger and A. Lonigro (2020), "Adolescent online friendships", in *Online Peer Engagement in Adolescence*, Routledge, https://doi.org/10.4324/9780429468360-3. [11]

Selwyn, N. (2019), "Banning mobile phones in schools: beneficial or risky? Here's what the evidence says", *The Conversation*, https://theconversation.com/banning-mobile-phones-in-schools-beneficial-or-risky-heres-what-the-evidence-says-119456 (accessed on 13 June 2024). [55]

Smale, W., R. Hutcheson and C. Russo (2021), "Cell Phones, Student Rights, and School Safety: Finding the Right Balance", *Canadian Journal of Educational Administration and Policy*, Vol. 195, pp. 49-64, https://doi.org/10.7202/1075672ar (accessed on 13 June 2024). [57]

Stoilova, M., M. Bulger and S. Livingstone (2024), "Do parental control tools fulfil family expectations for child protection? A rapid evidence review of the contexts and outcomes of use", *Journal of Children and Media*, Vol. 18/1, pp. 29-49, https://doi.org/10.1080/17482798.2023.2265512. [77]

Swider-Cios, E., A. Vermeij and M. Sitskoorn (2023), "Young children and screen-based media: The impact on cognitive and socioemotional development and the importance of parental mediation", *Cognitive Development*, Vol. 66, p. 101319, https://doi.org/10.1016/J.COGDEV.2023.101319. [66]

Third, A. and L. Moody (2021), *Our Rights in the Digital World A Report on the Children's Consultations to inform UNCRC General Comment 25*. [81]

UNICEF (2021), *Adolescent Perspectives on Artificial Intelligence Report*, Innocenti Global Office of Research and Foresight, https://www.unicef.org/innocenti/reports/adolescent-perspectives-artificial-intelligence-report (accessed on 13 December 2024). [35]

Van Ouytsel, J. et al. (2016), "Adolescent cyber dating abuse victimization and its associations with substance use, and sexual behaviors", *Public Health*, Vol. 135, pp. 147-151, https://doi.org/10.1016/j.puhe.2016.02.011. [51]

Vedechkina, M. and F. Borgonovi (2021), *A Review of Evidence on the Role of Digital Technology in Shaping Attention and Cognitive Control in Children*, https://doi.org/10.3389/fpsyg.2021.611155. [69]

Wilson, C. (2024), *Teen social media ban might backfire, risk harming youth: expert*, https://www.crikey.com.au/2024/11/18/teen-social-media-ban-young-australians-risk-harm/ (accessed on 9 January 2025). [26]

Wood, S. (2024), "Impact of regulation on children's digital lives". [76]

World Health Organisation (2019), "Guidelines on physical activity, sedentary behaviour and sleep", *World Health Organization*, p. 4, https://apps.who.int/iris/bitstream/handle/10665/325147/WHO-NMH-PND-2019.4-eng.pdf?sequence=1&isAllowed=y%0Ahttp://www.who.int/iris/handle/10665/311664%0Ahttps://apps.who.int/iris/handle/10665/325147 (accessed on 13 June 2024). [67]

Notes

[1] "Digital Service Providers" refers to any natural or legal person that provides products and services, electronically and at a distance (OECD, 2021[4]).

[2] In line with this observation, the OECD Recommendation on Children in the Digital Environment recognises that "*actions and policies for children in the digital environment should be age-appropriate, tailored to accommodate developmental differences, and reflect that children may experience different kinds of access to digital technologies based on their socio-cultural and socio-economic backgrounds and the level of parental, guardian, and carer engagement*" (OECD, 2021[4]).

[3] Digital citizenship refers to the responsible and ethical use of technology and digital tools to engage with society, participate in online activities, and interact with others. It encompasses a range of skills, behaviours, and understandings that individuals need to navigate the digital world responsibly.

[4] The Index of Self-Efficacy in Digital Competencies in PISA 2022 is calculated using a set of specific questions aimed at evaluating students' confidence in performing a variety of tasks related to digital technology and the Internet. The questions measure the extent to which students feel capable of completing tasks such as like creating a presentation or organising files, troubleshooting computer errors or finding effective ways to use software, designing or modifying digital content, managing online discussions or working on shared documents. Questions related to time management while using digital technologies were not directly included in this index, as the focus remains on technical and problem-solving skills rather than behavioural aspects like managing screen time.

[5] Active parental mediation is measured with questions such as "Do you speak with your child about what they do on their mobile phone? and questions on co-use of digital resources (e.g., "Do you help your child when something is difficult to do or find?").

6. Monitoring child digital well-being cross-nationally: The way forward

This chapter explores the gaps in data that hinder the effective monitoring of children's activities and engagement in digital spaces, including the accurate measurement of screen time and its relationship with child well-being outcomes. It examines how data sources could be leveraged or integrated to address these shortcomings. Additionally, the chapter highlights the importance of incorporating perspectives from health professionals, educators, parents, and children to better understand the challenges as experienced by children and those responsible for their guidance. This approach aims to inform the development of effective policies and supports.

Enhancing data and statistics on the impact of digital transformation on people's well-being is a key focus of countries' digital policies and the roadmap outlined by the OECD to support this transformation (OECD, 2022[1]), Children should be included in this programme as well. Data and indicators on children's digital resources, practices, and experiences in the digital environment are essential for governments and other stakeholders to comprehend the challenges associated with the increasing role of digital technologies in children's lives. To address this need, the Better Internet for Kids' "Knowledge Hub", established in Europe, serves as a central resource for information, evidence, and policy insights on the impact of digital transformation on children and young people in the EU, Iceland, and Norway. It supports stakeholders in monitoring policies in this area through updated data, reports, maps, indices, and country profiles, facilitated by national policy experts.

Indicator sets are valuable tools to raise awareness and foster a shared understanding of child well-being issues (Dirwan and Thévenon, 2023[2]). They provide the necessary knowledge base for governments to establish coherent goals and policy priorities, thereby promoting strategic alignment and cooperation across departments and agencies. In this context, collecting data on children in the digital environment is essential for understanding the relationships between digital activities and child well-being (OECD, 2021[3]). As a result, data collection is increasing in many countries. However, assessments of ongoing initiatives suggest that data collection in this domain remains uneven and fragmented (OECD, 2020[4]). For instance, the report on Better Internet for Kids (2024[5]) highlights that only a few European countries conduct a regular (annual or bi-annual) nationally representative survey focusing on children's digital activity, while some others collect data within the context of broader surveys. However, many countries collect data on children's digital activities irregularly, on an ad hoc basis, or do not collect data at all.

Amidst this fragmented information landscape, internationally conducted surveys offer a valuable information base for documenting child digital well-being and the benefits and risks associated with children's engagement in the digital world. These surveys shed light on numerous issues related to child digital well-being; however, the information remains incomplete, resulting in significant important information gaps. At the international level, the review of available data in the second chapter of this report showed that the data only partially covers the dimensions necessary to fully assess children's well-being in the digital environment. Most of the available information primarily targets teenagers, emphasises risks and negative online experiences, and includes significant details on the different types of activities children engage in when using digital devices. However, these data provide limited insights into children's positive experiences in digital spaces, as well as on the support protections and boundaries set in their home and school environments.

6.1. What can we learn about child digital well-being from international data?

As discussed in Chapter 2, recent waves of the PISA and HBSC surveys include data on digital skills and teenagers' engagement in the digital world. Although this is not the primary focus of these surveys, and the information provided is therefore limited, their strength lies in their large geographical coverage and the ability to link this data to other aspects of teenagers' lives, such as educational outcomes in PISA and physical and mental health in the HBSC. The advantage of this data for monitoring children's experiences in the digital environment is that it provides child-specific information and allows for the examination of disparities based on key socio-economic characteristics, such as gender, socio-economic status, or migrant background.

Table 6.1 presents a list of indicators derived from available international data, which enable the development of a comprehensive set of metrics on key aspects of access to and use of digital devices. The selected indicators are intended to capture essential aspects of online practices, uses, and experiences that are important for child well-being and amenable to changes in child protection and support systems. This includes information on:

- **Internet and digital device access**, with data from the PIRLS and TIMS surveys for children around age 10, and from PISA for 15-year-olds.
- **Time spent using digital technologies outside of school**. Only the PISA data contain information on time spent with digital devices for 15-year-olds. In addition to an indicator of average time, it may be useful to include an indicator of the proportion of 15-year-olds who report spending 2 hours or more per weekday, with the 2-hour threshold justified by recommendations often suggesting that screen time be kept to less than two hours per day (see Chapter 5).
- **Online social interactions**. Digital tools allow teenagers to maintain virtual social interactions with friends from their physical world and to form new connections with peers they meet online. PISA data enables us to estimate the proportion of 15-year-old students who talk to their friends virtually, while HBSC data provides information on 11-, 13-, and 15-year-olds who have regular online contact with friends they met online.
- **Negative online experiences**. The 2022 PISA survey makes it possible to estimates the proportion of 15-year-olds who have encountered inappropriate, offensive, or discriminatory content, as well as the spread of personal information. The HBSC surveys for teenagers and PIRLS surveys for younger children offer data on cyberbullying victimisation.
- **At-risk digital practices and attitudes**. Three types of indicators can be developed from the PISA 2022 survey for 15- year-olds:
  i. Indicators of intensive time spent on activities like video games or social media, where there is a risk of developing a sense of dependency and excessive time engagement. Responses to the PISA 2022 questionnaire allow the identification of the percentage of 15-year-olds spending three hours or more on each of these activities during weekdays or weekends. Studies, such as Przybylski (2014[6]), suggest that excessive game engagement (over 3 hours daily) may be associated with lower life satisfaction, reduced prosocial behaviour, and increased externalising and internalising problems. Therefore, identifying the percentage of adolescents spending 3 or more hours on these activities can help highlight those at risk.
  ii. Attitude indicators reflecting a strong reliance on digital tools include the need to keep them close to respond immediately to messages, feelings of nervousness or anxiety when the tools are not nearby, or discomfort when unable to reply to a message, such as during class.
  iii. Indicators of at-risk or inappropriate behaviour when adolescents interact with others via digital tools, such as sharing unverified information and admitting to recent acts of cyberbullying.
- **Protective behaviours & environment**: This category includes indicators of actions that teenagers can take to protect themselves from the detrimental effects of digital tools, such as turning off social network and app notifications, adjusting settings to protect data and privacy, comparing sources of information before sharing, and discussing the accuracy of information with peers and family members.

Table 6.1. Indicators available for monitoring child digital well-being

	Monitoring indicators	Year	Data source
Access to the Internet and digital devices	Percentage of 15-year-old students who report not having an Internet connection at home	2009-2022	PISA
	Percentage of 10-year-old students who report not having access to the Internet at home	2011-2021	PIRLS/TIMSS
	Percentage of 15-year-old students who report not having a desktop computer, portable laptop or notebook, or a tablet computer in their home	2015-2022	PISA
	Percentage of 15-year-old students who report having three or more digital devices with screens in their home	2022	PISA
	Percentage of 10-year-old students who report having their own smartphone at home	2021	PIRLS/TIMSS
	Percentage of 15-year-old students who report having their own smartphone	2022	PISA
Use of digital technologies	Average time spent per week by 15-year-olds on digital devices for learning and leisure	2022	PISA
	Percentage of 15-year-old students who report spending over two hours per school day using digital resources for leisure	2022	PISA
	Percentage of 15-year-old students who report spending over two hours per weekend day using digital resources for leisure	2022	PISA
	Percentage of 15-year-old students who report spending over two hours per week using digital resources for learning	2022	PISA
	Percentage of 15-year-old students who report using digital devices to learn how to do something	2022	PISA
	Percentage of 15-year-old students who report using digital devices to create or edit their own digital content	2022	PISA
	Percentage of 15-year-old students who report using digital devices to look for practical information online	2022	PISA
	Percentage of 15-year-old students who report using digital devices to browse the Internet (excluding social networks) for fun	2022	PISA
	Percentage of 15-year-old students who report using digital devices to play video games	2022	PISA
	Percentage of 15-year-old students who report using digital devices to communicate and share digital content on social networks or any communication platform	2022	PISA
	Percentage of 15-year-old students who report using digital devices to browse social networks	2022	PISA
Negative online experiences	Percentage of 15-year-old students who report getting upset the last time they encountered content online that was inappropriate for their age	2022	PISA
	Percentage of 15-year-old students who report getting upset the last time they encountered discriminatory content online (e.g. about race, gender, sexual orientation or physical appearance)	2022	PISA
	Percentage of 15-year-old students who report getting upset the last time they received unkind, vulgar or offending messages, comments or videos on social media	2022	PISA
	Percentage of 15-year-old students who report getting upset the last time information about them was publicly displayed online without their consent	2022	PISA
	Percentage of 10-year-old students who report experiencing any of a specified list of online bullying acts by other students at least once or twice a month	2021	PIRLS
	Percentage of 11-, 13- and 15-year-old school children who report having been a victim of cyber-bullying in the previous couple of months	2017/18-2021/22	HBSC
Intensive use	Percentage of 11-, 13- and 15-year-old school children who report frequent and intensive online communication with friends they met online	2017/18-2021/22	HBSC
	Percentage of 15-year-old students who report talking to their friends on the phone, send them text messages or have contact through social media every day	2018-2022	PISA
	Percentage of 15-year-old students who report playing video-games for more than three hours on a typical week day	2022	PISA
	Percentage of 15-year-old students who report playing video-games for more than three hours on a typical weekend day	2022	PISA
	Percentage of 15-year-old students who report browsing social networks for more than three hours on a typical week day	2022	PISA
	Percentage of 15-year-old students who report browsing social networks for more than three hours on a typical weekend day	2022	PISA

	Monitoring indicators	Year	Data source
Problematic use	Percentage of 11-, 13- and 15-year-old school children who report having problematic social media use, with details on: *Percentage of 11-, 13- and 15-year-old school children who report that often used social media to escape from negative feelings* *Percentage of 11-, 13- and 15-year-old school children who report that regularly neglected other activities (e.g. hobbies, sport) because they wanted to use social media*	2017/18-2021/22	HBSC
	Percentage of 15-year-old students feeling nervous/anxious more than half of the time when they don't have their digital device near them	2022	PISA
	Percentage of 15-year-old students feeling pressured to be online and answer messages more than half of the time when they are in class	2022	PISA
	Percentage of 15-year-old students keeping their digital device near them to answer messages more than half of the time when they are at home	2022	PISA
	Percentage of 15-year-old students who report sharing made-up information on social networks without flagging its inaccuracy	2022	PISA
	Percentage of 11-, 13- and 15-year-old school children who report having cyber-bullied others in the previous couple of months	2017/18-2021/22	HBSC
	Percentage of 15-year-old students who report turning off notifications from social networks and apps on their digital devices more than half of the time when they go to sleep	2022	PISA
	Percentage of 15-year-old students who report turning off notifications from social networks and apps on their digital devices more than half of the time during class	2022	PISA
Protective digital behaviours	Percentage of 15-year-old students who report comparing different sources when searching for information online	2022	PISA
	Percentage of 15-year-old students who report checking the accuracy of online information before sharing it on social networks	2022	PISA
	Percentage of 15-year-old students who report being able to easily change the settings of a device or app in order to protect their data and privacy	2022	PISA
	Percentage of 15-year-old students who report discussing the accuracy of online information with friends, other students or family	2022	PISA
Self-reported digital skills	Percentage of 15-year-old students who report being able to assess the quality of the information found online	2022	PISA
	Percentage of 15-year-old students who report being able to search for and find relevant information online	2022	PISA
	Percentage of 10-year-old students who agree with the statement "It is easy for me to find information on the Internet"	2019-2021	PIRLS/TIMSS
	Percentage of 10-year-old students who agree with the statement "I can tell if a website is trustworthy"	2021-2021	PIRLS/TIMSS

This information can be used to highlight international differences and to position each country relative to the average or top-performing countries. To this end, it is recommended to add this information to the OECD Child Well-Being Data Portal & Dashboard, a tool for policymakers and the public to monitor countries' efforts to promote child well-being. This could be achieved through the development of a dedicated module featuring the indicators on child digital behaviours and experiences listed above. The module would also include user-friendly visual tools to facilitate cross-national comparisons and provide users with quicker access to relevant information. These indicators are valuable for monitoring children's lives in the digital environment because they refer to specific, measurable behaviours or experiences that can be influenced by changes in context (Box 6.1). They also align with aspects that policy initiatives may aim to address.

Box 6.1. SMART indicators in monitoring and evaluation

SMART indicators are metrics or measurements used to assess and monitor progress toward specific goals or objectives. They are designed to be:

- **Specific:** Indicators should be specific and clearly defined, with a clear meaning and scope. This means that the indicator should be focused on a specific aspect of child digital practices or experience, rather than being too broad or vague.
- **Measurable:** Indicators should be quantifiable and measurable, so that progress towards the goal can be tracked over time. This means that the indicator should have a clear unit of measurement, such as percentages, numbers, or rates.
- **Achievable:** Indicators should be achievable and realistic, meaning that they can be impacted by realistic changes in the context or the impact of interventions.
- **Relevant:** Indicators should be relevant to the goals and objectives of the program or project. This means that the indicator should be meaningful and have a clear relationship to the program or project's intended outcomes.
- **Time-bound:** Indicators should be time-bound, with a clear timeframe for measurement. This means that the indicator should be measured at specific points in time to track progress towards the goal.

Source: OECD (2021[7]), *Measuring What Matters for Child Well-being and Policies*, OECD Publishing, Paris, https://doi.org/10.1787/e82fded1-en.

Cross-country comparison

Table 6.2 offers a comparative summary overview of OECD country performance levels on each of the indicators listed in. Green or red are assigned when a country is respectively well above or well below the average for the OECD area. Yellow indicates countries around the OECD average, and light grey missing data. This helps identify which countries excel or lag in different aspects of child digital well-being as represented by the indicator set. For instance, no OECD country achieves a green score across all dimensions, indicating that none surpasses the average in every area. However, Finland stands out by combining high engagement in various digital activities with better-than-average rates for negative online experiences. Conversely, lower-than-average rates of digital activities coexist with higher-than-average occurrences of negative experiences in Türkiye.

Table 6.2. Traffic light table comparing countries' performance to the OECD average

Countries' relative-to-average performance in each dimension

Indicator area	Indicator	AUS	AUT	BEL	CAN	CHE	CHL	COL	CRI	CZE	DEU	DNK	ESP	EST	FIN	FRA	GBR	GRC	HUN	IRL	ISL	ISR	ITA	JPN	KOR	LTU	LUX	LVA	MEX	NLD	NOR	NZL	POL	PRT	SVK	SVN	SWE	TUR	USA
Access to the Internet and digital devices	15-year-old students who report not having an internet connection at home* (%)	2	2	1	1	3	7	24		1	2	2	2	1	2	3	1	2	1	1	1	5	4	4	1	2		3	14	1	1	1	1	1	2	1	1	14	2
	10-year-old students who report not having access to the Internet at home* (%)	5	9							4	12	3	4		3	6			4	3		9	7			3		3		3	1	11	2	2	7	8	3	17	
	15-year-old students who report not having a computer or tablet at home* (%)	1	1	1	1	1	8	35		2	1	0	2	0	1	2	1	3	3	1	1	3	2	4	1	2		1	26	1	1	1	1	2	5	1	1	24	2
	15-year-old students who report having three or more digital devices with screens at home (%)	99	97	98	99	98	94	77		97	98	99	98	98	98	97	99	94	96	99	98	94	97	98	98	95		98	82	99	99	98	97	98	92	98	98	85	98
	10-year-old students who report having their own smartphone at home (%)	34	71							89	67	94	45		98	40			86	54		73	51			96		95		69	95	36	93	59	79	73	94	29	
	15-year-old students who report having their own smartphone (%)	98	99	99	97	99	98	82		99	99	100	99	99	99	98	98	98	99	99	99	97	100	100	99	99		99	95	100	99	97	100	99	99	99	99	88	98
Use of digital technologies	Average time per week spent on digital devices by 15-year-old students (in hours)	49	47	44	45	41	40	41	41	47	48	51	39	58	54	37	44	45	55	35	41	50	62	26	47	50		59	37	49	48	45	57	47	57	37	51	42	
	15-year-old students who report using digital devices for leisure more than two hours per school day (%)	58	64	64	61	58	50	43	50	62	74	59	50	82	65	58	61	63	78	56	38	73	70	24	57	57		76	37	68	58	55	80	67	73	49	60	53	
	15-year-old students who report using digital devices for leisure more than two hours per weekend day (%)	71	72	77	72	75	61	53	57	87	84	63	68	88	67	74	81	78	89	73	42	74	80	44	85	68		84	52	75	61	64	85	79	81	63	67	71	
	15-year-old students who report using digital devices for learning outside of school more than two hours per week (%)	80	89	85	80	82	77	88	82	87	86	84	82	94	87	77	82	79	91	73	87	80	90	64	83	89		94	86	89	83	78	87	85	89	87	84	81	
	15-year-old students who report using digital devices to learn how to do something (%)	77	78	74		77	84		81	82	76	75	78	82	74		75	78	80	70	76	75	82	83	61	86		84					89		86	80	77	83	77
	15-year-old students who report creating or editing their own digital content (%)	64	73	76		73	63		60	77	69	64	60	78	74		61	80	76	55	62	65	79	38	52	78		79					78		76	78	67	75	67
	15-year-old students who report looking for pratical information online (%)	82	86	84		87	82		76	89	84	89	75	89	89		81	85	88	79	84	89	86	72	77	83		85					92		88	87	85	80	78
	15-year-old students who report browsing the Internet (excl. social networks) for fun (%)	96	96	95		95	96		93	96	96	96	96	97	97		94	94	96	94	94	92	96	92	90	96		96					97		95	94	96	92	96
	15-year-old students who report playing video games (%)	87	80	82		80	87		83	79	83	85	81	85	86		86	80	86	81	85	81	81	83	85	85		84					86		78	77	89	81	87

Indicator area	Indicator	AUS	AUT	BEL	CAN	CHE	CHL	COL	CRI	CZE	DEU	DNK	ESP	EST	FIN	FRA	GBR	GRC	HUN	IRL	ISL	ISR	ITA	JPN	KOR	LTU	LUX	LVA	MEX	NLD	NOR	NZL	POL	PRT	SVK	SVN	SWE	TUR	USA
Use of digital technologies	15-year-old students who report communicating and sharing digital content (%)	89	96	88		83	88		79	80	86	96	84	94	89		89	92	94	92	87	73	87	86	83	88		90					94		92	89	93	81	89
	15-year-old students who report browsing social networks (%)	95	96	97		96	98		95	97	94	98	96	96	97		95	97	96	97	96	92	97	91	89	96		96					95		95	97	96	92	95
Negative online experiences	15-year-old students who report getting upset the last time they encountered content online that was inappropriate for their age* (%)	36	33	40		35	31		45	53	36	38	40	31	34		21	37	24	24	30	49	34	27	46	34		34					39		36	38	37	38	37
	15-year-old students who report getting upset the last time they encountered discriminatory content online* (%)	61	49	55		49	57		64	61	45	59	63	56	45		47	58	33	49	40	59	58	36	67	56		50					57		48	55	41	65	57
	15-year-old students who report getting upset the last time they received unkind messages online* (%)	50	36	43		32	46		47	55	27	45	47	46	34		37	42	33	38	32	43	40	29	67	39		41					54		42	38	37	58	46
	15-year-old students who report getting upset the last time information about them was publicly displayed online without their consent* (%)	46	31	39		27	38		29	50	25	41	31	46	31		33	34	35	33	27	34	33	17	61	35		38					57		43	33	36	46	44
	10-year-old students who report experiencing online bullying by other students at least monthly* (%)	5	6							5	7	3	6		2	2			4	3			5			6		6		9	2	8	3	5	7	6	4	7	4
	11-, 13- and 15-year-old students who report having been a victim of cyber-bullying* (%)		13		21	11				15	14	16	8	20	16	10		9	20	19	15	13	13			27	14	24		11	13		22	9	14	19	18		
Intensive use	11-, 13- and 15-year-old students who report frequent and intensive online communication with friends they met online (%)		39		38					35	33	41	28	48	53	33		28	83	34	38	29	30			45	38	41		30	41		43	42		41	41		
	15-year-old students who report using digital devices to talk to their friends every day (%)								83				91			87			91	95									80	95		89				89			
	15-year-old students who report playing video-games for more than three hours on a typical week day (%)	29	23	21		19	36		27	30	26	29	18	32	28		33	24	28	20	27	29	23	17	26	33		31					28		32	19	33	27	32
	15-year-old students who report playing video-games for more than three hours on a typical weekend day (%)	41	30	31		28	45		34	35	36	38	31	41	34		44	30	40	31	33	33	28	35	38	40		38					40		35	26	39	30	43
	15-year-old students who report browsing social networks for more than three hours on a typical week day (%)	39	36	39		28	55		44	42	33	42	36	35	38		42	37	35	37	41	41	41	19	27	39		36					35		44	33	38	36	41
	15-year-old students who report browsing social networks for more than three hours on a typical weekend day (%)	46	40	44		37	56		45	42	39	48	44	38	39		49	42	41	45	41	41	42	35	32	41		37					41		44	36	38	38	48
Problematic use	11-, 13- and 15-year-old students who report problematic social media use* (%)		10		10	7				8	10	8	9	8	9	9		13	7	15	8	15	14			12	10	8		5	9		12	9		9	7		
	15-year-old students who report feeling nervous/anxious without their digital devices* (%)	15	15	18	18	12	18	12	11	17	14	14	14	17	14	18	18	22	18	13	15	25	16	17	10	20		22	15	11	19	14	29	15	29	12	18	30	

Indicator area	Indicator	AUS	AUT	BEL	CAN	CHE	CHL	COL	CRI	CZE	DEU	DNK	ESP	EST	FIN	FRA	GBR	GRC	HUN	IRL	ISL	ISR	ITA	JPN	KOR	LTU	LUX	LVA	MEX	NLD	NOR	NZL	POL	PRT	SVK	SVN	SWE	TUR	USA
Problematic use	15-year-old students who report feeling pressured to be online in class* (%)	8	12	12	10	7	7	5	9	24	8	5	8	11	9	8	5	11	12	5	18	15	18	4	25	13		11	6	10	6	8	19	9	23	9	10	11	
	15-year-old students who report keeping their digital devices near them when at home* (%)	75	74	71	73	72	73	58	65	77	77	82	67	69	73	73	79	65	72	79	69	70	74	64	61	68		72	63	76	78	72	65	76	75	66	77	65	
	15-year-old students who report sharing made-up information on social networks* (%)	29	23	26		24	35		28	26	17	30	29	27	30		25	33	26	19	32	29	31	11	22	30		26					29		35	28	31	38	27
	11-, 13- and 15-year-old students who report having cyber-bullied others* (%)		10		11	5				9	10	11	3	14	11	5		7	14	9	8	10	12			26	10	21		7	9		18	5	9	17	8		
Protective digital behaviours	15-year-old students who report turning off notifications on their digital devices when they go to sleep (%)	58	53	54	55	58	51	51	46	52	51	63	55	47	53	57	50	54	45	59	57	52	54	46	57	48		50	48	59	57	56	49	58	50	57	52	54	
	15-year-old students who report turning off notifications on their digital devices during class (%)	61	51	54	54	62	48	54	44	59	62	61	67	40	45	57	61	52	52	72	50	48	57	83	80	46		51	54	55	62	51	48	66	47	53	60	63	
	15-year-old students who report comparing sources when searching for information online (%)	78	60	67		66	75		75	72	62	77	74	74	72		70	73	70	76	72	66	76	78	64	74		77					69		69	72	75	73	79
	15-year-old students who report checking the accuracy of online information before sharing it (%)	76	64	66		64	71		73	72	66	77	72	72	71		69	71	71	75	72	67	77	77	70	73		75					69		71	71	77	71	77
	15-year-old students who report being able to easily change the settings of apps and devices to protect their data and privacy (%)	62	49	53		51	52		57	43	54	56	53	49	52		59	45	49	61	50	51	51	34	55	49		55					46		43	44	43	50	62
	15-year-old students who report discussing the accuracy of online information (%)	78	66	73		71	75		77	76	70	80	77	77	69		72	80	77	75	79	73	82	53	49	79		83					73		79	76	82	75	79
Self-reported digital skills	15-year-old students who report being able to assess the quality of the information found online (%)	91	79	82		84	83		84	86	82	91	86	85	87		87	79	83	91	86	76	86	82	89	88		86					79		77	84	79	82	89
	15-year-old students who report being able to search for relevant information online (%)	91	79	83		85	84		86	86	83	91	88	88	84		88	78	83	91	86	78	84	91	91	89		87					77		77	85	79	82	89
	10-year-old students who agree that it is easy for them to find information on the internet (%)	83	86							87	85	86	87		91	81			88	89		84	82			90		90		85	88	82	94	89	89	82	87	83	83
	10-year-old students who agree that they can tell if a website is trustworthy (%)	74	68							70	70	74	70		88	42			79	77		73	65			82		79		68	86	75	87	78	68	80	80	59	73

Note: This figure shows country performance levels on each indicator relative to the OECD average and the performance of other OECD countries. Green cells represent countries well above (at least half a standard deviation above) the OECD average on a given indicator, and red cells well below (at least half a standard deviation below) the OECD average. Yellow cells represent countries around (within half a standard deviation either way) the OECD average. The greater the number of yellow cells, the closer the clustering of OECD countries across that indicator. Light grey cells signify missing data.
*The indicator was reverse-coded, meaning that values well below (above) the OECD average are marked in green (red).
Source: OECD Secretariat calculations based on OECD (2022[8]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html; WHO (n.d.[9]), *Health Behaviour in School-aged Children (HBSC) WHO Collaborative Cross-National Survey 2021-22*, https://hbsc.org/about/ and IEA (2021[10]), *Progress in International Reading Literacy Study 2021*, https://pirls2021.org/results.

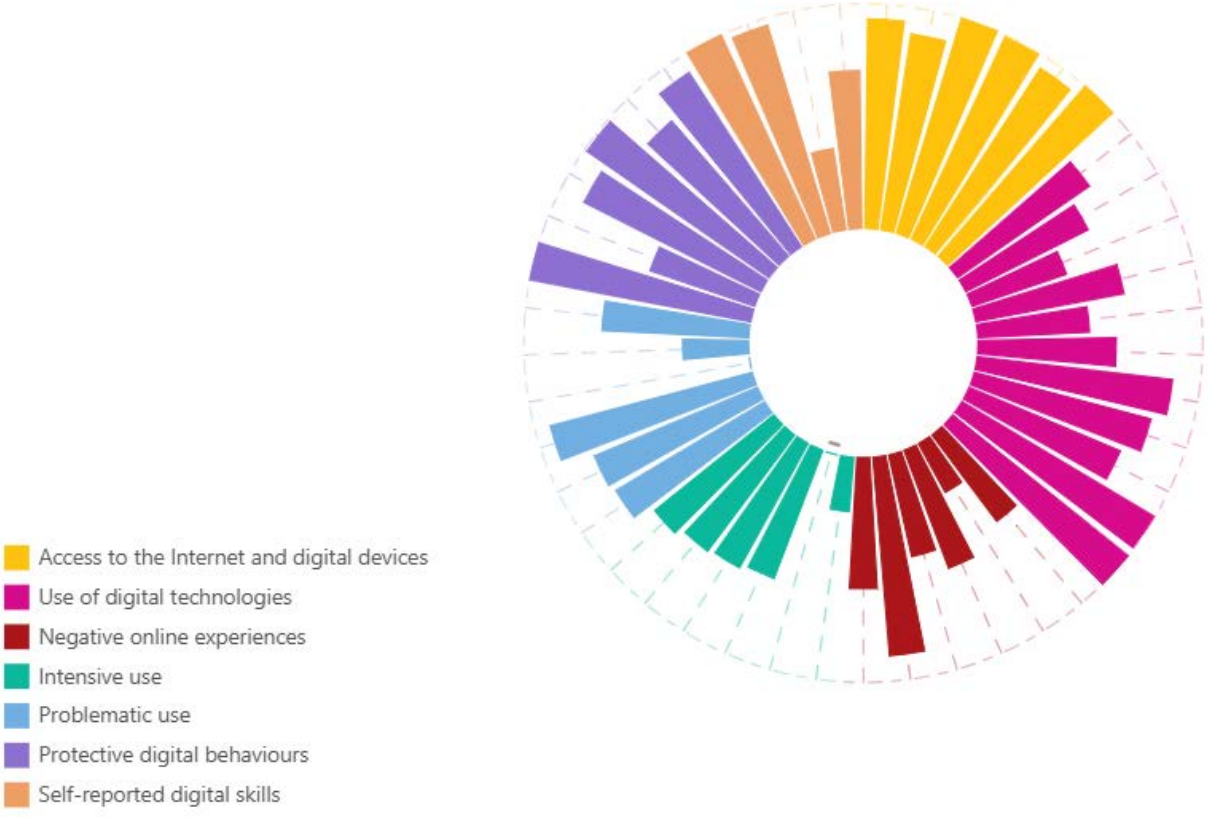
Evaluating individual country performance

While comparing country performance to the average in each dimension is important, it is equally useful to compare with the lowest- and highest-performing countries. Figure 6.1 illustrates how an individual country, exemplified by Denmark, measures up against the lowest- and highest-scoring country in each indicator set. Longer bars indicate that the country is closer to the highest scores in the respective dimension. The first inner circle represents the minimum outcome observed among OECD countries, while the outer circle represents the maximum outcome.

Figure 6.1 reveals that Denmark ranks among the highest in terms of children's access to digital devices, including smartphone ownership starting at age 10. While Denmark has one of the highest levels of Internet and digital device access among OECD countries (indicators in yellow), the average time spent and the proportion of adolescents using digital devices for two or more hours per day remain significantly lower than the highest levels recorded (indicators in pink). Negative online experiences are relatively infrequent compared to countries where they are most common (indicators in brown), except for 10-year-old students, who report experiencing online bullying at least monthly – placing them closer to the higher levels observed across the OECD. Finally, adolescents in Denmark generally exhibit a comparatively high occurrence of protective behaviours, except for the proportion of teenagers who turn off their notifications before sleep, which remains far below the highest levels in the OECD (indicators in dark blue).

Figure 6.1. Child digital well-being in Denmark

Monitoring outcomes for Denmark in comparison to other OECD countries



Source: OECD Secretariat calculations based on OECD (2022[8]), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html; WHO (n.d.[9]), *Health Behaviour in School-aged Children (HBSC) WHO Collaborative Cross-National Survey 2021-22*, https://hbsc.org/about/ and IEA (2021[10]), *Progress in International Reading Literacy Study 2021*, https://pirls2021.org/results.

6.2. Main data and evidence gaps and options to fill them

The review of the child digital data landscape presented in this document points to significant gaps in the existing cross-national information, hindering the ability to provide an objective overview of children's engagement with digital tools. This limits the capacity to fully capture both the benefits and risks associated with this engagement. Further development of the data and evidence on child digital life is necessary to understand the mechanisms behind the associations between children's engagement with the digital world and its outcomes, given that research often underscores uncertainties regarding causality direction. Globally, there is a lack of data to accurately capture the time spent on screens and digital activities, the content of those activities, and to assess the impact of screen exposure and use on children of all ages. For instance, it is very difficult to find reliable, comparable, especially longitudinal data that allows for connecting screen time, digital media use, and content with well-being and mental health outcomes. Longitudinal data would also help further explore the determinants and lasting effects of the time spent and the type of engagement with various digital technologies and media. Other important data gaps include:

- **A lack of national and international data on children's screen exposure and use**. The available evidence indicates that children are exposed to screens from a very early age,[1] both in preschool environments and within their family environment. This early exposure can alter child motor and cognitive development. However, when digital devices are used by parents and carers with moderation and interactively, they can support certain aspects of child learning, such as early language development. As children reach school age, they begin to develop digital skills and use online resources for both learning and play. Comprehensive data on their screen practices, awareness of associated risks, and the guidance provided by parents and teachers is essential for understanding and improving their digital experiences.
- **Tracking the time children spend on screens or engaging with digital media, alongside activities like reading, physical exercise, and other leisure activities**, is essential for understanding shifts in their daily use of time. It also helps assess whether the presence of digital technologies in children's lives is increasing and potentially displacing other activities. Beyond evaluating the direct impact of screen time on well-being, such data are crucial to determining whether digital activities come at the cost of other activities more surely linked to aspects of children's well-being.
- **A stronger focus on data collection regarding the quality of engagement** can support evidence-based policies, ensuring that digital technologies are understood and leveraged to promote well-being. This requires moving beyond simplistic screen-time metrics, which overlook the key factors that determine whether digital engagement supports or hinders children's lives. Understanding how and why children engage with digital media – and how it integrates into their lives – can provide deeper insight into its impact on well-being. This is essential for moving beyond simplistic narratives that label digital technologies and media as universally "good" or "bad".
- **Insufficient data on the use of digital devices and services and the features that influence them**. The risks associated with digital device use vary depending on the platforms, apps and services accessed. For example, social media apps can differ greatly in terms of how children socialise and consume content (Qustodio, 2020[11]). Additionally, the potential impact on children's sleep and cognitive development may be influenced by the length of screen exposure, whether the activities are passive or interactive, and the time of day when devices are used. Monitoring user activity throughout the day, as for instance made possible with app trackers, can provide better insights into usage patterns (Radesky et al., 2023[12]). This includes a better understanding of intensive or problematic use of digital services or devices, particularly smartphones, that may be visible, for instance, through how notifications are managed and children's reactions to them. More information on activities likely to lead to intensive or problematic use, such as video gaming, could

be collected to better understand the different practices in this area and their association with vulnerability factors and children's well-being outcomes.

It is also crucial to identify the key features of social media services (e.g., status updates, profiles, private messages, likes) to better understand the mechanisms through which social media may impact well-being (Meier and Reinecke, 2020[13]). This can help prevent misattributing effects to the wrong causes, such as attributing them to "screen time" or a specific device rather than to a particular type of interaction. Equally important is the collection of information on the technological features of social media, video platforms, and video game services, as well as the underlying automated processes that may influence how children interact with them (e.g., the succession of short videos designed to retain users' attention or exposure to repeated, similar content).

- **A lack of data on the positive experiences linked to the use of digital devices and the Internet and on their benefits for children's well-being.** In the two surveys available to document adolescents' digital activities in OECD countries, namely PISA and HBSC, the focus has primarily been on collecting information on the negative experiences and risks associated with the use of these devices. This inevitably creates a perception bias, making the digital world appear exclusively risky without fully recognising the benefits for the immediate or future well-being of children. The PISA 2022 survey includes some questions about online activities that likely foster the development of general skills, such as using digital devices to learn new things, including non-academic tasks, or to create personal content. However, a broader range of benefits and opportunities for children's subjective well-being could be considered, including whether the life online contribute to adolescents' flourishing and self- esteem, as well as to the quality of their social relationships (Marciano and Viswanath, 2023[14]). For instance, the Global Kids Online Survey asks whether children engage in digital activities or view their online activities as contributing to community and civic participation, strengthening their personal, cultural, or religious identity, or helping them access information, networks, or services.
- **Children's exposure to and perception of major risks associated with digital activities is poorly documented**. Currently, while the data available internationally provide information on the exposure of adolescents to certain risks, the range of risks covered is limited, and most importantly, they give little insights on children's and caregivers' awareness of the responses, procedures, or assistance available to prevent risk exposure and respond in case of risk realisation. Several major risks could benefit from more in-depth data collection, including (i) awareness of physical and mental health risks, (ii) misinformation, media literacy and the risks induced by online social media, (iii) problematic digital behaviours related to social media and video games, (iv) risks associated with commercial content.
- **Limited knowledge of protective and vulnerability factors arising from children's individual circumstances and environments**. Personal vulnerability factors (e.g., stress, loneliness) and protective factors beyond digital literacy (e.g., self-esteem) can affect both the use of digital services – such as the amount of time spent and the types of activities and interactions – and their subsequent impact on well-being outcomes (Meier and Reinecke, 2020[13]). Gathering information on these factors can help mitigate potential issues or assist children in building resilience.

Collecting information about the help and resources available to children within their family environment, at school, through their network of contacts and from health professionals is also critical. As indicated in Chapter 2, children's experience of the digital world is highly dependent on the resources, guidance and support they receive from parents, carers, educators, and teachers, or on the information they can exchange with or receive from their older peers. Documenting these aspects requires a holistic approach, as suggested in Chapter 2 and similar to the one used in the Global Kids Online survey. In optional modules, this survey asks parents and teachers about their mediation activities with their children to guide them in the digital world. It includes questions about

their proactive involvement to help children navigate digital spaces safely, the technical support they can provide, as well as on the restrictions they put on the use of online resources (Zlamal et al., 2020[15]).

- **Children views, specific experiences and priorities could be given more space**. To enhance children's protection against digital risks, it is essential to understand their concerns, their awareness of challenges, their perspectives on system weaknesses, and the types of protection they deem appropriate. This approach involves balancing protection with their legitimate desire to enjoy the benefits of the Internet and digital tools. To be effective, restrictions should not be imposed externally but be based on a shared understanding and assessment. Protective measures can leverage children's firsthand experiences and expertise in navigating the digital world – often surpassing that of their parents – and incorporate their insights on best practices. Additionally, it is crucial to consider the aspirations and experiences of children who are vulnerable due to disabilities, psychological challenges (e.g. neurodivergence (Coulstock, 2024[16])), sexual orientation, ethnicity, or specific family circumstances (such as those in care institutions) to ensure comprehensive protection. This inclusive approach helps mitigate specific risks they face and promotes equal opportunities by addressing inequalities carried over from the offline world into the online environment.

Diversifying vehicles of data collection

The need for data to monitor children's digital practices and assess their impact on well-being and fill the aforementioned gaps necessitates diversifying data collection methods and using each for their specific advantages. Integrating modules focused on children's digital experiences into existing surveys is a cost-effective option that enables linking digital engagement with other dimensions covered by the surveys (e.g., academic performance in PISA, physical or mental health in the HBSC). However, the number of questions that can be added to the main questionnaire is naturally limited. Developing dedicated surveys on children's digital engagement allows for a more comprehensive examination of digital practices and how their family, school and peer environment can provide positive mediation and help mitigate risks. Nonetheless, the capacity to link these findings with learning and well-being outcomes is more restricted. Moreover, the impact of digital technology on children varies individually based on factors such as age, gender, personality, family life situation, socio-economic status, health. Therefore, it is important for surveys documenting children's digital lives to include information on these aspects.

The need for better documentation of how digital practices affect children's development and well-being, including in their early years, highlights the importance of incorporating these questions into longitudinal surveys that track children and adolescents' outcomes, such as birth cohort studies and other longitudinal surveys involving adolescents. These surveys enable a better understanding of the temporal sequence between digital practices and well-being outcomes, identifying potential dynamics between them and the factors that mediate or mitigate the effects of digital activities on developmental and well-being outcomes.

Data from digital service providers and users' devices are also valuable data sources, offering detailed information on how children and teenagers use these tools throughout the day. Unlike self-reported data from survey questionnaires, which can be affected by various response biases, these sources reflect actual behaviours and practices, enhancing the reliability of insights into the relationship between digital behaviours and well-being.[2] Such data can provide granular insights into the time spent on different digital activities, the platforms and services used, the nature of engagement and interactions, and the behavioural responses to technical features and design elements. However, the collection and processing of this data must adhere to established data privacy and sharing regulations and ethical standards.

Observational data obtained from field-based experiments can also provide valuable insights into how children engage with digital technologies and respond to interactive designs. For instance, multi-week digital play interventions can be used to explore how certain digital services features or technologies (e.g.

Virtual Reality, Video game features) influence children's perceptions of their experiences, their reactions, their ability to interact, create, or make autonomous decisions, and ultimately, their well-being (UNICEF, 2024[17]).

Information from health and education professionals can provide valuable insights into the impact of digital practices on the well-being of children who are particularly vulnerable. Health professionals can share observations on the relationship between physical and mental health symptoms and the potential problematic use of digital services, especially in severe cases. Educators, on the other hand, offer perspectives on how children's digital practices may affect attention spans, learning processes, and social interactions. Through their direct engagement with children and families, these professionals can identify patterns and trends, such as the influence of technology on daily routines, sleep quality, and classroom engagement, while also highlighting possible dysfunctions in children's environments. Moreover, they play a crucial role in developing coping mechanisms and resilience strategies. Their expertise helps shape policies and programs that harness the benefits of digital technologies while addressing potential drawbacks, ensuring these tools are integrated to support, rather than hinder, child well-being.

To conclude, fostering good digital practices in children provides significant benefits for their well-being both during childhood and later in life. This report emphasizes the importance of empowering children and adolescents to harness the opportunities offered by digital technologies while effectively managing associated risks. A growing body of evidence indicates that increased digital technology use among adolescents can have positive impacts on various aspects of their development, including brain, cognitive, and social-emotional growth (Haddock et al., 2022[18]). Additionally, digital media platforms play a vital role in fostering connectedness, enabling adolescents to maintain relationships with family and friends, build new social connections, explore their interests, and access support networks (Holly et al., 2023[19]). Developing digital skills is also crucial for future professional success, as these competencies are increasingly indispensable in the workplace and will continue to gain importance in the ongoing digital transformation (OECD, 2022[20]).

For children to fully benefit from the positive aspects of this digital transformation both now and in their adult lives, they must navigate digital spaces that ensure their safety and be supported in developing digital literacy while maintaining the growth of other essential skills. They also need guidance in cultivating controlled usage habits and effectively managing the risks associated with the digital environment. Yet, effective management of digital risks also depends substantially on promoting children's offline well-being and addressing the issues that increase their vulnerability to problematic digital tool use or risky behaviour. With the increasing role of digital media in young people's lives, it is crucial to adopt a holistic and rights-based approach to promoting their well-being both online and offline.

Monitoring trends and progress in this area in the years to come will be critical for establishing effective policies and governance institutions that support children's safe and beneficial use of digital resources. Countries have several approaches to monitor trends: they can conduct surveys to explore children's and caregivers' usage of and attitudes towards digital tools; integrate questions on digital practices into existing surveys in other areas, such as physical and mental health education, to better understand the connections; and design surveys within an international framework to identify common challenges and address country-specific concerns; develop partnerships with digital service providers to analyse their data and get deeper insights into children's digital practices and their relations with service design features. This chapter has demonstrated that leveraging internationally available data can help analyse the usage patterns and differences among groups of children based on their socio-economic characteristics, as well as identify risk factors or areas of concern. However, significant evidence gaps exist, indicating that countries should enhance their monitoring capabilities in this area. By choosing or combining different data collection methods, they can better inform and guide policy decisions.

Last but not least, policymakers, clinicians, teachers, parents, and young people themselves require a clear and simplified understanding of the growing body of evidence as it emerges. The process of collating,

filtering, and evaluating new research findings should be guided by well-defined criteria for assessing quality, causal relationships, generalisability, and relevance to policy, education, healthcare, and social care. An explicit hierarchy of evidence could be used to inform policy decisions and practitioners, based on an assessment of the robustness, reliability, and accessibility of research evidence for practical use in decision-making or policy implementation. It implies that the evidence has been thoroughly vetted, assessed for quality, and is ready to be applied in real-world contexts, such as policymaking, education, healthcare, or social care. Assessing "evidence readiness" in the digital realm therefore can help prioritise which research findings are mature enough to inform actions or decisions, ensuring that only well-supported and relevant evidence is used in shaping policies or practices (Mansfield et al., 2025[21]).

References

Better Internet for Kids (2024), "The Better Internet for Kids (BIK) Policy Monitor Report 2024", https://www.betterinternetforkids.eu/bikmap (accessed on 13 June 2024). [5]

Boyle, S. et al. (2022), "Systematic Bias in Self-Reported Social Media Use in the Age of Platform Swinging: Implications for Studying Social Media Use in Relation to Adolescent Health Behavior", *International Journal of Environmental Research and Public Health 2022, Vol. 19, Page 9847*, Vol. 19/16, p. 9847, https://doi.org/10.3390/IJERPH19169847. [22]

Coulstock, H. (2024), *Bytes of advice: parenting neurodiverse children in the digital world*, https://blogs.lse.ac.uk/parenting4digitalfuture/2024/12/11/bytes-of-advice-parenting-neurodiverse-children-in-the-digital-world/ (accessed on 19 December 2024). [16]

Dirwan, G. and O. Thévenon (2023), "Integrated policy making for child well-being: Common approaches and challenges ahead"*, OECD Papers on Well-being and Inequalities*, No. 16, OECD Publishing, Paris, https://doi.org/10.1787/1a5202af-en. [2]

Haddock, A. et al. (2022), "Positive Effects of Digital Technology Use by Adolescents: A Scoping Review of the Literature", *International Journal of Environmental Research and Public Health*, Vol. 19/21, p. 14009, https://doi.org/10.3390/IJERPH192114009. [18]

Holly, L. et al. (2023), "Optimising adolescent wellbeing in a digital age", *BMJ*, Vol. 380, p. e068279, https://doi.org/10.1136/BMJ-2021-068279. [19]

IEA (2021), *Progress in International Reading Literacy Study 2021 (PIRLS 2021)*, International Association for the Evaluation of Educational Achievements, https://pirls2021.org/results. [10]

Mann, S. et al. (2025), *The Common Sense Census: Media Use by Kids Zero to Eight*, Common Sense Media, San Francisco, https://www.commonsensemedia.org/research/the-2025-common-sense-census-media-use-by-kids-zero-to-eight (accessed on 6 March 2025). [23]

Mansfield, K. et al. (2025), "From social media to artificial intelligence: improving research on digital harms in youth.", *The Lancet. Child & adolescent health*, Vol. 0/0, https://doi.org/10.1016/S2352-4642(24)00332-8/ATTACHMENT/353A9179-5D44-47B3-94E0-A9E2986E5C64/MMC1.PDF. [21]

Marciano, L. and K. Viswanath (2023), "Social media use and adolescents' well-being: A note on flourishing", *Frontiers in Psychology*, Vol. 14, p. 1092109, https://doi.org/10.3389/FPSYG.2023.1092109/BIBTEX. [14]

Meier, A. and L. Reinecke (2020), "Computer-Mediated Communication, Social Media, and Mental Health: A Conceptual and Empirical Meta-Review", *Communication Research*, Vol. 48/8, pp. 1182-1209, https://doi.org/10.1177/0093650220958224. [13]

OECD (2022), *PISA 2022 Database*, https://www.oecd.org/en/data/datasets/pisa-2022-database.html. [8]

OECD (2022), *Skills for the Digital Transition: Assessing Recent Trends Using Big Data*, OECD Publishing, Paris, https://doi.org/10.1787/38c36777-en. [20]

OECD (2022), "The OECD Going Digital Measurement Roadmap", *OECD Digital Economy Papers*, No. 328, OECD Publishing, Paris, https://doi.org/10.1787/bd10100f-en. [1]

OECD (2021), *Measuring What Matters for Child Well-being and Policies*, OECD Publishing, Paris, https://doi.org/10.1787/e82fded1-en. [7]

OECD (2021), *OECD Recommendation on Children in the Digital Environment*, https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0389 (accessed on 12 June 2024). [3]

OECD (2020), *Protecting Children Online: An Overview of Recent Developments in Legal Frameworks and Policies*, OECD Publishing, Paris, https://doi.org/10.1787/9e0e49a9-en. [4]

Parry, D. et al. (2021), "A systematic review and meta-analysis of discrepancies between logged and self-reported digital media use", *Nature Human Behaviour*, Vol. 5/11, pp. 1535-1547, https://doi.org/10.1038/s41562-021-01117-5. [24]

Przybylski, A. (2014), "Electronic Gaming and Psychosocial Adjustment", *Pediatrics*, Vol. 134/3, pp. e716-e722, https://doi.org/10.1542/PEDS.2013-4021. [6]

Qustodio (2020), *Connected More than Ever*, https://qweb.cdn.prismic.io/qweb/e59c2e0f-ef4f-4598-b330-10c430e2ec71_Qustodio+2020+Annual+Report+on+Children%27s+Digital+Habits.pdf (accessed on 30 January 2024). [11]

Radesky, J. et al. (2023), *Constant Companion: A Week in the Life of a Young Person's Smartphone Use*, Common Sense Media, San Fransisco, https://www.commonsensemedia.org/sites/default/files/research/report/2023-cs-smartphone-research-report_final-for-web.pdf (accessed on 23 May 2024). [12]

UNICEF (2024), *Digital Technology, Play, and Child Well-Being. Responsible Innovation in Technology for Children*, UNICEF Innocenti Centre, https://www.unicef.org/innocenti/reports/responsible-innovation-technology-children#download (accessed on 18 June 2024). [17]

WHO (n.d.), *Health Behaviour in School-aged Children (HBSC) cross-national survey*, World Health Organization, Regional Office for Europe, https://hbsc.org/about/. [9]

Zlamal, R. et al. (2020), "EU Kids Online 2020: technical report", https://doi.org/10.21953/LSE.04DR94MATPY7. [15]

Notes

[1] For instance, a 2024 survey conducted across the United States found that caregivers reported children aged 8 and younger spend an average of 2 hours and 27 minutes on screens daily (Mann et al., 2025[23]). Screen time varies significantly by age: children under 2 years old average 1 hour and 3 minutes per day, while 2- to 4-year-olds spend approximately 2 hours and 8 minutes. Those aged 5 to 8 use screens for about 3.5 hours daily. Compared to 2020, children now watch less live television and cable but spend more time viewing short videos on platforms like TikTok, Instagram Reels, and YouTube Shorts, with average daily use increasing from 1 minute in early 2020 to 14 minutes in 2024. Time spent gaming has risen from 23 minutes to 38 minutes per day, while video chatting has increased from 1% daily usage in 2017 and 2020 to 4% in 2024.

[2] Survey questionnaires on digital services and devices are often subject to biases that can compromise data accuracy and reliability. Key examples include response bias, where respondents provide socially acceptable rather than truthful answers; coverage bias, which occurs when certain groups, such as those without access to certain digital services, platforms or devices, are excluded, leading potentially to skewed results. Other personal and environmental factors can introduce bias in self-reported data on the use of digital services. For instance, there is evidence that adolescents tend to significantly overestimate the average daily time they spend on individual social media platforms during a given period (Boyle et al., 2022[22]). Moreover, the accuracy of their self-reported usage is systematically influenced by the specific platforms involved, the participant's sex, and the total number of platforms they regularly use. These factors introduce biases into survey-based studies exploring the health-related impacts of social media use. In a meta-analysis of 106 studies, Parry et al. (2021[24]) found that self-reported media use only moderately aligns with logged data, with self-reports often failing to accurately reflect actual media usage. Additionally, measures of problematic media use exhibit an even weaker correlation with usage logs.

How's Life for Children in the Digital Age?

Today's children are growing up in a rapidly evolving digital world, where digital media play an important role in their daily lives. Digital services offer opportunities for learning, entertainment, accessing information, discovering new things, and connecting with other peers and community members. However, they also pose risks, including problematic or excessive use of digital media, exposure to inappropriate content, harmful conducts, and other online safety concerns.

The report *How's Life for Children in the Digital Age?* provides an overview of the current state of children's lives in the digital environment across OECD countries, based on the latest cross-national data. It explores the challenges of ensuring that children are both protected and empowered to use digital media in a beneficial way while managing potential risks. The report highlights the need for a whole-of-society, multi-sectoral policy approach, engaging digital service providers, health professionals, educators, experts, parents, and children to protect, empower, and support children, while also addressing offline vulnerabilities, with the ultimate aim of enhancing their well-being and future outcomes. Additionally, it calls for strengthening countries' capacities to assess the impact of digital media on children's lives and to monitor rapidly evolving challenges.

PRINT ISBN 978-92-64-90899-4
PDF ISBN 978-92-64-52492-7