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Technology use and the mental health of children and young people

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COLLEGE REPORT

Contents

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Foreword

Just over two years ago, the wrecking ball of suicide smashed brutally and unexpectedly into our unremarkable, stable family life. Sometime in the early hours of Tuesday 21 November 2017, my youngest daughter, Molly, died by suicide, just six days before her 15th birthday. As her life ended, in some ways, so did the lives of the four family members she left behind. Our lives, and those of many of her friends, will be forever divided in two: the contented, intact lives lived before Molly's death and the fractured lives we have been rebuilding since the ruinous day we lost Molly.

The weekend before Molly died, our house was full of family and friends who gathered to celebrate the November birthdays of all three Russell daughters. Molly had eagerly helped us prepare, clearly enjoyed the party and, the following day, joined in with the tidying-up and spent time talking to her grandparents about plans for Christmas and the new year to come. She seemed full of joy, hope and enthusiasm.

The night before Molly died, she came home from school, did her homework and handed it in online, joined the rest of her family to watch a popular TV entertainment show and, before going to bed, Molly packed her school bag, ready for the next day. She seemed her usual capable, organised and forward-looking self.

So, as we began what seemed a very normal day the following morning, finding Molly's lifeless body at 7.20am left us not only immediately confronted by the onslaught of raw grief from losing someone so loved and adored, but also we were left dealing with many more devastating emotions. The unimaginable shock and horror of bereavement by suicide was supplemented by the realisation that we had not known Molly had been so unwell and we'd therefore not been able to do anything to help her.

There really were no obvious signs of Molly's mental anguish. We know her family, friends, teachers and classmates did not know she was suffering so deeply. Molly was widely loved, she achieved well at school and there was no evidence of bullying. Molly was simply adored as a friend, sister, daughter and granddaughter.

Suicide leaves in its wake an inevitable list of questions, most of which begin with a 'why?' In Molly's case, this list was perhaps even more bewildering than others. Our search for answers soon led us to her social media accounts, there we discovered what Molly had been viewing, saving and 'liking'.

Among the usual schoolfriends, pop groups and celebrities followed by 14-year-olds, we found bleak depressive material, graphic self-harm content and suicide encouraging memes. These horrifying discoveries helped us fill in some of the missing pieces of the suicidal jigsaw puzzle Molly had set for us.

I have no doubt that social media helped kill my daughter. Having viewed some of the posts Molly had seen, it is clear they would have normalised, encouraged and escalated her depression; persuaded Molly not to ask for help and instead keep it all to herself; and convinced her it was irreversible and that she had no hope.

In one of the notes Molly left for us, she described how she felt with heart-breaking clarity, “I’m the weird sister, quiet daughter, depressed friend, lonely classmate. I’m nothing, I’m worthless, I’m numb, I’m lost, I’m weak, I’m gone. I’m sorry. I’ll see you in a little while. I love you all so much. Have a happy life. Stay strong xxx.”

The World Wide Web provided Molly a virtual sense of community, sadly full of similarly struggling people and with a marked lack of access to measured, professional help. Online, Molly found a world that grew in importance to her and its escalating dominance isolated her from the real world. The pushy algorithms of social media helped ensure Molly increasingly connected to her digital life while encouraging her to hide her problems from those of us around her, those who could help Molly find the professional care she needed.

When we discovered the harmful content Molly had been viewing, quickly there grew in us a wish to warn others about the problem and to better connect those young people suffering mental ill-health to the help and support they require. So, we set up a charity in her name, the Molly Rose Foundation and, as a family, we decided to tell Molly’s story publicly to raise awareness about the online harms we never thought were so easy to access on social media.

While the Foundation continues to raise awareness, we need others to do this as well, if real and positive change is to be secured. That is why I warmly welcome this new report from the Royal College of Psychiatrists, particularly its explicit calls for government and social media companies to do so much more to protect users from harmful content.

The ‘turnover tax’ on social media companies will fund much needed research into the impact of harmful content on internet users, particularly the most vulnerable. Without such research, we cannot understand how content can lead our children and young people – our sons and daughters – to self-harm or, in the most tragic cases, die by suicide.

It will also help fund training packages for clinicians, teachers and others working with children to help them identify children struggling with their mental health and to understand how social media might be affecting them.

Since Molly’s death, I have learned so much about mental ill-health, anxiety, depression, self-harm and suicide. I was dismayed to learn that the prevalence of non-suicidal self-harm in England nearly tripled over the past 10 years and horrified that, on average, over four school-age children die by suicide every week. There are far too many others; – families, friends and communities – who have to face the rest of their lives missing someone they loved because of suicide.

Mental health and its surrounding issues are now more often talked about and, at last, perhaps the associated stigma is beginning to be eroded. But now, when listening to these welcome and more widespread conversations, sometimes it can be difficult to discover sensible, considered opinion or find reasonable, consistent advice among the growing chatter.

There is much ongoing talk about the merits or demerits of removing harmful online content. Debate about whether or not Government should introduce legislation to reign in the harmful excesses of new technology. Questions are asked about the possible

introduction of a new regulator and what powers it might be given. This debate needs to end and in its place, concrete action undertaken and the College's Report sets a clear direction for that.

The College calls for the regulator's powers to be able to establish a protocol for the sharing of data from social media companies with universities for research into the benefits and harms on children and young people. This coupled with research paid for by the 'turnover tax', would give us a comprehensive understanding of both the benefits and risks of social media use.

The increasing speed of the digital revolution is hard to keep up with. Exponential technological progress brings many benefits, but the quickening developments can easily disguise the growth of harms that inevitably come in their wake. Parents are so often several steps behind their children's latest 'hacks' when using the internet.

This is why this report on technology use and the health of children and young people, from the Royal College of Psychiatrists is so welcome and timely. It provides a sensible stocktake of the wide gamut of currently available information. Both by drawing on many recent reports and recommendations and also by carefully examining the latest data, the paper provides a much needed, considered assessment of the current collected thought on this subject.

The paper also highlights that the evidence base is still emerging and there is an urgent need for further good quality studies which explore the context and content of technology use, including, importantly, how technology can be harnessed for its positive benefits.

Above all, despite coming from a Royal College of highly qualified mental healthcare professionals, this paper is accessible and easy to read and understand. I hope it will help focus minds, encourage future research, inspire further studies and thereby drive policy and social responsibility from Government, to technology companies, to each of us as individuals.

I believe this paper will play an important role in helping us all find the urgent solutions required to mitigate both the harms currently found online and the detrimental effects they have on the mental health of children and the young. This paper, I am convinced, will help ensure, that in future, there will be fewer Mollys to mourn.

Ian Russell
Founder, Molly Rose Foundation
January 2019

Introduction

The use of screen time and social media by children and young people has rarely been out of the headlines in recent years. In light of the concerns from young people, the public and policy makers, RCPsych has developed this position paper on the use of technology by children and young people. This paper will build on recent recommendations from the House of Commons Science and Technology Committee (STC)[1], the Chief Medical Officers (CMOs)[2], the Royal College of Paediatrics and Child Health (RCPCH)[3], the All-Party Parliamentary Digital, Culture, Media and Sport Committee (APPG) report[1], the Digital, Culture, Media and Sport Committee report on Immersive and Addictive Technologies[4] and the World Health Organization (WHO) report into sedentary behaviour, physical activity and sleep in under 5s[5].

We agree with the above reports that the research data on the effects of screen time remains limited and urgently call for more research. However, in view of the increasing amount of differing lines of evidence, we endorse the precautionary approach as highlighted by the CMOs and the APPG report[6]. We also share the concerns of the WHO[5] of the potential detrimental effects of increased screen time on very young children's development and support their recommendation that children under one year should not be provided with screen time and 2 to 4-year-olds should have a maximum of one hour a day.

Much of the current data is concerned with screen time and data at a population level has not consistently identified any large detrimental effects. However, as noted by the STC, the context and content of screen time use has not been systematically evaluated. In particular, the effects on the most vulnerable children and young people are unknown. Media and research reports often conflate the use of varying types of screen time[7] and do not explore how screens are used, including the many potential benefits of new technology, as well as the different kinds of activities with which users can engage .

Therefore, along with exploring the impact of screen time generally, this paper also explores the impact of different types of screen use: negative content; how vulnerable groups may be affected such as those with mental health problems and very young children; potential for bullying and safeguarding issues; as well as the potential for addiction.

In addition, guidance is provided for children and young people, parents and carers, clinicians and teachers.

To inform our report, a scoping review was undertaken to examine the links between technology use and mental health, which included a range of technology search terms (internet, social media, screen time, digital gaming). This process was not a systematic analysis; however, recent systematic reviews and key studies published in the last few years have been highlighted.

The evidence base is still emerging and many of the studies listed describe associations that do not determine causality [1] [2]. However, a number of longitudinal studies are also

described which strengthen the weight of the evidence in some areas. There is an urgent need for good quality longitudinal studies which explore the context and content of technology use beyond just screen time use, including how technology can be harnessed for its positive benefits in children and young people to improve or maintain well-being. We also need to empower our children and young people to develop greater self-control and digital literacy to enable them to be more digitally resilient.

However, the responsibility for supporting our children and young people to navigate new technology safely cannot solely rest with them; carers, professionals, technology companies and government also have a crucial role to play. We therefore welcome the publication of the UK government's White Paper on Online Harms[8] and in particular the commitment to establish an independent regulator to write a code of practice for social networks, gaming and internet companies, who will have enforcement powers [8] including reviewing the promotion of self-harm and suicide. Although this task will be challenging, we believe this is an important first step in our duty of care to our children and a necessary conversation for us as a society.

Easy read summary with recommendations

Children's use of technology is increasing annually with social media now a part of many families' lives. Screen time can cover a broad range of activities from reading novels on an e-reader or doing research for a school project to cooperatively playing games with others across the world. Even on the same platform, children and young people could have vastly different experiences depending on the content they are accessing. Therefore, when considering the risks and benefits of technology use, an understanding of the content with which children and young people are engaging is essential.

For children and young people there are many positives about these innovations: instant communication with family and friends around the world; the ability to play and be creative; access to high-quality information; the ability to socialise in a different environment; and online support for a range of health concerns and identity themes.

However, these devices can pose potential challenges to the health and well-being of children and young people:

1. Time spent engaging with digital technology can come at the expense of time spent on other activities including face-to-face interactions with family or carers and peers, exercise and sleep.

2. Online content may be viewed which is distressing, including exposure to violent, graphic or sexual imagery and exposure to hate speech.

3. Exposure to online bullying.

4. The risk of exploitation including sexual exploitation.

5. Money can be quickly and easily spent online, for example in game purchases, online gambling and on products such as prescription and illegal drugs.

6. Whilst evidence for causal links is still developing, there is evidence to suggest that digital technology can affect weight, mood, thoughts of suicide and self-harm and body image.

7. Some children and young people may be more vulnerable to the impact of digital technology, for example those with mental health needs such as depression, anxiety and developmental conditions such as ADHD.

8. The concept of technology addiction is emerging together with developing clinical services for children and young people with addiction.

Guidance for children and young people

1 Getting a balance.

Technology can be great but it can also take over! Do you think that you are getting the right balance between spending time looking at technology and spending time with the people you care about and looking after yourself? Do you regularly spend time having fun with your family or carers? Do you spend time face-to-face with your friends? Do you stay on top of the things you need to do for school or college? Do you get enough fresh air and exercise?

If the answer to these questions is no you are probably not getting the balance right. Try thinking about how you spend your time across the week. Can you spend more time each week with the people you care about, getting your work done and being active?

2 Making use of technology time limits and setting your own boundaries.

Many devices, e.g. smartphones, tablets and consoles, now have programs to record and limit the amount of time they are used. Individual users can also set limits to the amount of time they spend on games or devices.

If you feel technology is interfering with your life and you're struggling to get a balance, try setting limits for yourself – plan what you'd like to do instead then ask did you enjoy yourself or feel a sense of achievement? If so, plan your next goal.

3 Being aware that you might be using technology to avoid other things.

Sometimes people might use technology as a way of coping when they are feeling anxious or upset. Sometimes this can help, for example in getting support and information online. Sometimes people might spend time on technology as a way of avoiding difficult things.

Do you find that you are using technology just for the sake of it even if you are feeling bored or not enjoying it? Do you feel overwhelmed when you stop using technology? Talk to someone about how you are feeling. You can find more information about mental health problems and how to access help at https://youngminds.org.uk/find-help/

4 Sleep

It can be really tempting to stay up late going online or watching videos. Do you think using technology affects your sleep? Are you tired during the daytime? Does this affect how you concentrate in school?

We recommend that you stop looking at screens one hour before you go to bed because the light from screens can make it more difficult to get off to sleep. As it's easy to pick up a phone or tablet at night we recommend that you keep technology in a different room from the one where you sleep.

5 Sports and exercise

Most of our online time or digital activity involves sitting still for long periods of time. This can stop us from taking part in physical activity which is very important for our health and well-being. So, scheduling in some time each day for sports and exercise is a great way to break up our screen time with healthy physical activity.

6 Content

Sometimes you may come across something stressful online. This could be pictures, videos or audio or writing which can be generally available or may be something directed at you personally.

It's not okay for people to bully you online. Talk to an adult you can trust if this happens; this could be a family member or carer, school staff member or another adult. Find out more about how to stay safe online, how to block people or report distressing content here: https://www.childline.org.uk/info-advice/bullying-abuse-safety/online-mobile-safety/staying-safe-online/

7 Impact on your health

If your online world is making you feel self-conscious or sad – take a break or talk to someone.

8 Sharing information online

Once you have posted or shared information online you are not in control of it. Would you want your parents or teachers to see it? If not don't post it. People may not be who they say they are online, don't share personal information with people you don't know. There is useful information on the 5Rights website such as *The Right to Know how your information is being used*: https://5rightsfoundation.com/in-action/fulfilling-the-5rights.html

9 People you meet online

Remember that the people you meet online might not be open about their age or their true identity.

Guidance for parents

- Although technology can be a positive and unifying experience for families, many parents worry about its potential impact. Technology will continue to evolve but there are core principles of parenting that can be maintained and applied to the use of technology. Maintaining a dialogue with your child about the pros and cons of the use of technology is important, as well as thinking about the needs and vulnerabilities of your individual child and their stage of development.

- From a young age encourage discussions within the family on content viewed online.

- Pick your battles, be flexible and choose the right moment to discuss technology with your children. Remember, the younger the child the easier it is to develop good habits around technology use, for example around the use of screens at bedtime.

- Provide a positive perspective on healthy routines e.g. having beautiful skin from a good night's sleep rather than discussing the negative consequences of poor sleep.

- You may feel that your children know more about technology than you do but remember you know a lot about being a parent and this is just another opportunity to use your parenting skills. Resources such as MindEd provide helpful advice about parenting and technology.

- Think about the images that you post of your children and remember that they may see those images in years to come. Consider asking your child's permission before posting their image.

- Be open about your concerns and seek advice if your child is engaging excessively with online activities and becoming more withdrawn.

Screen time boundaries

- Think about the developmental needs of your child. Try to decide what is the right age for your child to own a smartphone or tablet. If your child is using your smartphone or tablet ensure that you have set the controls for appropriate content access.

- Sleep is central to healthy functioning. Screens should be kept out of the bedroom and children should spend one hour away from all technology conducting relaxing activities before bed.

Promoting a balance of activities

- Try to promote offline activities e.g. talking and playing games together. Remember technology can also be a positive parenting strategy, for example by watching educational programmes together and talking about the programmes you have seen.

- Children can often spend large amounts of time sitting in front of a screen. However, we know that physical activity is very important for children and young people's

physical and mental health. Try to encourage your child to take breaks from the screen and take regular exercise.

- Support your child to enhance their social and emotional development by promoting the development of offline relationships with family and friends. Online relationships can be an important way for children to keep in touch with friends and family but face-to-face relationships are vital for the development of social and communication life skills.

- Ensure that you build in times of the day without devices e.g. mealtimes.

Parents modelling a balanced approach to technology

- You can model good screen use by moderating your own use of technology and avoiding phones at certain times e.g. at mealtimes and during face-to-face conversations.

Safeguarding

- Think about your child's online safety, for example: by reviewing privacy settings; sharing of their location; sharing of personal information and images; and discussing how children can block unwanted messages.

- Provide general guidance about the internet and ways of interacting safely online, for example, oversharing information, online identities and meeting people they don't know offline.

Younger children

- If boundaries are set at an early age then it may be easier to support children to develop routines.

- Keep very young children's use of screen time to a minimum: the World Health Organization (WHO) recommends that 1-year-olds should not have access to screen time and 2 to 4-year-olds should have a maximum of one hour a day, although 'less is better'.

- Ensure that children are using age-appropriate apps, games and television.

Older children

- Dialogue around boundaries becomes increasingly important as a child becomes older. Maintaining a positive parent–child relationship is important in providing a space for children to be open and discuss any worries they may have related to technology use e.g. cyberbullying, unwanted messages, inappropriate images, worries about missing out. If your child is able to discuss their worries this will be an opportunity to offer support and help your child with maintaining boundaries around screen use.

- Work with your child to set boundaries around the amount of screen time and the times when screens can be used. Encourage self-observation of screen time involvement through the use of self-monitoring apps.

Safeguarding

- Support young people to manage the potential impact of hurtful comments and other experiences which may be stressful, such as viewing distressing content, comparing themselves to others, worries about their self-image and the impact of fear of missing out.

Recommendations for Government

Governmental pressure on gaming and social media providers is essential to allow access to behavioural data for research purposes in order to establish accuracy and specificity with real-time data beyond the use of self-report assessment. We welcome the recommendations from the White Paper, in particular the government appointment of an independent regulator for online safety which will encourage and monitor companies' commitment to sharing data and working with UK Research and Innovation to develop the evidence base with regard to minimising the risk of online harm. We also welcome the commitment from the government to work with a broad range of stakeholders including researchers to develop a new online media literacy strategy.

Specifically we recommend:

- Regulator to urgently review and establish a protocol for the sharing of sharing of data from social media companies with universities for research into benefits and harms on children and young people.

- Urgent review of ethical framework for using digital data - same standards need to apply as in other areas of research.

- Government funding for follow up of NHS digital prevalence study to examine impact of social media on vulnerable children and young people over time

- To instruct the regulator to establish a levy on tech companies proportionate to their worldwide turnover. This would be used to fund independent research and training packages for clinicians, teachers and others working with children and young people. As with the gambling industry and social responsibility measures, the gaming and social media industry should be required to increase social responsibility measures similarly, such as emulate the gambling industry's duty of care practices (e.g. personalised behavioural feedback, stop messages) in gaming/social media platforms.

- Enable the regulator to undertake a joint review with the UK Gambling Commission to review regulation regarding loot boxes in line with other countries which have recognized loot boxes as a form of gambling.

- Undertake a consultation in 2020 on a yellow card warning system similar to that used for medicines, in order for professionals and potentially parents/carers/young people to report harms of social media and gaming companies.

- Prioritise the strictest enforcement of Data Protection law and in particular UK DPA 2018 "Age appropriate design" to services targeting and / or popular with children, including that services should default to assuming users need child protection until explicit action is taken to opt out.

Recommendations for technology companies

- Social media platforms should flag up engagement with risky content and operate and offer a free direct hotline for at-risk or vulnerable individuals.

- Social media companies should provide user configurable controls (not in the cloud) that can block incoming content of the young person's choosing (by default 'full safety measures on'), and provide feedback on content they are planning to send (e.g. BBC Own It app for an example).

- Social media companies should promote and contribute to mental health charities in home countries to support any vulnerable individuals

- Gaming companies and social media platforms should regularly fund research related to their products, to be conducted by independent external bodies and provide on a regular basis user data for research purposes to academic institutions.

- Funding of media literacy awareness campaigns.

Recommendations for education

Systematic engagement of children in schools is essential with open discussion of the problems and potential solutions recommended by the children themselves and safeguarded by whole-school approaches and appropriate school policies. The Department for Education Relationships Education, Relationships and Sex Education (RSE) and Health Education notes that online safety is a priority and provides a list of resources for online safety.

- Teachers have a key role to play in terms of education about online safety.

- Schools and colleges should have policies relating to device use and a digital code of conduct. Good practice should be sought out and shared. A multi-stakeholder engagement of peers, parents and school staff should be encouraged to support, inform and update school policies.

- If teachers are concerned about the level of technology used by children and young people and the possible impact on their health and well-being, they should seek guidance from resources such as the MindEd modules and discuss the issue with their mental health leads within schools, as well as sharing concerns with parents.

- In England the Personal, Social and Health Education Association and in Scotland the Health and Wellbeing Education syllabus provides resources for schools. The Personal, Social and Health Education Association provides a toolkit for online safety; this should be developed further. There is also guidance from the Department for Education about online safety. Further resource development should be prioritised.

- Opportunities for group working away from screens should be encouraged whenever possible.

- Discussion around the potentially harmful nature of technology, such as cyberbullying and safeguarding issues, should take place within health and well-being education lessons. The syllabus should address online safety and dealing with the online world.

Children and young people should be empowered to use technology responsibly and as an aid to their learning. It is important that young people develop greater self-control and digital literacy **to enable them to be more digitally resilient.** Further training resources for education staff need to be developed as well as teaching discrete components within the initial teacher training curriculum.

Recommendations for clinicians

Gaming disorder is now a proposed part of the International Classification of Diseases 11th Revision (ICD-11); clinicians need to be aware of this concept of addiction.

- Questions around technology use should become a core part of biopsychosocial assessments and formulations; the online world can be just as important to young people as their offline world. It is helpful to ask children and young people about any areas that worry them in their digital lives, whilst keeping a check on their use and its disruption of healthy or necessary activities.

- Psychiatrists should be mindful of the possible impact of technology use when children and young people report difficulties in areas such as sleeping, academic performance, mood, behaviour or eating.

- Mental health conditions such as depression and behavioural problems may make children more vulnerable to problematic technology use; clinicians should be aware of the impact of technology.

- Clinicians must be aware of the additional needs of vulnerable parents, such as those suffering from depression, who may struggle to support their child around problematic technology use.

If problematic technology use is identified:

- The assessing clinician will seek to understand the impact of all presenting difficulties including potential problematic use on family relationships, educational performance and social interactions. In this context, the clinician will start to understand the potential level of problematic technology use.

- It has not yet been fully elucidated whether conditions such as depression and anxiety are contributing factors to problematic internet use or gaming or are a result of the condition. It is recommended that, where more than one condition is present, the clinician documents the duration of all conditions.

- Clinicians should be aware of the safeguarding implications of online content and contact.

Training and service development

- Services should deliver training in the concept of technology addiction. Online resources such as minded.org are useful training resources and should be further developed as knowledge increases in this area.

- Pathways to specialist services also need to be developed. There are models for other specialist pathways, such as eating disorders, where locality services treat children and young people whose symptoms are less severe. This enables locality teams to maintain expertise and recognise conditions, ensuring that children and young people can be treated as soon as possible. Where symptoms are more severe, children and young people will need specialist care. As treatment for technology addiction is still developing, this may involve travelling to specialist clinics, however as more awareness of the condition develops, the level of expertise will increase. Local protocols will need to be developed based on the diagnostic criteria available. What must be acknowledged is that children and young people with technology addiction are more likely to experience additional mental health needs such as depression, anxiety, developmental conditions such as ADHD and eating disorders.

Research

Research examining the dynamic interaction of duration, content and correlation is still lacking. To date, research is still fragmented and not systematically evaluated across the spectrum of normative to addictive use, yet initial evidence of negative physical, mental health and cognitive associations necessitates further inter-disciplinary, nationally funded research across the developmental spectrum. Embedding the use of device-collected screen time and internet usage-type data in ongoing (or commencing) large-scale cohort studies examining other variables including health outcomes is essential. This will allow for:

- longitudinal research studies with children and young people at different developmental stages, examining whether technology causes harmful outcomes as well as potential benefits

- examining different types of screen use, as well as content, and exploring a variety of health-related outcomes. Screen time use data cannot rely purely on self-report

- determining the effects of extensive online media usage on cognitive development.

In addition:

- There is a need for qualitative studies exploring children's and young people's perspectives, including gender differences.

- Research is needed that focuses on potentially vulnerable groups such as those with mental health and neurodevelopmental disorders, looked-after children, LGBTQ young people and very young children.

- Websites which normalise or promote concepts such as self-harm, suicide and anorexia should be studied and their impact on young people understood. Additionally, when limitations are proactively placed on sites by technology companies, the impact of these limitations on the health and well-being of children and young people should be studied.

- Research needs to elucidate the possible concepts of technology addiction and examine the potential for addiction, including further development of screening tools and treatment programmes.

- Research is needed into the incidence of problematic technology use across the UK.

- The development of further brain neuroimaging studies is needed that will examine the posited affected areas, not only for overuse but also to examine tolerance and withdrawal effects.

Therapeutic interventions

- Research is needed to understand how young people with mental health needs are using the internet and what support could be put in place.

- Research is also needed to understand the possible benefits of programmes that can help people manage their digital technology use, for example, apps which can block the use of other apps and the use of time restrictions. Personalised programmes for media addiction, for example, including specialised Cognitive Behavioural Therapy (CBT) and systemic family therapy, need to be developed and evaluated. Programmes need to take into account heterogeneity around potential causes (e.g. severe mental illness, low self-esteem, loneliness, ADHD, individual's predisposition to addiction) and engagement with specific internet content or transactions (e.g. social media, online gaming or gambling).

- Therapeutic trials should have integrated mediation analyses as a core aspect of trial design in order to determine which psychological and/or neurological changes predict and accompany successful treatment outcomes.

- Further research into the use of social media platforms for support, for example, in relation to suicide prevention.

Executive summary

The use of screens by CYP is now integral to their lives. There are many positive benefits for CYP from the use of the internet: for example, they can gain information; express creativity; develop and enhance relationships; improve educational outcomes; seek information about well-being and health; and access online therapies. However, there is some evidence to suggest that digital technology may impact adversely on CYP's development, education and attention. There is a connection between screen use and obesity, difficulties with sleep and mental health issues including self-harm, depression and eating distress. CYP may also encounter distressing material online and may be vulnerable to online harms e.g. sexual exploitation and cyberbullying. Gaming disorder has recently been recognised and the concept of internet addiction is emerging. The role of persuasive technology has been documented with regards to compulsive use,, and is manifest, for example, in notifications that a post has been 'liked' or a tweet re-tweeted, which can also impact on a young person's self-esteem. Although most CYP will be able to harness the benefits of technology without negative effects, some CYP may be vulnerable to compulsive use and potential harms.

Further work is needed to understand the impact of digital technology on vulnerable CYP in particular and there is an urgent need for more sophisticated longitudinal studies to understand the relationship between digital technology and well-being in CYP, which go beyond the impact of screen time alone in general populations.

The College has developed a set of guidelines for CYP in order to develop a balance between screen time and other activities including sleep and exercise; and to consider the possibility that the online world is impacting on their mental health.

Recommendations for parents are beginning to be developed: the WHO notes that for one-year-olds, sedentary screen time is not recommended. For those aged 2 to 4 years, sedentary screen time should be no more than one hour, although less is better. While parents may not feel that they know as much about technology as their children, they can be empowered to remember that this is simply another place within which they can apply the parenting strategies they use elsewhere.

Parents should maintain a dialogue with their children about the pros and cons of technology use, as well as thinking about the needs and vulnerabilities of individual CYP and their stage of development. It may be helpful for parents to negotiate screen-free times of the day such as mealtimes, to set boundaries around screen time before bed and to consider making bedrooms screen free. Dialogue around online bullying and ways of disclosing inappropriate content are important as is following age restrictions on apps and games. Finally, parents should be mindful of their own use of technology and should consider asking for a child's permission before posting their image.

Gaming disorder is now a part of ICD-11; clinicians need to be aware of this concept of addiction. Questions around technology use should become a core

part of biopsychosocial assessments and formulations; the online world can be just as important to CYP as their offline world. It is helpful to ask CYP about any areas that worry them in their digital lives, whilst keeping a check on its use and its disruption of healthy or necessary activities. Psychiatrists should be mindful of the possible impact of technology use when CYP report difficulties in areas such as sleeping, academic performance, mood, behaviour or eating. Mental health conditions such as depression and behaviour problems may make CYP more vulnerable to problematic technology use. Clinicians must be aware of the additional needs of vulnerable parents, such as those suffering from depression, who may struggle to support their child around problematic technology use.

Pathways to specialist services need to be developed. There are models for other specialist pathways such as eating disorders where locality services treat CYP whose symptoms are less severe. This enables locality teams to maintain expertise and recognise conditions ensuring that CYP can be treated as soon as possible. Where symptoms are more severe, CYP will need specialist care. Local protocols will need to be developed based on the diagnostic criteria available. What must be acknowledged is that CYP with technology addiction are more likely to experience additional mental health needs such as depression, anxiety and developmental conditions such as ADHD.

The Department for Education, Relationships Education, Relationships and Sex Education and Health Education notes that online safety is a priority and provides resources for online safety. Schools and colleges should have policies relating to smartphone and tablet use and good practice should be sought out and shared. If teachers are concerned about the level of technology used by CYP, and the possible impact on health and well-being, they should seek guidance from resources such as the online MindEd modules and discuss its use with their school mental health leads. In England, the Personal, Social and Health Education Association and in Scotland the Health and Wellbeing Education syllabus provide resources for schools, such as a toolkit for online safety; this should be developed further.

Digital technology is here to stay and the opportunities for exploration, creativity and information sharing cannot be denied to our CYP. Our role is to ensure that we support CYP to maintain a balance of time in the offline and online world, maximise the benefits and minimise any harms. We support the recommendations from the UK government's White Paper in relation to technology companies.

To this end, we call for urgent funding for more high-quality research to examine potential harms and also to establish how we can best harness the potential of digital technology to help CYP, as well as increasing access to high quality training and education resources. We welcome the UK Government's White Paper and focus on our most vulnerable CYP. The challenge now will be how to establish a duty of care and the role of an independent regulator. However, this commitment is an important first step towards enhancing the online lives of our next generation and a vital ongoing conversation for our society.

Background

The use of technology is increasing and we do not yet know the potential impact on the development of children and young people of living lives with the everyday use of it [2]. There is a challenge for us all to learn to live well when surrounded by immersive and persuasive technologies [2]. Screen time is clearly valued by children and young people and their parents and is becoming an essential part of modern living. Understanding the underpinning values (what is important about screen time to children, young people and families) may help us understand why some people get locked into excessive screen time which is detrimental to other important areas of life, such as health (eating, sleeping, exercising), face-to-face relationships, work, school and leisure activities.

How much time are children and young people spending watching screens?

More than 90% of children in all age groups watch TV on a TV set[9]. The number of children aged between three and 11 years going online has been increasing, as has the use of YouTube among children. Additionally, children and young people are increasingly likely to own their own tablet and more likely to use this to go online[9]. A UK preschool report[10] notes that about 75% of three to four-year-olds had access to an internet connected device and most had their own personal computer or tablet.

A 2018 study[11] in the UK found that 9% of students reported that their parents set limits regarding time spent online and actually enforced it, whilst almost 30% said the limits were there but not enforced and about 35% reported that they did not have any limitations. NHS Digital[12] reported that over half of children and young people who were social media users spent more time online than they had intended; in addition, a higher proportion of 11 to 19-year-olds with a mental disorder spent more than four hours on a social media site on a typical school day compared to those without a disorder (29.4% compared to 12.0%).

Table 1 – Use of screen time per week [9]			
3–4 years	5–7 years	8–11 years	12–15 years
1% have their own smartphone, 21% their own tablet	5% have their own smartphone, 35% their own tablet	39% have their own smartphone, 52% their own tablet	83% have their own smartphone, 55% their own tablet
96% watch TV on a TV for 15 hours a week	95% watch TV on a TV for 13.5 hours a week	95% watch TV on a TV for 14 hours a week	91% watch TV on a TV for 14.5 hours a week
41% watch TV on other devices mostly a tablet	49% watch TV on other devices mostly a tablet	55% watch TV on other devices mostly a tablet	68% watch TV on other devices mostly a tablet
40% play games for nearly 6 hours a week	66% play games for nearly 7.5 hours a week	81% play games for nearly 10 hours a week	77% play games for nearly 12 hours a week
53% go online for nearly 8 hours a week	79% go online for nearly 9 hours a week	94% go online for nearly 13.5 hours a week	99% go online for nearly 21 hours a week
48% use YouTube	71% use YouTube	81% use YouTube	90% use YouTube
	3% have a social media profile	23% have a social media profile	74% have a social media profile
40% watch TV and go online for 29 hours a week. This amounts to just over 4 hours a day.	66% watch TV, play games and go online for 30 hours a week. This amounts to over 4 hours a day.	81% watch TV, play games and go online for 37.5 hours a week. This amounts to over 5 hours a day.	77% watch TV, play games and go online for 47.5 hours a week. This amounts to almost 7 hours a day.

Table 2 – Online experiences of 12 to 15-year-olds		
12% have been bullied face to face and 12% have been bullied online	45% have seen something hateful online directed at a particular group	1 in 10 have seen something of a sexual nature online which made them feel uncomfortable

Advantages of technology use

For further information about the advantages of technology use, see Appendix 1.

The internet can be a rich and valuable resource for young people[2] and social media and mobile technology have become extensions of themselves[13]. For example: young people can obtain information about physical and mental health as well as support from online services; they can obtain information about hobbies and interests and express their creativity online[14]; and the majority of teens report that social media can help them to develop and sustain friendships as well as being an important source of peer support [1]. In addition, the internet provides many educational opportunities, for example, a longitudinal study identified that higher rates of home internet use have been associated with better academic outcomes in low-income families[15].

Potential harms of technology

Although the majority of young people find social media useful[16], young people are also reporting that it places them under significant stress. For example, in a UK survey of 2,162 16 to 25-year-olds: 57% reported that social media creates an 'overwhelming pressure' to succeed; 48% said that they felt more anxious about their future when seeing the lives of their friends online; and half of young people reported being more anxious than they were a year ago[17]. The NHS digital prevalence survey reported an association between young people with a mental health disorder and negative effects of social media; these young people were more likely to compare themselves to others on social media and more likely to report that their mood was affected by likes and comments [18] when compared to young people without a mental health disorder. A report by Young Minds also highlighted the potential increased risk of harms in some vulnerable young people, such as those with literacy issues, young carers or those who live in institutions[19]. Furthermore, there is evidence that young people who have experienced more adversity are more likely to experience harmful effects of screen media, such as receiving more negative feedback and difficulties in regulating their online usage [20]. This can lead to a 'digital divide' between those who can healthily engage with internet usage and those who are particularly vulnerable to adverse online interactions.

Parents also report struggling to manage their child's screen time. For example, Ofcom reports that 12% of parents of three-year-olds, 19% of parents of five to seven-year-olds, 33% of parents of eight to 11-year-olds and 41% of parents of 12 to 15-year-olds find it hard to control their child's screen time[9].

Safeguarding implications of technology use

Young people also worry about the content of what they may view online. For example, in an EU study nearly 10,000 children and young people were asked what bothered them online [21]; pornography and violent or gory content were the key concerns identified. A significant minority of children and young people have also experienced cyberbullying[22] [12] and those who are online for longer periods of time are more likely to be affected[22].

The UK Council of Child Internet Safety summarises potential safeguarding harms within three categories: content (violence, pornography, hate, commercial/advertising); adult contact (harassment, grooming/sexual exploitation, ideological/persuasion, personal data exploitation); and child conduct[23] (bullying, sexting, potentially harmful user-generated content, gambling). Similarly, the government Green Paper on internet safety[24] raises numerous concerns about online safety such as pornography, commercial content and advertising, fake news, exposure to hate content, cyberbullying, trolling, sexting, providing personal information online and 'catfishing' or fake online profiles. The Science and Technology Committee report on social media and screen use provides a detailed summary of evidence in these areas. With regard to potentially harmful content the committee concluded that although "great strides have recently been made to address and remove content that incites terrorist activities. The same effort and determination must now be applied to curb the proliferation online of the physical, emotional and sexual abuse and exploitation of children, as a matter of urgency". In addition, "while social media and screen-use is not necessarily creating these risks, it has, in numerous

cases, amplified them. Initiatives are in place to address some of these harms – notably around cyberbullying – yet others are falling through the cracks. A comprehensive, joined-up approach to address the plethora of negative effects is needed". They state that the principle underpinning any future legislation must be that children, as far as practicably possible, should be protected from harm when accessing and using social media sites, which includes harms from cyberbullying, grooming, child abuse and child sexual exploitation (CSE), 'self-generated' images and 'sexting', the live streaming of CSE, violence, hate speech and pornography[1].

Despite these concerns, Young Minds report that 61% of young people were found to have a social media account at age 12 or younger, although the official age restriction is 13 [25], and a quarter of 12 to 15-year-olds have been contacted by someone that they don't know[9]. There has also been a concerning rise in reported rates of sexting cases involving children and young people in the UK[26]. A small proportion of children and young people post naked or nearly naked pictures of themselves[27] but of those who have taken sexual images, 55% have been found to share them with others, while 31% had also shared the image with someone that they did not know[28].

Young people who are vulnerable may be at particular risks of harm. For example, in a UK survey by Barnardo's of sexual exploitation of 702 children who had received support from them in the preceding six months, 42% had been groomed online[29]. It is not known whether these children were already known to any other child sexual exploitation services.

The 5Rights Foundation[30] summarises the risks to young people of targeted advertising, gambling, discriminatory or inaccurate profiling and potential misuse of their personal data. More recently, the parliamentary Digital, Culture, Media and Sport Committee published its report condemning social media companies for not taking responsibility for content and data security and called for urgent statutory regulation. Damien Collins, the Chair of the Committee, stated that young people were being exposed to harmful content but were trapped in feedback loops that meant that if they engaged with this material, they were served more of it[31].

Early development

There is some preliminary evidence from a large longitudinal study[32] of 3,388 mothers and children between the ages of two and five to suggest that screen time may impact on development. The study notes that opportunities to practice and develop mastery of communication, motor and interpersonal skills can be lost if children are watching screens. The study also noted that there was an interplay between screen time and performance on developmental screening tests and a number of contextual factors including maternal mental health, family income, the child's sleep, gender and whether the child was being read to regularly[32]. Although the effects were relatively small at a population level, further studies are required to examine effects on vulnerable young children, such as those with existing developmental delays, where negative effects are likely to be greater. A further cross-sectional study of screen time use in preschool children also reported that increased use was associated with behaviour problems and inattention. A WHO report in 2019[5] studied the available evidence and concluded that "there was a predominantly unfavourable, or a null association between screen time

and adiposity, cognitive or motor development and psychosocial health". In contrast, "there was a favourable or null association between time spent with a caregiver reading or storytelling and cognitive development". On this basis, the WHO has recommended that one-year-olds should not have access to screen time and two to four-year-olds should only have a maximum of one hour a day although 'less is better'.

Education

Education providers express concern regarding the detrimental effects of the internet on children's attention, with over 85% of teachers endorsing the statement that "today's digital technologies are creating an easily-distracted generation"[33]. Research has also shown that children and young adults who game excessively, or use entertainment media while working, experience a deterioration in their academic performance [34,35,34] and an online survey of first year university students suggested that electronic media use was negatively associated with grades[35]. An ongoing study with the National Institutes of Health has released provisional results which suggest that children and young people who spend more than two hours per day on screens achieve lower scores on tests of language and thinking[36]. Removal of smartphones during exams for university students has improved performance; this effect was greatest for more vulnerable students from poorer backgrounds and those who were low achieving[37]. Furthermore, a study of all secondary students in the UK identified that among low-income and low-achieving students smartphone use in the classroom exacerbated existing educational inequalities [38].

A systematic review of the effects of mobile devices on learning in two to five-year-olds[39], in which the majority of the 19 studies examined the cognitive effects of mobile devices in relation to Maths, Science and literacy, identified largely positive effects. However, the study noted that there was limited exploration of the possible impact of mobile devices in relation to children's social and emotional development.

Technology use and physical health

Systematic reviews[40,41,42], cross-sectional studies [43,44,45,46], consensus statements[47], longitudinal studies[48,49] and surveys[50] have documented the association between screen time and obesity in children and young people. Children and young people who use screens more often have been found to exercise less[51]. A large longitudinal study of 1,517 adolescents aged 14–18 years identified that increased screen time predicted an increase in body mass index (BMI)[49].

Sitting for prolonged periods of time can increase the risk of deep vein thrombosis [52,53]. This risk is exacerbated by obesity and dehydration in older adult patients[54].

Cognitive effects

In 2019, the journal of the World Psychiatric Association published an evidence review of how internet usage may be impacting upon brain functioning and development[55]. Firstly, regarding neurocognition, the constant stream of information afforded by ubiquitous internet access may impede upon certain individual's capacities for sustained attention

by prompting them towards attentional–switching (or 'media multi-tasking') between streams of incoming online information. This is supported by experimental studies showing individuals who engage in extensive amounts of such multi-tasking perform worse in sustained attention tasks[56,57,58]. Moreover, evidence suggests that the mere presence of smartphones may induce inattentiveness[59]. Furthermore, recent data shows that even short-term engagement with online environments which encourage divided attention produces temporary, but significant, reductions in attentional capacities[60]. Notifications on smartphones have also been found to be disruptive and lead to a negative impact on mood and well-being[61]. Alongside this, the constant availability of factual information in the online world may reduce incentives for memorising content retrieved through the internet. Indeed, several studies have indicated that although using internet searching increases this speed of information gathering, it may not sufficiently recruit brain regions for storing information in the long term[62].

To date, the majority of studies on neurocognitive effects of internet engagement have been conducted in adult samples, with relatively few studies conducted in young people who are the primary users of such media[63] and at a crucial developmental phase for refining higher cognitive abilities[64]. Interestingly however, emerging longitudinal data in younger samples suggests that the association between online media engagement and attentional deficits is stronger for those in early adolescence, as opposed to older teens[65]. Additionally, children who engage in extensive amounts of internet use are at greater risk of impeded maturation of neural development and verbal intelligence[66].

With regard to social cognition, there is now a large body of evidence showing that multiple cognitive processes and structures inherent to 'real world' sociality are mirrored in our online social worlds[67,68,69,70,71,72,73,74]. This close connection between social interactions in online and offline networks calls for serious consideration of how the 'artificial' aspects of social media platforms can have 'real world' cognitive and social consequences in vulnerable young people. For instance, being rejected online produces similar neural responses to 'real' rejection. However, whereas rejection in the real world is often masked by ambiguity, subjective interpretation and even social pleasantries, social media precisely reports (and even publicises) acceptance/rejection by 'friend requests' and popularity through 'likes'[75]. Although nascent, emerging evidence shows that young people who feel rejected online are particularly vulnerable to heightened feelings of depression, anxiety, reduced self-esteem[76], isolation[77,78,79] and online bullying[80]. Social media also creates an artificial environment for upward social comparisons[81,82,83] which may in turn produce negative evaluations of self-worth and body image due to the unattainable expectations this can create in young people[84,75,77,63]. Key motivations underlying social media use may be the need to control content, self-presentation and relationships, which may be implicated in excessive or problematic use[85].

Sleep

There are many reasons why children and young people may not be getting enough sleep; these include environment, life events and physical and emotional health. However, children and young people may also be reluctant to stop using technology in order to go to sleep. Children may also be more vulnerable to the impact of artificial light suppressing the sleep hormone melatonin, when compared to adults[86].

A meta-analysis[87] of 20 studies concluded that access to and use of technology at bedtime was significantly associated with poor sleep quality, inadequate sleep quantity and excessive daytime sleepiness.

Furthermore, a large cross-sectional study[88] of almost 10,000 adolescents identified that daytime and bedtime use of electronic devices were both related to an increased risk of short sleep duration and difficulties with sleep onset, with a dose–response relationship between sleep duration and use of electronic devices. However, the impact of screens on sleep has been questioned in a cross-sectional study of over 50,000 children which noted that each hour of screen time was only associated with three to eight fewer minutes of sleep and that screen time accounted for less than 2% of variance in children's sleep time[89].

The role of sleep in maintaining well-being has also been explored[90]: a large longitudinal study of secondary school pupils (*Our Future* study) identified that persistent, very frequent social media use predicted lower well-being in girls and most of this impact was due to inadequate sleep, as well as cyberbullying and lack of physical activity.

In summary, although there is evidence of an association between the amount of screen time use and sleep problems, further longitudinal studies are needed to confirm a causal link, the size of this effect, any varying effects of different types of screen use and also whether particular groups of children and young people may be more vulnerable to these effects. Nevertheless, getting sufficient sleep remains important to children and young people's health and evidence for the role of sleep in maintaining well-being has been further substantiated with recent data.

Technology use and mental health

Impact on wellbeing

The previously mentioned *Our Future* study[20] of 12,866 secondary school pupils identified strong, longitudinal associations between very frequent social media use and mental health and well-being in girls. These effects were largely mediated by cyberbullying and the displacement of sleep and physical activity. The same factors mediated this relationship in boys but to a much smaller degree.

An earlier study [91] similarly reported a negative relationship between screen time and young people's well-being. After one hour/day of use, more hours of daily screen time were associated with lower psychological well-being and other negative outcomes. Among 14 to 17-year-olds, high users of screens (seven+ hour/day versus low users of one hour/day) were more than twice as likely to have been diagnosed with mental health problems such as depression and anxiety. Moderate use of screens (four hour/day) was also associated with lower psychological well-being. Data from the NHS digital prevalence survey also suggests that young people with mental health problems may be more vulnerable to the harmful effects of social media [12]. However, some authors have argued that the effects found in other data sets are too small to warrant policy change.[92]

Although not specifically focused on young people, an interesting study of 2,743 Facebook users in the general population[93], invited users to have their Facebook accounts deactivated for four weeks. The study found that when their Facebook was deactivated, people reduced online activity generally, increased social interaction with family and friends and experienced increased well-being. Once the study was completed, Facebook use also reduced. These findings are echoed in a longitudinal study [94] over three years which identified that, overall, Facebook use was negatively associated with well-being.

In summary, there is emerging evidence that increased use of social media or screen time may result in poorer well-being. The negative effect of social media may be mediated by other factors such as reduced sleep, cyberbullying and displacement of physical activity; however, these findings need replication.

Self-harm and suicide

A systematic review of 14 studies[95] concluded that although the internet is most commonly used for constructive reasons, it may also exert a negative influence, normalising self-harm and potentially discouraging disclosure or professional help-seeking. Both cyberbullying and general internet use correlated with increased risk of self-harm, suicidal ideation and depression.

In an updated and broader systematic review[96], the same group examined 46 studies of people aged under 25 years. The authors included a wide range of search terms such as 'hashtag', 'instant message' as well as a wide range of internet mediums, although cyberbullying was examined in a separate review. A relationship between internet use and self-harm/suicidal behaviour was particularly associated with internet addiction, high levels of internet use and websites with self-harm or suicide content. They concluded that there is significant potential for harm from online behaviour (normalisation, triggering, competition, contagion) but also the potential to exploit its benefits (crisis support, reduction of social isolation, delivery of therapy, outreach) and that young people appear to be increasingly using social media to communicate distress. The authors suggest that the focus should now be on how specific mediums (social media, video/image sharing) might be used in therapy and recovery and that clinicians should engage in discussion about internet use. Although this review did not report on cyberbullying, their previous review and other data also point to an association with self-harm [97]. A further global meta-analysis examining the association between internet addiction (IA) and suicidality reported that suicidal ideation was substantially higher in children and adolescents with IA when compared to adults with IA [98]; however, the direction of this effect was unclear.

A large cross-sectional study of 3,946 participants in the Avon Longitudinal Study of Parents and Children similarly confirmed that young people who self-harmed were more likely to search for sites that offered help and advice; however, they also searched for sites that offered advice on killing oneself[99]. Furthermore, a telephone survey of 1,560 young people who used the internet identified that 1% of adolescents reported visiting a website encouraging self-harm or suicide. This group were 11 times more likely to have thought about hurting themselves and seven times more likely to report thoughts of killing themselves[100]. Other data[101] suggest that young people who are struggling

with mental health problems may be drawn to spending more time on line. In a study of 753 children and adolescents, those with unmet mental health needs were more likely to use social networking sites for more than two hours a day. Daily use of social networking sites was noted to be connected to higher levels of distress and suicidal ideation.

Clinical samples provide additional evidence for an association between suicidality and internet use. A cross-sectional study of 111 adolescent inpatients[102] identified that suicide attempts were significantly higher amongst adolescents with problematic internet use; 23% of suicides in England among under 25-year-olds followed suicide-related internet use[103] and a quarter of children and young people presenting to hospital with self-harm have looked at suicide/self-harm-related content, compared to less than 10% of presenting adults. This study also demonstrated that suicide or self-harm-related internet use was associated with higher levels of suicidal intent[104].

The above studies provide evidence for an association between high levels of internet use and access to harmful content with suicidal behaviour and self-harm. High risk groups such as inpatients and young people who are engaging in self-harm appear to be particularly at risk, however, these studies do not describe a causative effect. Although not primarily focused on young people, evidence from a large Japanese cohort study of young and middle-aged adults has demonstrated increasing suicidal ideation among people reporting suicide or self-harm related internet use in the months following usage, compared with those who had not used the internet in relation to their self-harm [105].

Evidence for any causal effect therefore remains tentative; nevertheless, access to graphic images and the normalisation of self-harm through online forums is of significant concern and reflects the experience of clinicians, for example, with regard to the well-known 'contagion' effects of self-harm in inpatient units[106]. Exposure to graphic images and 'pro-suicide' content has been discussed in the media where it has been implicated in the suicide of young people[107].

There is also additional strong evidence from a time series analysis that the Netflix series *13 Reasons Why*, which portrayed the suicide of a 17-year-old girl, led to an approximately 13% increase in suicides for youths aged 10 to 19 years in the three months that followed its release. No similar percentage increase was seen in any other age group. Twitter and Instagram posts were used as a proxy to estimate the amount of attention the show received through social media, with public interest highest in the month after release. The authors conclude that these findings are consistent with a contagion effect by media[108].

In an editorial that accompanied this research, the authors argued that there is evidence that the content of media has become increasingly negative; since the human brain is more attentive to potentially dangerous events, media sources with more negative material have more viewers which incentivises negative reporting. While the effect size of negative reporting or social media posts may be very small at the individual level, the capacity to both reach large numbers of people and spread massively through a social network may result in consequences that, at the population level, bring about considerable harm in human interaction and health. The authors conclude that a small change in reporting practices could have substantial benefits. Likewise, media portrayal of resilience, rather than suicide, may help those struggling[109].

ADHD

Screen time use has been associated with behaviour problems and inattention in a large study of preschool children[110]. Similarly, an association was found between a higher frequency of digital media use and subsequent ADHD symptoms among a large cohort of adolescents followed up over two years[111]. A meta-analysis of 45 studies has also reported a small significant relationship between media use and ADHD-related behaviours[112,113]. A small cross-sectional study[114] examined night-time media use and its relationship with sleep difficulties, anxiety and depression in adolescents with ADHD. Higher media use was associated with higher rates of adolescent-reported anxiety and depression. A further systematic review[115] of adolescents and young adults in which the concept of 'internet addiction' had been identified with a standardised tool identified 15 studies, two cohorts and 13 cross-sectional. ADHD symptoms were more severe in the internet addiction group than in the controls but there was insufficient evidence for a causal link.

In summary, there appears to be an association between technology use and ADHD but further research is needed to establish a causal link. There should also be a focus on the symptoms of ADHD in individuals with internet addiction, as well as the monitoring of their internet use.

Low mood and depression

There have been a number of studies describing an association between screen time and depression. For example, a meta-analysis[40] of studies examining the use of screen time in children and adolescents reported moderately strong evidence for an association with depression.

However, the analysis of technology use is complex and goes beyond screen time use alone. With regard to social media use, a cohort study of 6,595 US adolescents reported that, over time, increased use of social media was associated with an increased risk of emotional problems, even after adjusting for history of mental health problems[116]. A systematic review which examined social networking sites, identified a more complex relationship. Thirty studies were identified which examined possible moderators in the relationship between social networking sites (SNSs) and depression and anxiety. The findings were mixed and suggested that the relationship between depression and social networking sites was bidirectional: eight studies reported that social networking site use was associated with increased rates of depression while in sixteen studies no significant association was identified. Positive interactions, social support and social connectedness on SNSs were consistently related to lower levels of depression and anxiety whereas negative interaction and social comparisons on SNSs were related to higher levels of depression and anxiety. SNS use related to less loneliness and greater self-esteem and life satisfaction. The authors conclude that methodology has predominantly focused on self-report cross-sectional approaches and that future research will benefit from examining real-time SNS data over time. Thus, the evidence suggests that SNS use correlates with mental illness and well-being; however, whether this effect is beneficial or detrimental depends at least partly on the quality of social factors in the SNS environment. Understanding these relationships will lead to better utilisation of SNSs in their potential to positively influence mental health[117].

This bidirectional relationship and complexity has been further confirmed in a systematic review[118] which examined the relationship between social media and depression in 11 studies, five longitudinal and six cross-sectional. The paper reported a small but statistically significant correlation between social media use and depressive symptoms with some evidence regarding an increased prevalence in girls, although findings were mixed. The authors conclude that the relationship between antecedents and outcomes is not simply linear but a product of the influence of many factors, such as psychological vulnerability and social isolation. They go on to state that until more is known about the interplay of variables, straightforward cause-and-effect studies are not fully credible, unless a large sample can be observed and analysed over a suitably long time period, including consideration of child development factors.

Findings from the population-based UK Millennium Cohort Study provide analysis of the complex relationship between social media and depression. An association was confirmed between the amount of social media use and depressive symptoms which was greater for girls than boys. Further analysis showed that greater social media use related to online harassment, poor sleep, low self-esteem and poor body image; this in turn related to higher depressive symptom scores[119]. In contrast, a further longitudinal study of a large sample of young people reported that social media use did not predict depressive symptoms over time for males or females. However, greater depressive symptoms predicted more frequent social media use only among adolescent girls[120]. This study provides further evidence of a complex, potentially bidirectional relationship, particularly in girls.

A further longitudinal study[121] of 3,826 adolescents assessed over four years aimed to disentangle the effects of different types of screen use. The study reported an increase in depressive symptoms with an increase in time spent on social media. Television viewing was also noted to be associated with depression. These findings highlight the need for more nuanced research, as different, complex effects were found. Increasing social media use was associated with a worsening of depression, which may be related to the type of content that depressed young people select. Both increased television and social media use impacted on self-esteem and the study suggests that this could be through repeated exposure to idealised images and unfavourable social comparisons. Not all screen time had negative consequences for mental well-being though – computer time and gaming did not have any effect on depression.

A systematic review of problematic gaming and adverse health outcomes identified 30 studies which focused on adolescents or young adults (12–25 years) and 22 studies examined teenagers (12–18 years). There was a moderate correlation between depression and anxiety symptoms in young adults but the effect was small for adolescents. The authors recommend that future research should examine the role of developmental factors in the relationship between risk factors of problematic gaming as this may help in designing efficacious intervention programmes[122].

In summary, there is evidence of a complex relationship between technology use and depression; this depends on many factors both in the child/young person as well as the different forms of technology and how it is used. Better understanding of this relationship is important in order to harness the potential benefits of technology as well as to provide interventions to limit harms in vulnerable young people.

Eating disorders

Viewing images of bodies in the media has been linked to children and young people's dissatisfaction with their bodies[123] and unfavourable comparisons with celebrities[14]. Teenage girls with Facebook profiles also score more highly on body image concerns[124] and young people who experience cyberbullying also report higher rates of eating disorders[97].

A systematic review[125] of the impact of the internet on eating disordered outcomes and body image in children, adolescents and adults included 20 studies. Social networking activities were noted to be associated with disordered eating and negative body image. The paper concluded that, while correlational evidence supports a maladaptive relationship between social networking sites, body image and disordered eating, there is a need for more longitudinal research.

A study [126] which searched for 'proana' ('pro-anorexia') twitter accounts for four weeks noted that the accounts were popular with a mean of 2,360 followers most of whom were girls with a range of ages from 12–28 years and a mean of 17.9. Notably only 6% of the sites had a warning about their dangerous content. Following the concerns around the promotion of self-harm and suicide content online[107], similar concerns have also been raised regarding the impact of potentially harmful content around eating disorders, with calls for regulation of social media sites. Dasha Nichols, former Chair of the Royal College of Psychiatrists Eating Disorders Faculty, has noted[127] that some websites "actively promote disordered eating and inspire others to behave in that way, particularly around restriction and fasting".

Summary of the evidence base on mental health and development

As noted by the Chief Medical Officers[2], there is an urgent need for longitudinal studies with less reliance on self-report measures. More precise terminology is needed regarding screen use and examination of content as well as context, including effects on vulnerable groups, and more qualitative data from children and young people. Nevertheless, the evidence base is growing and there are serious, valid concerns around the safeguarding implications of unregulated content, amplification of negative content and potential for the abuse and exploitation of children and young people. There is emerging evidence that vulnerable groups, such as those with mental health problems or looked-after children, may be disproportionately affected by social media and harmful content, as well as recent evidence of the potential effect of screen time on the development of young children, which requires urgent replication. Future research must explicitly examine the differential impact across different sub-groups to determine if there are interactions; this should include children with autism and intellectual disability where there has been relatively little research despite concerns regarding the relative vulnerability of this group [128]. Some populations of children may be resilient to any adverse effects whilst others are more susceptible and these effects may be masked at a population level if the latter are a relatively small proportion of the total young population.

Although the research data on the effects of screen time on sleep remains disputed, young people report the need to check their phones in bed and parents struggle to manage their children's screen time. As we have an epidemic of sleep problems in young people, with evidence for the lack of sleep causing mental health problems[129,130,

[131], good sleep hygiene and a non-stimulating bedroom environment remains essential advice. Finally, the benefits of new technology must be harnessed to help children and young people who are in distress and seek support on line, as well as promoting resilience. Ongoing efforts to improve our research data will further enhance our ability to provide the most effective forms of online support.

Persuasive technology and problematic use

Problematic use of the internet and electronic games was first reported in the last century. In 1992[132] a young man's use of pinball machines was compared with pathological gambling using the DSM-III-R criteria. In 1996 the phenomenon of internet addiction was first posited[133] and it is notable that, after 2006, the publication rate rose 'exponentially[134]', with increasing articulation of both 'addicted on the internet' and 'addicted to the internet'[135]. For more information please see Appendix 3.

The term 'Mass Interpersonal Persuasion[136]' has been proposed, whereby social media has the potential to change behaviours and attitudes on a large scale. For example, a systematic review[137] of studies of adults demonstrated that, in the majority of studies, digital marketing increased the use of unhealthy products.

Extended use strategies, based on the science of 'persuasive design' (also known as 'behavioural design[138]') are features that direct, nudge and influence user behaviour for the purposes of extending engagement. Technical strategies (no save button or auto-play) and emotional strategies (designing social obligations and/or anxieties into services), work singly or in concert to summon users to engage with a service and to hold their attention once engaged. Extended use design includes features such as: notifications (buzzes, pings, vibrations); read receipts; auto-suggested content; loading wheels; endless feeds; quantification (the number of likes, retweets, friends); and obligation (streaks, read receipts[139]).

Persuasive design deliberately reinforces digital habits; subconsciously reaching for a device, refreshing pages and profiles to check for new content and locking and unlocking devices. Young people are particularly vulnerable to compulsive use because they are less able to self-regulate and they tend to seek instant rewards. Ofcom's media[9] report showed that children choose media activities based upon habit[140].

Oral evidence presented to the All-Party Parliamentary Digital, Culture, Media and Sport Committee[6] discussed the concept of 'ludic loops', a term coined by Natasha Dow Schüll who described ludic loops as "repeated cycles of uncertainty, anticipation and feedback – and the rewards are just enough to keep you going".

The Digital, Culture, Media and Sport Committee published their report on Immersive and Addictive Technologies in 2019 stating particular concerns about the effects of gaming on children and young people. The report called upon games companies to accept responsibility for addictive gaming disorders, protect their players from potential harms due to excessive play time and spending and, along with social media companies, introduce more effective age verification tools for users. In particular the committee warned that 'loot boxes' in video games should be regulated under gambling law and be banned from being sold to children[141].

A review of internet addiction (IA)[142] reported[143] that high prevalence rates have been found in some countries. For example, 8.8% of Chinese adolescents are affected and China acknowledged internet addiction as an official disorder in 2008. Similarly, in 2002, the South Korean government opened the first internet addiction prevention counselling centre in the world and has since developed large-scale projects to tackle technology overuse.

In a further meta-analysis of IA across 31 nations, increased IA prevalence was also associated with a poorer quality of life[144].

These high prevalence rates could indicate that the internet is placing a new and substantial mental health burden on society – thus requiring novel, targeted interventions. Alternatively, excessive internet usage may be better understood (and treated) as a behavioural symptom of pre-existing mental illness. However, pending further research, it remains unclear whether problematic technology use is a cause or consequence of poor mental health.

Screening tools to assess problematic technology use

Many of the available tools have been used with both adults and children. Self-report tools predominate for problematic internet use [145], social media use[146,147,148,149,150] and problematic gaming[151,152]. A systematic review of treatment of internet addiction has noted the need for a consistent definition of internet addiction to be used to improve the methodology of future intervention and prevention studies [153]. A detailed analysis of assessment is beyond the scope of this paper[154].

Screening questions derived from clinical experience

When understanding technology use, simple rules can be applied: What is the child or young person using the device to do? How much time are they spending on the device? Is it impacting on homework, family time or social contact? Do parents and carers know at what the child or young person is looking? Is the activity age appropriate e.g. a game only for 18-year-olds? Is the activity impacting on the young person's mood or behaviour?

It can be helpful to engage young people in a discussion of their digital life with some useful opening questions derived from clinical expertise with young people: "Do you stream?" or "Are you a YouTuber?"; the aim is to demonstrate a degree of digital literacy and to understand the differing motivations for use. If the answer is "No", then other motives for use should be explored by the interviewer e.g. social gaming or other avenues for monetisation. The latter question is directed at young people who may be seeking to make money within the digital economy. The pleasurable rewards of gaming may be a side issue to the excitement of developing a successful, profitable online presence. The questions also allow the interviewer to convey some knowledge of the digital world. It

may be helpful to ask some gamers how much they have in cryptocurrencies and can they explain *Blockchain* to you. For example, Bitcoin is a form of digital money, it exists because there is an electronic record (*Blockchain*) that is shared by everyone who is using Bitcoin. The idea is that everyone has the record and it is continually updated. These discussions may also help you understand whether the cryptocurrencies are used for further areas of risk e.g. gambling or any illegal purchases, such as drugs.

Table 3 – Questions for young people who may be affected by internet use
What platforms do you use? **Do you watch videos? What is their content?** **Do you upload videos?** **Do you make money online?** **Do you use social media?** **Do you enjoy gaming?** **Do you ever see stressful things happening online?** **Do you consider that you spend much time online?** **Are you able to go offline/stop gaming in order to undertake other important activities?** **When you are online are you enjoying it or how often do you use it as a way of killing time or to avoid doing stressful activities?** **Do you use a function on your phone to tell you how much time you have spent online?**

Evidence from brain imaging studies of people with gaming disorder

There is evidence that digital gaming may have positive effects. A systematic review identified that digital gaming has the potential to enhance visuospatial skills and lead to gaining of skills[155]. In addition, a wide range of medical and psychological benefits of gaming have been reported in the context of rehabilitation, for example, in children undergoing chemotherapy, children with muscular dystrophy and autistic children. However[156], excessive gaming is associated with abnormal resting state activity in the brain regions that are responsible for impulse control and reward processing[157]. A review of available studies demonstrates the resemblance between the neural mechanisms underlying substance misuse disorder and internet gaming disorder, together with brain changes in people who game excessively[158,159]. Adolescents diagnosed with internet gaming disorder have higher cerebral blood flow in areas associated with learning and memory (amygdala/hippocampus) and the insula (associated with conscious urges to use drugs) [160], as well as lower diffusion measures in brain areas associated with impulse control, motor function, attention and control and emotional regulation[161,155].

A study of 119 young adults (78 gaming-naive controls; 41 gamers) randomly assigned gaming-naive subjects to six weeks of daily internet gaming or a non-gaming condition (training control group). At study inclusion, excessive internet gamers demonstrated lower right orbitofrontal grey matter volume compared with internet gaming-naive subjects. Within the internet gamers, a lower grey matter volume in this region was associated with higher online video gaming addiction severity. Longitudinal analysis revealed initial evidence that left orbitofrontal grey matter volume decreased during the training period in the training group as well as in the group of excessive gamers. Together, the findings

suggest an important role of the orbitofrontal cortex in the development of internet addiction with a direct association between excessive engagement in online gaming and structural deficits in this brain region[162].

Possible vulnerability factors which may predispose young people towards problematic technology use

The lack of research relating to the connection between mental health and technology means that it is difficult to identify causality. However, there is some evidence from longitudinal studies which suggest that children and young people who have anxiety, depression and ADHD may be more vulnerable to problematic technology use[163]. Data from EU Kids Online[164] identified that children who have emotional problems, are older and exhibit higher levels of sensation-seeking, are more vulnerable to excessive internet use and its negative outcomes.

A survey comparing 111 adolescent inpatients[102] with matched non-referred adolescents identified that rates of problematic internet use were much higher among inpatients. Furthermore, adolescents with problematic internet use showed a pattern of psychopathology which included thoughts of suicide, difficulties with identity stability and peer victimisation. More work is needed to understand whether factors such as low mood or behaviour problems lead to problematic technology use or are exacerbated by it[86]. Evidence suggests that male children can be more vulnerable to problematic technology use [165] and that this can be exacerbated by difficult family dynamics. A systematic review of recent large-scale studies examining problematic social networking site use and mental health needs[166] identified that most of the studies were cross-sectional with almost no longitudinal studies; whilst causality could not be inferred, an association between depression and anxiety and the problematic use of social networking sites was noted.

Protective factors

A large cross-sectional and longitudinal study in the Netherlands reported that quality communication between parents and children on internet use at baseline significantly reduced the risk of compulsive internet use at follow-up, suggesting this was a promising tool for parents to reduce the risk of compulsive use[167]. Youngsters who felt comfortable, understood and are taken seriously by their parents during conversations about their internet use, had a lower risk of developing compulsive internet use (CIU). This effect was greater than the effect of general parenting practices. On the other hand, the study also reported that strict rules about time of internet use may promote compulsive tendencies.

Recommendations for children and young people

1 Getting a balance

Technology can be great but it can also take over! Do you think that you are getting the right balance between spending time looking at technology and spending time with the people you care about and looking after yourself? Do you spend regular time having fun with your family or carers? Do you spend time face-to-face with your friends? Do you stay on top of the things you need to do for school or college? Do you get enough fresh air and exercise?

If the answer to these questions is no, you are probably not getting the balance right. Try thinking about how you spend your time across the week. Can you spend more time each week with the people you care about, getting your work done and being active?

2 Making use of technology time limits and setting your own boundaries.

Many devices e.g. smartphones, tablets and consoles, now have programs to record and limit the amount of time that they are used. Individual users can also set limits around the amount of time they spend on games or devices.

If you feel technology is interfering with your life and you're struggling to get a balance, try setting limits for yourself – plan what you'd like to do instead, then ask yourself did you enjoy yourself or feel pleased that you got something done? If so, plan your next goal.

3 Being aware that you might be using technology to avoid other things.

Sometimes people might use technology as a way of coping when they are feeling anxious or upset. Sometimes this can help, for example getting support and information online. Sometimes people might spend time on technology as a way of avoiding difficult things.

Do you find that you are using technology just for the sake of it even if you are feeling bored or not enjoying it? Do you feel overwhelmed when you stop using technology? Talk to someone about how you are feeling. You can find more information about mental health problems and how to access help at https://youngminds.org.uk/find-help/ and minded.org

4 Sleep

It can be really tempting to stay up late going online or watching videos. Do you think using technology affects your sleep? Are you tired during the daytime? Does this affect how you concentrate in school?

Try to stop looking at screens one hour before you go to bed. As it's so easy to pick up a phone or tablet at night we recommend that you keep your screens in a different room from where you sleep.

5 Sports and exercise

Most of our online time or digital activities involves sitting still for long periods of time. This can stop us from taking part in physical activity which is very important for our health and well-being. So, scheduling in some time each day for sports and exercise is a great way to break up our screen time with healthy physical activity.

6 Impact on your health

If your online world is making you feel self-conscious or sad – take a break or talk to someone.

7 Content

Sometimes you may come across something stressful online, this could be pictures, videos or audio or writing which is generally available or something directed at you personally.

It's not okay for people to bully you online. Talk to an adult you can trust if this happens, this could be a family member or carer, school staff member or another adult. Find out more about how to stay safe online and how to block people or report distressing content here: https://www.childline.org.uk/info-advice/bullying-abuse-safety/online-mobile-safety/staying-safe-online/

8 Sharing information online

Once you have posted or shared information online you are not in control of it. Would you want your parents or teachers to see it? If not, don't post it. People may not be who they say they are online; don't share personal information with people you don't know. Find out more about staying safe online at https://www.childline.org.uk/info-advice/bullying-abuse-safety/online-mobile-safety/staying-safe-online/

9 People you meet online

Remember that the people you meet online might not be open about their age or true identity.

Figure 1 – Advice for older children

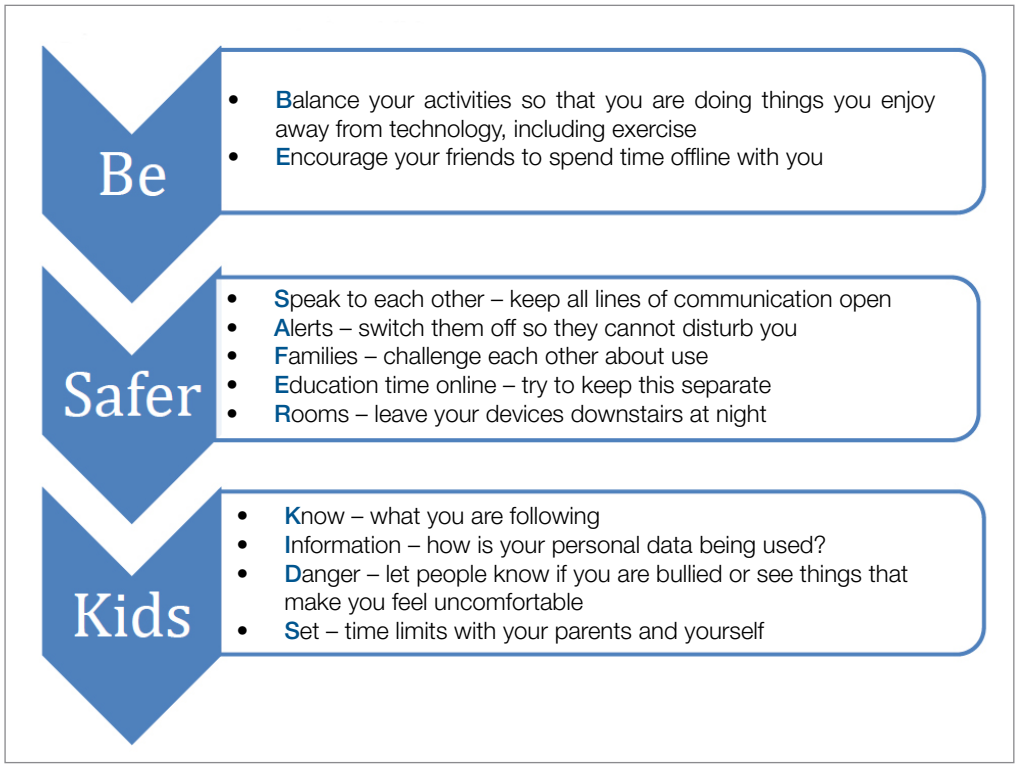


Figure 2 – Breaking your tech habits

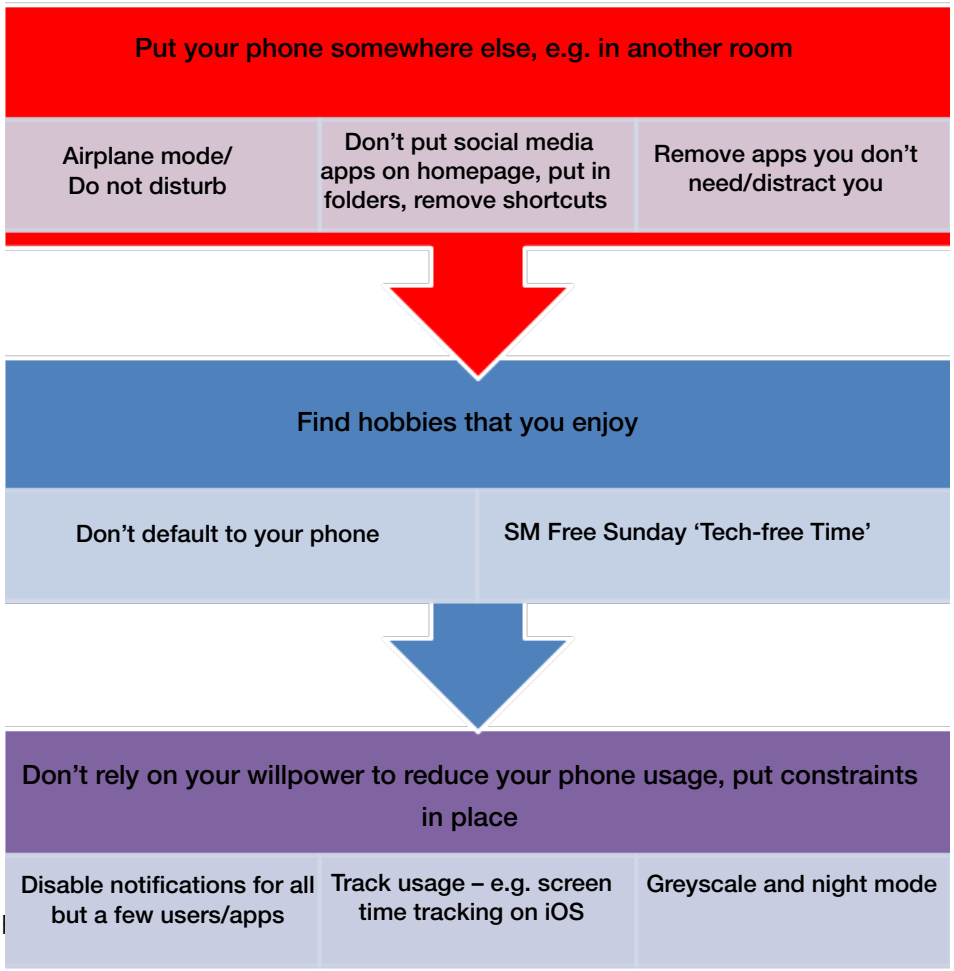
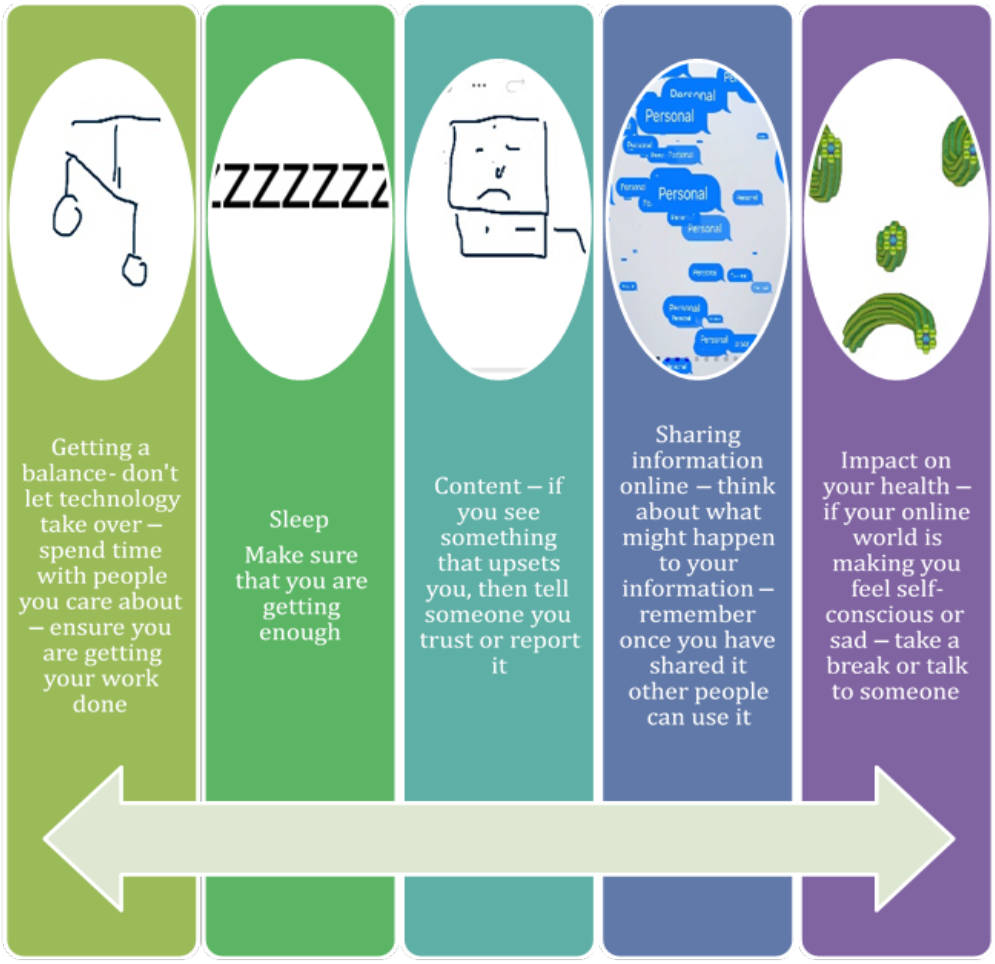


Figure 3 – Being online safe and sound

Figure 4 – Staying safe and happy online



Recommendations for parents

For a list of available National and International Guidance for parents please see Appendix 6 and 8.

Although technology can be a positive and unifying experience for families, many parents worry about the potential impact. Technology will continue to evolve but there are core principles of parenting that can be maintained and applied to the use of technology. Maintaining a dialogue with your child about the pros and cons of technology use is important, as well as thinking about the needs and vulnerabilities of your individual child and their stage of development. Encourage discussions within the family, from a young age, on content viewed online. Also, provide a positive perspective on healthy routines e.g. having beautiful skin from a good night's sleep rather than discussing the negative consequences of poor sleep.

Pick your battles, be flexible and choose the right moment to discuss technology with your children. Remember, the younger the child, the easier it is to develop good habits around technology use, for example, around the use of screens at bedtime.

You may feel that your children know more about technology than you do; remember you know a lot about parenting and this is just another space in which to parent. Resources such as MindEd provide helpful advice about parenting and technology. It is also important to think about the images that you post of your children and remember that they and others may see those images in years to come. Consider asking your child's permission before posting their image.

Lastly, be open about your concerns and seek advice if your child is excessively engaging with online activities and becoming more withdrawn.

- **S**hare – encourage children to be open about what they are using devices for.

- **P**rovide general guidance about the internet and ways of interacting safely online, for example, oversharing information, online identities and meeting people they don't know offline.

- **A**ctivities – develop a balance of technology time, face-to-face and other activities. Try to promote offline activities e.g. physical activities, talking and playing games together.

- **F**ocus on shared screen time activities e.g. watching technology together. Remember technology can also be a positive parenting strategy, for example by watching educational programmes together; you can talk about the programmes you have seen, possibly with the device switched off to help children to process what they have seen.

- **E**nsure that your mental health is maintained, this is a valuable part of parenting. Online relationships can be an important way for children to keep in touch with friends and family but face-to-face relationships are vital for the development of social and communication life skills.

- **R**esources – use recommended sites to learn about technology and safe use. Think about your child's online safety, for example, by reviewing privacy settings, sharing of their location, sharing of personal information and images and discussing how children can block unwanted messages.

- **P**ermission – remember that in time children may see the images that you post. Think how they would feel and consider asking their permission.

- **A**ge-appropriate apps, games and television shows should be used by your children. Think about the developmental needs of your child. Try to decide what is the right age for your children to own a smartphone or tablet. If your children are using your smartphone tablet ensure that you have set the controls for appropriate content access.

- **R**ooms – keep bedrooms device free of screens at night. Sleep is central to healthy functioning. Screens should be out of the bedroom and children should spend one hour off all technology doing relaxing activity before bed.

- **E**ncourage children to use silent alerts on their phone.

- **N**egotiate time limits with your children from as young an age as you can and stick to them.

- **T**imes of the day when meals are eaten should be free of technology. Support your children to enhance their social and emotional development by promoting the development of offline relationships with family and friends.

- **S**et a good example with your own technology use – don't use it when children are talking to you. Think about your technology use.

Screen time boundaries

Younger children

- If boundaries are set at an earlier age then it may be easier to support children to develop routines.

- Ensure that children are using age-appropriate apps, games and television.

Older children

- Dialogue around boundaries becomes increasingly important as a child becomes older. Maintaining a positive parent–child relationship is important to provide a space for children to be open and discuss any worries they may have related to technology use e.g. cyberbullying, unwanted messages, inappropriate images, worries about missing out. If your child is able to discuss their worries, this is also an opportunity to offer support and help your child with maintaining boundaries around screen use.

- Work with your children to set boundaries around the amount of screen time and the times when screens can be used. Encourage self-observation of screen time involvement through the use of self-monitoring apps.

- The BBC Own It app provides useful guidance on looking after your well-being online.

Safeguarding

- Support young people to manage the potential impact of hurtful comments and other experiences which may be stressful such as viewing distressing content, comparing themselves to others, worries about their self-image and the impact of the fear of missing out.

Figure 5 – Advice for parents

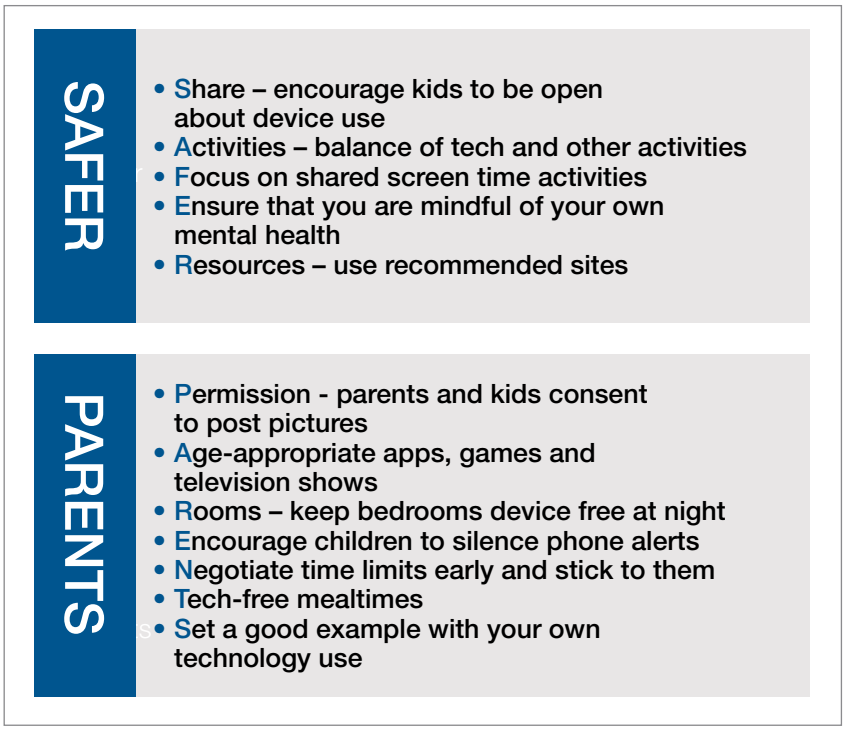


Table 4 – A quick guide for parents	
Under 1 year old	Avoid screen time
2–5 years old	Ensure that screen time is part of a varied and balanced day with activity and face-to-face time. Spend at least three hours a day in physical activity. Children should spend no more than one hour sitting watching or playing with screens.
5–11 years old	Develop a plan with your child for screen time and try to stick to it. Ensure that children have a balance of activities in the day with physical activity, face-to-face conversation and tech-free times. Encourage mealtimes to be tech free. Ensure that you have spoken to your children about how to keep safe online and check that they are keeping safe. Make it clear that you will support them if they feel unsafe or upset online. Try to ensure that there are no screens in the bedroom at night.
11–16 years old	Develop a plan with your teenager; if you have a plan, check that this still fits. Encourage a balance of activity, face-to-face social time, schoolwork and family time. Encourage mealtimes to be tech free. Keep having conversations about keeping safe online and offer space to talk about things that teens might see online which they find upsetting. Make it clear that you will support them if they feel unsafe or upset online. Try to ensure that there are no screens in the bedroom at night.

Recommendations for clinicians

For a list of available National and International Guidance for clinicians please see Appendix 6 and 8.

1 Guidance for psychiatrists regarding technology use

- Gaming disorder is now a proposed part of ICD-11; clinicians need to be aware of this concept of addiction.

- Questions around technology use should become a core part of biopsychosocial assessments and formulations: the online world can be just as important to young people as their offline world. It is helpful to ask children and young people about any areas that worry them in their digital lives, whilst keeping a check on use and its disruption of healthy or necessary activities.

- Psychiatrists should be mindful of the possible impact of technology use when children and young people report difficulties in areas such as sleeping, academic performance, mood, behaviour or eating.

- Psychiatrists should make use of the *Practice standards for young people with substance misuse problems*[168]. There is much practical information about young people who are experiencing addiction within this document.

- Mental health conditions such as depression and behaviour problems may make children more vulnerable to problematic technology use; clinicians should be aware of the impact of technology.

- All psychiatrists who are working with children and young people who are affected by media addiction should work within the standards from the College Centre for Quality Improvement, specifically the *Standards for Community-Based Mental Health Services.* The standards relating to information, consent and confidentiality, control and being part of decision making in treatment options applies to all young people regardless of their mental health and well-being needs.

- Clinicians must be aware of the additional needs of vulnerable parents, such as those suffering from depression, who may struggle to support their child around problematic technology use.

- Understanding the underpinning values (what is important about screen time to children, young people and families) may help clinicians understand why some young people get locked into excessive screen time which is detrimental to other important areas of life, such as face-to-face social interactions, sleep and other leisure activities. Values clarification does take time during psychological assessment but can act as a lever for change by unlocking family and individual motivation and resources that may have been consumed by excessive mal-adaptive screen time and its consequences. A functional behavioural analysis may be helpful as part of this values/function/behavioural assessment. For a further discussion of values in clinical practice, see minded.org.uk.

If problematic technology use is identified

- The assessing clinician will seek to understand the impact of all presenting difficulties including potential problematic use on family relationships, educational performance and social interactions. In this context, the clinician will start to understand the potential level of problematic technology use.

- It has not yet been fully elucidated whether conditions such as depression and anxiety are contributing factors to problematic internet use or gaming, or a result of the condition. It is recommended that where more than one condition is present, the clinician documents the duration of all conditions.

- Clinicians should be aware of the safeguarding implications of online content and contact.

2 Research recommendations

Research examining the interaction of screen time duration, content and associations is still lacking. To date, research remains fragmented and not systematically evaluated across the spectrum of use, from normal to addictive. Initial evidence of physical, mental health and cognitive harms necessitates further inter-disciplinary, nationally funded research across the developmental spectrum. Embedding the use of device-collected screen time and internet usage type data in ongoing (or commencing) large-scale cohort studies examining other variables including health outcomes is essential. This will allow for:

- Longitudinal research studies with children and young people at different developmental stages examining whether technology causes harmful outcomes, as well as potential benefits.

- Examining different types of screen use, as well as content, and explore a variety of health-related outcomes. Screen time use data cannot rely purely on self-report.

- Determining the effects of extensive online media usage on cognitive development.

In addition:

- There is a need for qualitative studies exploring children and young people's perspectives, including gender differences.

- Research is needed that focuses on potentially vulnerable groups such as those with mental health and neurodevelopmental disorders, looked-after children, LGBTQ young people and very young children.

- Websites which normalise or promote concepts such as self-harm, suicide and anorexia should be studied and their impact on young people understood. Additionally, when limitations are proactively placed on sites by technology companies, the impact of these limitations on the health and well-being of children and young people should be studied.

- Research needs to elucidate the possible concepts of technology addiction and examine the potential for addiction, including further development of screening tools and treatment programmes.

- Research into the incidence of problematic technology use across the UK.

- The development of further brain neuroimaging studies is needed that will examine the posited affected areas, not only for overuse but also to examine tolerance and withdrawal effects.

Therapeutic interventions

- Research to understand how young people with mental health needs are using the internet and what support could be put in place.

- Research is needed to understand the possible benefit of programmes that can help people manage their digital technology use, for example, apps which can block the use of other apps and the use of time restrictions.

- Personalised programmes for media addiction, for example, including specialised CBT and systemic family therapy, need to be developed and evaluated. Programmes need to take into account heterogeneity around potential causes (e.g. severe mental illness, low self-esteem, loneliness, ADHD, individual's predisposition to addiction) and engagement with specific internet content or transactions (e.g. social media, online gaming or gambling).

- Therapeutic trials should have integrated mediation analyses as a core aspect of trial design in order to determine which psychological and/or neurological changes predict and accompany successful treatment outcomes.

- Further research into the use of social media platforms for support, for example, in relation to suicide prevention.

3 Training and service development

- Services should deliver training in the concept of technology addiction. Online training resources e.g. MindEd should be further developed as knowledge increases in this area, as well as training events from the Royal College of Psychiatrists.

- Pathways to specialist services will also need to be developed. There are models for other specialist pathways such as eating disorders where locality services treat children and young people whose symptoms are less severe. This enables locality teams to maintain expertise and recognise conditions ensuring that children and young people can be treated as soon as possible. Where symptoms are more severe, children and young people will need specialist care. As treatment for technology addiction is still developing, this may involve travelling to specialist clinics, however as more awareness of the condition develops, the level of expertise will increase. Local protocols will need to be developed based on the diagnostic criteria available. What must be acknowledged is that children and young people

with technology addiction are more likely to experience additional mental health needs such as depression, anxiety, developmental conditions such as ADHD and eating disorders.

4 Schools, colleges and wider education

Systematic engagement of children in schools is essential with open discussion of the problems and potential solutions recommended by the children themselves and safeguarded by whole-school approaches and appropriate school policies. The Department for Education [169] Relationships Education, Relationships and Sex Education (RSE) and Health Education notes that online safety is a priority and provides a list of resources for online safety:

- Teachers have a key role to play in terms of education about online safety.
- Schools and colleges should have policies relating to device use and digital code of conduct. Good practice should be sought out and shared. A multi-stakeholder engagement of peers, parents and school staff should be encouraged to support, inform and update school policies.
- If teachers are concerned about the level of technology used by children and young people and the possible impact on health and well-being, they should seek guidance from resources such as the MindEd modules and discuss use with their mental health leads within schools, as well as sharing concerns with parents.
- In England, the Personal, Social and Health Education Association and in Scotland, the Health and Wellbeing Education syllabus provides resources for schools. The Personal, Social and Health Education Association provides a toolkit for online safety and this should be developed further [170]. There is also guidance from the Department for Education about Online Safety [171]. Further resource development should be prioritised.
- Opportunities for group working away from screens should be encouraged when possible.
- Discussion around the potential harms of technology, such as cyberbullying and safeguarding issues, should take place within Health and Wellbeing Education lessons. The syllabus addresses online safety and dealing with the online world.
- Children and young people should be empowered to use technology responsibly to aid their learning. It is important that young people develop greater self-control and digital literacy to enable them to be more digitally resilient.
- Further training resources for education staff need to be developed as well as teaching discrete components within the initial teacher training curriculum.

5 Government

Governmental pressure on gaming and social media providers is essential to allow access to behavioural data for research purposes in order to establish accuracy and specificity with real-time data beyond the use of self-report assessment. We welcome the recommendations from the White Paper, in particular the government appointment of an independent regulator for online safety which will encourage and monitor companies' commitment to sharing data and working with UK Research and Innovation to develop the evidence base with regard to minimising the risk of online harm. We also welcome the commitment from the government to work with a broad range of stakeholders including researchers to develop a new online media literacy strategy.

Specifically we recommend:

- Regulator to urgently review and establish a protocol for the sharing of sharing of data from social media companies with universities for research into benefits and harms on children and young people.

- Urgent review of ethical framework for using digital data - same standards need to apply as in other areas of research.

- Government funding for follow up of NHS digital prevalence study to examine impact of social media on vulnerable children and young people over time

- To instruct the regulator to establish a levy on tech companies proportionate to their worldwide turnover. This would be used to fund independent research and training packages for clinicians, teachers and others working with children and young people. As with the gambling industry and social responsibility measures, the gaming and social media industry should be required to increase social responsibility measures similarly, such as emulate the gambling industry's duty of care practices (e.g. personalized behavioural feedback, stop messages) in gaming/social media platforms.

- Enable the regulator to undertake a joint review with the UK Gambling Commission to review regulation regarding loot boxes in line with other countries which have recognized loot boxes as a form of gambling.

- Undertake a consultation in 2020 on a yellow card warning system similar to that used for medicines, in order for professionals and potentially parents/carers/young people to report harms of social media and gaming companies.

- Prioritise the strictest enforcement of Data Protection law and in particular UK DPA 2018 "Age appropriate design" to services targeting and / or popular with children, including that services should default to assuming users need child protection until explicit action is taken to opt out.

6 Technology companies

- Social media platforms should flag up engagement with risky content and operate and offer a free direct hotline for at-risk or vulnerable individuals.

- Social media companies should provide user configurable controls (not in the cloud) that can block incoming content of the young person's choosing (by default 'full safety measures on'), and provide feedback on content they are planning to send (e.g. BBC Own It app for an example).

- Social media companies should promote and contribute to mental health charities in home countries to support any vulnerable individuals

- Gaming companies and social media platforms should regularly fund research related to their products, to be conducted by independent external bodies and provide on a regular basis user data for research purposes to academic institutions.

- Funding of media literacy awareness campaigns.

Conclusion

Digital technology is here to stay and the opportunities for exploration, creativity and information sharing cannot be denied to our children and young people. Our role is to ensure that we support children and young people to maintain a balance of time in the offline and online world, maximise the benefits and minimise any harms. We support the recommendations from the UK government's White Paper in relation to technology companies.

As stated in a recent *Lancet* editorial: "Children and adolescents have the most to gain and are most at risk from digital technologies. They must be at the forefront of national and global digital policies, not only to protect them from online harm but also to allow technology to help them fulfil their full potential[173]".

To this end, we call for urgent funding for more high-quality research to both examine potential harms and also to establish how we can best harness the potential of digital technology to help young people. We welcome the UK government's White Paper and focus on our most vulnerable children and young people. The challenge now will be how to establish a duty of care and the role of an independent regulator; this commitment is an important first step towards enhancing the online lives of our next generation and a vital ongoing conversation for our society. We need to ensure that we collaboratively establish the research and healthcare framework to enable cost-efficient and targeted prevention approaches to be implemented, supported by relevant governmental policy and regulatory approaches that do not diminish the enjoyment of technology use and that pay respect to the individual and sociocultural context in which screen use takes place[174].

On a final note, it is worth noting the concerns of a prominent neuroscientist, Baroness Greenfield[175]: "As a neuroscientist I am very aware that the brain adapts to its environment – if you're placed in an environment that encourages say, a short attention span, which doesn't encourage empathy or interpersonal communication, which is partially addictive or compulsive… all these things will inevitably shape who you are".

Stakeholders

Kadra Abdinasir, Strategic Lead,
The Children and Young People's Mental Health Coalition (CYPMHC)

CYPMHC welcomes the College's position statement and recommendations. Digital technology has become an integral part of children and young people's lives. While most young users have positive experiences online, there are some who are adversely affected due to pre-existing vulnerabilities or because they encounter a range of online harms. A pragmatic and precautionary approach is vital in keeping children and young people safe and preventing excessive use.

Young people should also have fair and equitable digital access to enable them to thrive in modern society. Therefore, we must support their autonomy and choice to make the right decisions.

We are building on shifting sands but this shouldn't detract us from implementing existing or simple solutions to help children and young people today. Collaboration across different sectors is needed to ensure we have a deeper understanding of the impact of digital technology on mental health and respond at pace.

Matthew Blow, Policy and Government Affairs Manager,
YoungMinds

YoungMinds welcomes the College's review and position statement on technology use and the health of children and young people. Young people's use of technology is changing at a rapid rate and, for many, their online activity is an integral part of their everyday life.

Young people, including those who are experiencing mental ill health, consistently tell us that digital technology offers a wide range of social or emotional benefits. However, research has shown that certain online behaviours can lead to additional risks of harm and can exacerbate mental health problems and we know that young people who have experienced adversity have a higher propensity of online risk-taking.

It is important that we take an integrated cross-sector approach to supporting young people to build digital resilience, so that they can navigate online spaces in a safe and positive way. It is sensible that clinicians consider the role of technology use as part of a holistic psychosocial assessment of young people's needs. However, as the position statement suggests, there is an urgent need for longitudinal research into the impact of technology use on young people's mental health, to make sure that policy and practice are founded on robust evidence.

Professor Yvonne Kelly, Director ESRC International Centre for Lifecourse Studies in Society and Health (ICLS),
Research Department of Epidemiology and Public Health, University College London

This report highlights the complex ways in which young people interact with digital technologies and the importance of researchers and practitioners in taking a nuanced approach to assessing benefits and risks. Digital technology use is undoubtedly beneficial in many ways, but it is well known that young people are experiencing multiple pressures that have the potential to have an impact on their mental health, and the idea that certain forms of technology such as social networking sites could carry potential harms has gained momentum over the last few years. This report summarises the most recent findings – that 'content and context of use are key to understanding effects' and highlights the need for future research to tackle unanswered questions on cause and effect. It also provides useful practical guidance for young people themselves, their parents, and schools and health professionals.

Neera Sharma, Head of Policy,
Barnardo's

Barnardo's welcomes this position paper. It is an invaluable contribution to the current debate about the positive and negative uses of social media. New technologies and the internet have transformed the way children live their lives. Much of this is positive but there is also an emerging evidence base that social media may have a negative impact on children and young people's mental health. We support the call for more solid research which focuses on the experience of vulnerable children and young people and the impact social media can have on their mental health. Many of the themes explored echo the insights from our practitioners for our recent insight report, Left to their own devices, which highlights concerns around cyberbullying and young children's use of technology.

Glossary

App – application: a computer program or piece of software designed for a particular purpose that you can download onto a mobile phone or other mobile device *Cambridge Dictionary*

Block (verb) – to stop emails, text messages, phone calls, etc. from a particular person *Cambridge Dictionary*

Computer – an electronic machine that is used for storing, organising, and finding words, numbers, and pictures, for doing calculations, and for controlling other machines *Cambridge Dictionary*

Console – a surface on which you find the controls for a piece of electrical equipment or a machine: a gaming console *Cambridge Dictionary*

Dumb phone – a very basic phone that cannot connect to the internet *Cambridge Dictionary*

Gaming – the activity of playing video games *Cambridge Dictionary*

Internet – the large system of connected computers around the world that allows people to share information and communicate with each other *Cambridge Dictionary*

Like – to show that you think something is good on a social networking website by clicking on a symbol or the word 'like' *Cambridge Dictionary*

Livestream – to broadcast video and sound of an event over the internet as it happens, or to be broadcast in this way *Cambridge Dictionary*

Meme – an idea, image, video, etc. that is spread very quickly on the internet *Cambridge Dictionary*

Online abuse – any type of abuse that happens on the web, whether through social networks, playing online games or using mobile phones *NSPCC* [176]

Personal digital assistant – a small computer that you can carry with you *Cambridge Dictionary*

Sexting – when someone shares sexual, naked or semi-naked images or videos of themselves or others, or sends sexually-explicit messages. They can be sent using mobiles, tablets, smartphones, laptops – any device that allows the sharing of media and messages *NSPCC* [177]

Smartphone – a mobile phone that can be used as a small computer and that connects to the internet *Cambridge Dictionary*

Social media – websites and computer programs that allow people to communicate and share information on the internet using a computer or mobile phone *Cambridge Dictionary*

Streak – Something on Snapchat that forces other people to snap you and makes you look like you have lots of friends but in reality most pictures are of a wall or the ground *Urban Dictionary*

Streaming – the activity of listening to or watching sound or video directly from the internet *Cambridge Dictionary*

Tablet or tablet computer – a small, flat computer that is controlled by touching the screen or by using a special pen *Cambridge Dictionary*

Troll – someone who leaves an intentionally annoying message on the internet in order to get attention or cause trouble or a message that someone leaves on the internet that is intended to annoy people *Cambridge Dictionary*

Website – a set of pages of information on the internet about a particular subject, published by a single person or organisation *Cambridge Dictionary*

Wifi – a system for connecting electronic equipment such as computers and electronic organisers to the internet without using wires *Cambridge Dictionary*

Appendices

Appendix 1 – Additional evidence relating to the positive impact of technology use

Physical health

- A cross-sectional study identified that social media can help young people share information about healthy eating and about smoking[178].

Mental health

- Amongst young people who contact Childline, 78% now do so online [179].
- YouTube has been reported to have an overall positive impact on the mental health of adults with serious mental illness when they shared their stories [180].
- A one-year longitudinal study identified internet use may help to reduce anxiety in adolescents with higher levels of pre-existing anxiety [181]. Young people who visited their favourite sites experienced a reduction in anxiety.
- A meta-analysis of internet-based online CBT for anxiety and depression suggests that this may be an effective medium for young people who struggle with face-to-face treatment [182]. Thirteen randomised trials were identified involving 796 children and adolescents that met inclusion criteria. "The overall mean effect size (Hedges' g) of CCBT on symptoms of anxiety or depression at post-test was g=0.72 (95% CI:0.55–0.90, numbers needed to be treated (NNT)=2.56). Heterogeneity was low (I^2=20.14%, 95% CI: 0–58%). The superiority of CCBT over controls was evident for interventions targeting anxiety (g=0.68; 95% CI: 0.45–0.92; p < .001; NNT=2.70) and for interventions targeting depression (g=0.76; 95% CI: 0.41–0.12; p < .001; NNT=2.44) as well as for transdiagnostic interventions (g=0.94; 95% CI: 0.23–2.66; p < .001; NNT=2.60)."
- An online survey of 206 children and young people recruited through established bullying support websites has identified that 90% of young people would like to disclose bullying through a screening questionnaire which they would like to have shared with their GP[183].

Social interaction

- A qualitative research approach was employed that had been defined by an ethnographic methodology to study the changing new media ecology. 659 semi-structured interviews were conducted and complemented with 28 diary studies, 67 participants took part in focus groups and informal interviews were conducted with 78 young people. The researchers noted that, while online, young people can develop their social interactions and collaborate with other students while doing their homework[184].
- A research project in Australia worked to connect nine children in hospital with their school using a purpose-designed Presence App on a tablet computer. The Presence App was helpful in creating and maintaining a social presence for the child in the classroom. Additionally, the app offered an advantage over technology such as videoconferencing and email by creating an ongoing classroom presence for the absent child[185].

Appendix 2 – Evidence relating to technology use and substance use

There is growing evidence that exposure through social media to alcohol or cigarette use is connected to earlier commencement of those activities[186,187,188,189]. Adolescents who are perceived as being of high status who portray the use of alcohol online can influence other adolescents who visit their sites[190]. A large European study of 9 to 16-year-olds suggested that 7% had been exposed to content involving drug taking[191]. A study of young people working with addiction treatment centres in the US[192] identified that 2% of the sample bought drugs online, mostly painkillers. A study[193] of the phenomenon of 'cryptomarkets' which are anonymous online market places for illegal goods posits that such markets will increase the range and quantity of illegal drugs sold.

Appendix 3 – Concepts of addiction

The word addiction[194] is derived from the Latin *addictus* which means 'excessively devoted to something with loss of ability to choose freely or slave'. The core elements of addiction[149] are "salience, mood modification, tolerance, withdrawal, conflict, and relapse". The understanding of addiction now includes both substance addiction and behavioural or process addiction[195] e.g. internet use, gambling, exercise and shopping. It is of note that people will use the internet to access a wide range of sites e.g. shopping, social media, online games, news, email or videos.

Neither the World Health Organization nor the American Academy have proposed definitions of internet addiction and there is currently much debate about how internet addiction could be defined[196]. It is also noted that there are lots of different terms used e.g. internet addiction, excessive internet use and pathological internet use. However, definitions have been posited in the literature e.g. excessive internet use[197] as "characterized by excessive or poorly controlled preoccupations, urges, or behaviours regarding computer use and internet access that lead to impairment or distress". Pathological internet use[198] has been characterised by excessive use of or poorly controlled preoccupations with the internet or urges or behaviours regarding internet use that lead to distress or impairment. The use of the internet causes a specified number of symptoms, including failure to fulfil major role obligations, mood-altering use of the internet, guilt and craving.

Thus it can be seen that there are common themes[194] amongst the proposed definitions include preoccupation, increasing amounts of time being devoted, mood change, unsuccessful efforts to desist from use, negative consequences from the use and conflict with others who try to intervene. It is also noted [117] that adults may be more vulnerable to excessive internet use if they have pre-existing depression or anxiety. It has been proposed[199] that internet addictions among adults could be divided into five categories: information overload, computer addiction, net compulsions, cyber relationship addiction and cybersexual addiction. There are calls for a clear definition of internet addiction[200]. It is of note that much of the literature relates to older adolescents and young adults. The concept of technology addiction is being explored[201] and the adult literature suggests that some people may be vulnerable to the phenomenon of technology addiction.

Social media use can be described as the use of social networking sites (SNSs). These are virtual communities where users can create and personalise a profile through which they can interact with real-life friends. Neither the World Health Organization nor the American Academy have proposed definitions of social media addiction. However proposed addiction to social media has been argued to have six criteria[148]: mood modification in which the engagement in SNSs leads to a positive change in emotional states; salience relating to the behavioural, cognitive and emotional preoccupation with the SNS usage; tolerance relating to increasing use of SNSs over time; withdrawal symptoms with the user experiencing unpleasant physical and emotional symptoms when SNS use is restricted or stopped; conflict relating to interpersonal and intrapsychic problems ensuing because of SNS usage; and relapse in which the addicted individual quickly reverts back in their excessive SNS usage after a period of abstinence.

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders [202] (DSM-5) placed internet gaming disorder (IGD) into the section of conditions warranting further study. DSM-5 has defined IGD as "repetitive use of internet-based games, often with other players, that leads to significant issues with functioning." To qualify, five of the following criteria must be met within one year:

1. Preoccupation or obsession with internet games.
2. Withdrawal symptoms when not playing internet games.
3. A build-up of tolerance – more time needs to be spent playing the games.
4. The person has tried to stop or curb playing internet games but has failed to do so.
5. The person has had a loss of interest in other life activities, such as hobbies.
6. A person has had continued overuse of internet games even with the knowledge of how much they impact on a person's life.
7. The person lied to others about his or her internet game usage.
8. The person uses internet games to relieve anxiety or guilt – it's a way to escape.
9. The person has lost or put at risk an opportunity or relationship because of internet games.

DSM-5 suggests severity modifiers of mild, moderate or severe disorders depending on the person's overall level of functioning and the amount of time spent gaming.

The International Classification of Diseases-11 (2018) has proposed a category of gaming disorder. "Gaming disorder is characterized by a pattern of persistent or recurrent gaming behaviour ('digital gaming' or 'video-gaming')," which may be online (i.e. over the internet) or offline, manifested by:

1. impaired control over gaming (e.g. onset, frequency, intensity, duration, termination, context)
2. increasing priority given to gaming to the extent that gaming takes precedence over other life interests and daily activities and
3. continuation or escalation of gaming despite the occurrence of negative consequences."

The behaviour pattern is of sufficient severity to result in significant impairment in personal, family, social, educational, occupational or other important areas of functioning. The pattern of gaming behaviour may be continuous or episodic and recurrent. The gaming behaviour and other features are normally evident over a period of at least 12 months in order for a diagnosis to be assigned, although the required duration may be shortened if all diagnostic requirements are met and symptoms are severe."

There is a distinction of predominantly online and predominantly offline. It has been noted [203] that the "main difference between excessive and pathological gaming is that excessive gaming reflects behavior that is disproportionate but not necessarily problematic".

It is of note that both the DSM-5 and the ICD-11 criteria for gaming disorder do not acknowledge the different developmental levels and abilities of children and young people. Additionally, much of the evidence relating to internet addiction is derived from adult studies.

Appendix 4 – Additional prevalence data

A National Australian study[204] which looked at problematic internet use and gaming disorder identified that 3.9% of young people had problematic internet or gaming use. The researchers modified a scale based on the EU Kids Online Survey[205] to develop 11 questions to assess internet and gaming use.

A meta-analysis of three decades of the prevalence of gaming disorder in adolescents[206] demonstrated that the pooled prevalence of gaming disorder was revealed to be 4.6% (95% CI = 3.4%–6.0%) with high heterogeneity noted between the studies (I2 = 98%). It is of note that the prevalence for males was higher in all studies.

Appendix 5 – UK recommendations from other organisations for parents

- The Chief Medical Officers[2] have issued guidance on screen and social media use:
  - leave phones outside the bedroom at bedtime, sleep is important,
  - parents should ensure that children are happy for their photos to be shared and should discuss the fact that online photos can be manipulated
  - parents and children are encouraged to follow school policy on screen time
  - everyone should take a break after a couple of hours using a screen and move around
  - screens should be put away when doing activities such as crossing the road
  - parents should talk to children about their screen use and make it clear that they can bring any worries to their parents or another responsible adult
  - screen-free mealtimes are encouraged
  - parents are encouraged to ensure that they work with children to use features which keep track of screen time.
- MindEd[207] has an online module for parents which provides guidance on the use of the internet, guidance on what children can safely access online and what the risks are.
- The RCPCH[3] has advised that children should not use screens for an hour before bedtime. They have also advised that parents ask themselves four questions: is screen time controlled; does screen time interfere with what the family wants to do; does it interfere with sleep; and is snacking while using screens controlled?
- The Children's Commissioner[208] has introduced the concept of a 'digital 5 a day' for children. Children are advised to use the internet to 'connect', to regularly 'be active', to 'get creative' online rather than simply watching things, to 'give to others' e.g. through local charities and for parents and children to both 'be mindful' of the amount of time spent online and to consider keeping a diary of the length of time spent.
- The 5Rights Foundation[209] has a range of information sheets about keeping children and young people safe online.
- The NSPCC Net Aware website is a good resource.[210]
- Families can consider setting up a Family Media Plan[211] when the child first gets a smartphone.

Internet matters is a not for profit organisation designed to provide information and skills to keep children and parents safe in the online world.[232]

Appendix 6 – Additional UK recommendations for clinicians

- When working with people with eating disorders, the National Institute of Health and Care Excellence recommends assessing the potential impact of social media and the internet on people with eating disorders[212].

Appendix 7 – International guidance for parents

- The American Academy of Paediatrics' current advice has relied not only on time limits but this has been complemented with recommendations for a mix of more active mediation approaches, suggesting a gradual transition from restrictive mediation to a more informed ecological approach and encouragement of healthy co-management of screen time (evaluation of risks and benefits, provision of healthy alternatives). The guidance recommends[216] that children younger than 18 months should avoid use of screen media other than video-chatting. If parents of children between 18 to 24 months of age want to introduce digital media, they should choose high-quality programming and should watch with their children to support them and help them to understand what they're seeing. Parents of children between two to five years should limit screen use to one hour per day of high-quality programmes and parents should watch media with children to help them understand what they are seeing and discuss how they can apply it to the world around them. Children aged six and older should have consistent limits placed on the time spent using media, the types of media used and it should be ensured that media does not take the place of adequate sleep, physical activity and wider positive behaviours. There is also a view that there should be media-free family times e.g. meals or driving, with the addition of media-free home locations, e.g. bedrooms. Finally, parents are encouraged to have ongoing communication about online citizenship and safety.

- The American Academy of Paediatrics[217] recommends that parents and doctors work together to develop a family use plan to take into account both the child's developmental level and their social media use.

- The Canadian Paediatric Society[218] notes that, based on data from television viewing, it is easier to establish healthy relationships with screen times in early childhood, that very young children should have minimal screen time and that adults should watch screens with children to enable them to make sense of what they are seeing.

- The Government of South Australia[219] has advised that parents should let their children know what the screen time limits are and should encourage children and young people to keep their own records. They advise involving children in the preparation of food and having technology-free mealtimes. They advise encouraging children to plan what they will watch on television and switch off the television once programmes are finished. They advise keeping bedrooms free of television and that parents should be aware of their own television use.

- EU Kids Online[222] notes that there are an increasing number of parental controls designed to keep children safe online. Parents can restrict the time spent online, restrict content, restrict activities such as purchases, use of chatrooms and multiplayer games and monitor where a child has been online. They note that this can impact on the parent–child relationship and that parents do not always understand the full scope of risks. Consequently they advocate for increased parental knowledge of technology and greater research into these controls.

Appendix 8 – International guidance for professionals

- The Royal Australian & New Zealand College of Psychiatrists notes the many benefits of technology use[223] but also identifies that problematic use of media which leads to withdrawal and significant social isolation can impact on the development of a child.

- The Royal Australasian College of Physicians recommends that clinicians should include guidance about technology use to parents and also recommends that clinical waiting rooms should have books rather than televisions[224].

- The PIPATIC model[225] of treatment for gaming disorder uses a model of Cognitive Behavioural Therapy, starting with psychoeducation and addressing the core components of addiction, specifically techniques of motivational interviewing techniques, stimulus control, learning appropriate coping responses, self-monitoring, strategies of cognitive restructuring, using problem solving in relation to addiction and withdrawal regulation techniques with exposure. This very recent study has now been used to treat 17 young people.

Appendix 9 – National policy

- A new collaborative forum, the UK Council for Child Internet Safety, is being set up. This collaboration will bring together the "government, the tech community and the third sector" to "ensure the UK is the safest place in the world to be online". We welcome this initiative and look forward to the recommendations and actions, particularly with regard to how the tech community can also consider ways of mitigating potential addictive effects.

- The Age Appropriate Design Code of Practice[226] notes the child's right to privacy online and the need for children to be able to maintain anonymity online. The code will work with GDPR (General Data Protection Regulation) to inform the regulation of companies that store and use children's data and guide any legal cases which might ensue. The aspects of design to be taken into account include strategies used to encourage extended user engagement (e.g. notifications by default) or transparency of paid-for content among many others[30].

- The government Green Paper[213] notes that we need to be ensuring that lives should be lived with the best health possible at all ages. The paper notes that the UK has one of the highest childhood obesity rates and identifies the need to ensure that mental health is maintained. In this context, insufficient sleep, cyberbullying[214] and the overuse of social media are cited as concerns. The Green Paper notes the need to encourage literacy and to increase activity levels.

- The government's Internet Safety Strategy Green Paper[24] identifies that the government will consult on the role "online safety education will play in the new, compulsory subjects required by the Children and Social Work Act".

Appendix 10 – International policy

- France has introduced a ban on French students using smartphones and tablets while in school[228], this will include breaks and lunchtime. They have also proposed a ban on children under 16 opening a Facebook account without parental consent.

- In Ireland UCD academic Dr Mary Aiken has proposed that children under 14 should not have a smartphone[229] and Kerry Primary School has banned the use of smartphones at school and home[230]. The Irish Department of Education has sent out a circular to other schools asking them to discuss similar measures.

- South Korea has become the world's first jurisdiction to require children and young people to have content-filtering applications installed on their mobile phones[231].

Appendix 11 – Useful websites

- 5Rights – https://5rightsfoundation.com/ [accessed 24.01.19]
- American Academy of Child and Adolescent Psychiatry – https://www.aacap.org/ [accessed 21.01.19]
- American Academy of Paediatrics – https://www.aap.org/en-us/Pages/Default.aspx [accessed 21.01.19]
- BBC Own It App https://www.bbc.com/ownit/take-control/own-it-app aspx [accessed 21.01.19]
- Canadian Paediatric Society – https://www.cps.ca/ [accessed 21.01.19]
- Centre for Mental Health – https://www.centreformentalhealth.org.uk/ [accessed 21.01.19]
- Children's Commissioner – https://www.childrenscommissioner.gov.uk [accessed 02.02.19]
- Commons Select Committee Social media companies must be subject to legal 'duty of care' https://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/news-parliament-2017/impact-of-social-media-young-people-report-published-17-19/
- Department for Digital, Culture, Media & Sport, Home Office, Online Harms White Paper, 8 April 2019. [Online]. Available: https://www.gov.uk/government/consultations/online-harms-white-paper. [Accessed 27.04.19].
- eNurture a UKRI mental health research network focusing on young people's mental health in the digital age – https://www.enurture.org.uk/ [accessed 24.01.19]
- London School of Economics Enhancing knowledge of European children's online opportunities, risks and safety. http://www.lse.ac.uk/media-and-communications/research/research-projects/eu-kids-online
- MindEd - https://www.minded.org.uk/ [accessed 21.01.19]
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