MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

Briefing Note: Screen Time – The effects on children's emotional, social, and cognitive development

To:	Hon Jan Tinetti, Associate Minister of Education		
Cc:	Hon Chris Hipkins, Minister of Education Hon Kelvin Davis, Associate Minister of Education Hon Aupito William Sio, Associate Minister of Education		
Date:	24/09/2021	**Priority:**	Low
Security Level:	In Confidence	**METIS No:**	1271123
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Messaging seen by Communications team:	No	**Round Robin:**	No

Purpose of Report

The purpose of this paper is for you to:

a. **Note** the role and current areas of advice that Professor Stuart McNaughton provides as the Chief Education Scientific Advisor at the Ministry of Education.

b. **Note** that Professor McNaughton provides independent advice within the Ministry of Education, and cross agency advice along with other Chief Science Advisors.

c. **Agree** to proactively release this Briefing Note. **Agree / Disagree**

Summary

- This Briefing Note continues a practice established with previous Ministers within the Education portfolio on informing them about current areas of advice provided by Professor Stuart McNaughton as the Chief Education Scientific Advisor (CSA) at the Ministry of Education.
- This practice enables direct access by the Minister to areas of advice from the CSA and also informs the CSA on areas of advice needed by the Ministers.

Alexander Brunt
Deputy Secretary
Evidence, Data & Knowledge Group

24/ 09/ 2021

Hon Jan Tinetti
Associate Minister of Education

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Background

1. Professor Stuart McNaughton is seconded (0.6 FTE) to the CSA position from his professorial position at the University of Auckland. Professor McNaughton reports to the Deputy Secretary of the Evidence, Data and Knowledge Group, Alex Brunt.

2. Professor McNaughton provides independent advice to the Ministry on evidence for policy, on a case-by-case basis.

3. Professor Juliet Gerrard (the Prime Minister's Chief Science Advisor) and the CSAs across agencies constitute a forum providing joint advice; including advice on mental health, and risks and benefits of digital developments. We also publish evidence and informed reviews.

Chief Education Scientific Advisor (CSA) advice on the effects of screen time on children's emotional, social and cognitive development

4. The attached research evidence brief ('the brief', Appendix 1) that provides an update of previous evidence and advice provided to the Ministry of Education by the Chief Education Scientific Advisor.[1] It focuses on the effects of screen time from home use, mostly in 'non educational' time spent, such as with social media, gaming and more broadly entertainment. This research adds to a growing body of New Zealand and international research about the impacts of screen time on children.[2] This area of research also has implications for how screen time may affect student wellbeing as screen use grows. Four major themes emerge in the research brief and these are summarised below.

Four themes arising from the research

5. Children in Aotearoa New Zealand have high levels of screen time in international comparisons. But the evidence does not provide a clear relationship between sheer amount of time and negative outcomes. For adolescents, for example, the effects of hours on social media on well-being are described by a 'U' shaped function. Too little screen time is a problem (relating to limited social engagement with peers and access to supportive communities) and too much is a problem (relating to obsessive or addictive behaviour), and importantly, there are positive effects between these. A cut off is difficult to set and a summary figure in the brief suggests increasingly negative effects after about 3 - 4 hours per day. The general conclusion is that apart from the extremes, it is the content and activities in which children engage that matter.

6. The mediation or interactive role of parents and whānau is important at all ages. For example, a consistent finding is high levels of screen time for children under two years, either directly or indirectly (e.g., with TV or devices on in the background) is problematic for language development because of reduced parent-child talk. The brief contains strong advice for parental and whānau co viewing, 'mediation' and monitoring both for positive effects on cognitive development and social and emotional

[1] *Briefing Note: Professor Stuart McNaughton - Chief Education Scientific Advisor*, 3 May 2021, METIS 1258181 refers.

[2] One impetus for the current update is the recent release of *Screen Time: The Effects on Children's Emotional, Social, and Cognitive Development*, by Chloe Wilkinson, Dr Felicia Low and Sir Peter Gluckman from the Centre for Informed Studies, University of Auckland (4 September 2021, copy attached).

development, but also to reduce or control interference effects on e.g., sleep, positive interactions within whānau, and physical exercise.[3]

7. While the evidence is still limited in many areas and the relationships are complex (for example, there are likely bidirectional relationships in which children predisposed to be more obsessive or anxious may engage in more screen time) there are some relationships that are relatively well established. For example, there are clear relationships between cyberbullying and a range of mental health outcomes; or between some 'recreational' activities designed to be educational (games, interactive books) and positive effects on cognitive and social and emotional skills.

8. More research is needed to unpack relationships and to be more specific about how parent and whānau that can be supportive of development given the screen time. The current advice from the Ministry of Health is not nuanced enough. The brief is very clear that given the use of digital technology is a norm, blanket limitations are problematic. Parents, whānau and young people need advice on how to engage with various types of screen time so that children learn to engage with electronic media in age-appropriate ways that minimise the potential for harm and optimise positive outcomes. High level advice is provided in the brief. The Ministry's advice to parents about distance learning support during an emergency event is available at Distance learning support during an emergency event | Learning from home.

Next Steps

9. This Briefing Note will provide the contents for any discussion on the effects of screen time on children if required at future agency meetings.

Proactive Release

10. We recommend that this Briefing is proactively released as per your expectation that information be released as soon as possible. Any information which may need to be withheld will be done so in line with the provisions of the Official Information Act 1982.

[3] Research with local schools and whānau published recently and not reviewed in the research brief establishes a positive relationship between high levels of parent monitoring and self-regulation by 9- to 12-year-olds. McNaughton, S., Zhu, T., Rosedale, N., Jesson, R., Oldehaver, J. and Williamson, R. (2021), In school and out of school digital use and the development of children's self-regulation and social skills. *British Journal of Educational Psychology* e12447. https://doi.org/10.1111/bjep.12447

Appendix 1

Screen time at school and outside of school:
effects on children and adolescent's development and learning

General conclusions:

1. Apart from the extremes of too little and too much (which we do have evidence for), there is not enough evidence to be definitive about amounts of time and relationships with different aspects of development and learning – we need to: "better understand how, for whom, and under what conditions … interactions with mobile technologies influence their still developing social relationships, brains, and bodies."[4]

2. Apart from extreme amounts (both too little or too much) it is not the amount of screen time that is important, it is the "context (where, when, and how digital media are accessed), content (what is being watched or used), and connections (whether and how relationships are facilitated or impeded)".[5]

3. To understand effects, and to provide advice to teachers, parents, and whanau types of uses and tools need to distinguish. For example, school-related use of chrome books or laptops or tablets, either online or offline; social media use on smart phones; serious games (those with educational aims) or games for entertainment on smart phones, tablets, laptops, or computers.

4. It is also useful to think about the issues in terms of cumulative inside and outside of school usage. The question is about screen time in terms of content, content and connections accumulated within and outside of school.

Specific points:

1. Screen time in general.
    a. Because of the relationships between content, connections and individuals, The *American Academy of Paediatrics* recently lifted its long-standing advice to limit amount of total non-school related screen time to <1-2 hours daily. But it still suggests discouraging screen media exposure for children <2 years of age.[6] For children younger than 18 months, the advice is to avoid use of screen media other than on line chatting, for children 18 to 24 months of age high-quality programming, which parents and whanau watch together to help them understand what they're seeing; and For children ages 2 to 5 years, limited screen use (e.g. 1 hour per day of high-quality programs) with co-viewing media with children to help them understand what they are seeing and apply it to the world around them.

[4] George, M. J. & Odgers, C. L. (2015). Seven Fears and the Science of How Mobile Technologies May Be Influencing Adolescents in the Digital Age. *Perspectives on Psychological Science* 2015, Vol. 10(6) 832–851

[5] Blum-Ross, A., and S. Livingstone (2016) Families and screen time: Current advice and emerging research. *Media Policy Brief 17*. London: Media Policy Project, London School of Economics and Political Science.

[6] American Academy of Paediatrics (2016). Media Use in School-Aged Children and Adolescents *Paediatrics*; originally published online October 21, 2016;

b. There are extremes of screen time that are clearly problematic when it involves internet uses. The OECD has a cut point at 6 hours or more per weekday of internet use outside of school, which is associated with a range of negative features of developmental (increased dissatisfaction, loneliness) and learning (e.g., lower achievement).[7] 28% of New Zealand students reported this level of use (the OECD average is 26%). On average, New Zealand students spend a little more time per day on the internet outside of school than the OECD average (2 hours and 43 minutes, versus 2 hours and 26 minutes).

c. Reanalysis of the PISA data for New Zealand 15-year-olds show that not having access to the internet on weekdays after school is associated with lower wellbeing. This positive relationship with wellbeing declines after about 2 hours.[8]

d. There is evidence that the relationships between usage and outcomes are not linear for adolescents. Relationships with mental and physical health problems have been found at the extremes of both low / no usage or heavy Internet uses (>2 hours/day).[9]

e. There are known relationships between some forms of usage and problems in development. For example, cyber bullying and increased internalising problems such as anxiety and depression, and externalising problems such as aggression and antisocial behaviour, each of which are linked to negative educational outcomes.[10] Other examples include language delay and irritability with younger children from screen time.

f. There are also positive relationships between usage and valued developmental outcomes, including in cognitive development, social skills, and well-being. [11]

2. Screen time at school

a. As with screen time in general, apart from extremes, it's not the amount of time spent with digital technologies it's the usage, content, and relationships with valued learning objectives.

b. It is useful to think about the benefits and risks of 'screen time' in terms of opportunity costs. There is evidence that a blend of digital engagement with extended face to face interactions with teachers is associated with effective

[7] PISA 2015 Student Well-being Report
[8] Grimes, A, & White, D. (2019). Digital Inclusion and wellbeing in New Zealand. Motu Working Paper 19-17 Motu Economic and Public Policy Research A report to Department of Internal Affairs. October 2019
[9] Richard E. Bélanger,R. E., Akre, C., Berchtold, A. & Pierre-André Michaud, P-A. (2011). A U-Shaped Association Between Intensity of Internet Use and Adolescent Health www.pediatrics.org/cgi/doi/10.1542/peds.2010-1235 doi:10.1542/peds.2010-1235.
[10] Gardella, J. H., Fisher, B. W. & Teurbe-Tolon, A. R. (2017). A Systematic Review and Meta-Analysis of Cyber-Victimization and Educational Outcomes for Adolescents. *Review of Educational Research* Vol. 87, No. 2, pp. 283–308 DOI: 10.3102/0034654316689136
[11] George, & Odgers, (2015). Op. cit. American Academy of Paediatrics (2016). Op.cit.

learning.[12] This suggests that at the extreme of spending all day in class on digital technology would compromise the interactions and mediation provided by teachers.

c. We know that access to and use of digital technologies in classrooms alone are not sufficient to impact consistently on learning and achievement. The teacher adds value through designing and managing usage to better personalise, match digital activities with current levels and background, and extend and generalise learning through the sequencing and complexity of tasks. But with appropriate conditions in place there are clear benefits to learning and teaching with use of digital environments in classrooms. Benefits under appropriate condition can be shown in cognitive development and achievement as well as with social skills and self-control. This means at the extreme of no access to and use of digital technologies there are now risks to learning.

d. There are issues to be researched about the relationships between age and screen time and use in classrooms. Higher amounts of use for younger children have been associated with increased distractibility and there may be costs for cognitive and brain development in terms of efficiency and accuracy of performance of multitasking on digital devices, especially for younger children whose attention systems and executive functions are immature.[13] The evidence is mixed for an association between amount of screen time and myopia. [14]

e. Current evidence is that children and adolescents have higher levels of comprehension when reading print compared with reading on a screen. However, the effects are small and noticeable only on information (expository) texts and not when reading narrative (story) texts.[15] This suggests there isn't an essential advantage to print (or weakness to screen use), rather new or adapted strategies for comprehension may be needed for reading certain types of texts on screen.

3. Screen time at home with online school activities: suggestions for advice

a. Parents and whānau should consider their children's' different uses of screen time and judge the appropriateness of time spent for those different screens and different uses.
b. They should also consider the uses and the time spent by children in terms of their own well-being, including their breaks.

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[12] Jesson, R., McNaughton, S., Rosedale, N., Zhu T. & Cockle, J. (2018). 'A mixed-methods study to identify effective practices in the teaching of writing in a digital learning environment in low-income schools'. *Computers in Education*, 119, 14-30. doi.org/10.1016/j.compedu.2017.12.005
Jesson, J., McNaughton, S., Wilson, A., Zhu T. & Cockle, J. (2018). 'Improving Achievement Using Digital Pedagogy: Impact of a Research Practice Partnership in New Zealand'. *Journal of Research on Technology in Education*, DOI:10.1080/15391523.2018.1436012;
[13] Courage, M.L., Bakhtiar, A., Fitzpatrick, C., Kenny, S. & Brandeau, K. (2015). Growing up multitasking: the costs and benefits for cognitive development. *Developmental Review.* 35, 5-14.
[14] Lanca C & Saw S-M. The association between digital screen time and myopia: A systematic review. *Ophthalmic Physiol Opt*. 2020; 40: 216–229. https://doi.org/10.1111/opo.12657
[15] Clinton, V. (2019). Reading from paper compared to screens: A systematic review and metanalysis *Journal of Research in Reading*, Volume 42, Issue 2, 2019, pp 288–325. DOI:10.1111/1467-9817.12269

c. *For general daily screen time use* (not specifically when learning online) the evidence informed advice is consistent brief[16]:

   i. Have a shared or agreed ways of using digital devices which sets reasonable age-appropriate limits on time and appropriate breaks.

   ii. Ensure daily physical activity (around 1 hour) and adequate sleep (8–12 hours) depending on age.

   iii. If children have their own bedrooms, if possible, avoid them sleeping with TV and computers and other devices in the room. Avoid screen use (e.g., one hour) just before going to bed.

   iv. Set up media free times for family and whānau together (e.g., mealtimes) and media free locations.

   v. Promote positive family and whānau activities together such as reading, teaching, talking, cooking, singing and dance such and playing together.

   vi. Engage in selecting and co-viewing media with children and adolescents, through which your child can use media to learn and be creative, and share.

   vii. Have ongoing communication with children about online citizenship and safety, including treating others with respect online and offline, avoiding cyberbullying and sexting, being wary of online solicitation, and avoiding communications that can compromise personal privacy and safety.

   viii. Having trusted family and whānau members with whom children can express concerns and questions.

d. *For online learning[17]:* Parents and whānau are not expected to become the teacher, and under conditions of online learning at home the activities in which children and adolescents engage are not 'homework' in the usual sense. They are more like their schoolwork at home. However, the usual strategies each family and whānau have for supporting children and young people in their schoolwork provide a good basis. This includes communicating with children as well as with their teachers. In addition:

   i. Monitoring will be important to check whether children are positively engaged with their school activities (focused and not distracted, achieving what is required, enjoying, not being frustrated).

[16] Blum-Ross, A. and S. Livingstone (2016) op. cit. Domingues-Montanari , S. (2017). Clinical and psychological effects of excessive screen time on children**.** *Journal of Paediatrics and Child Health,* **53** (2017) 333–338. American Academy of Paediatrics (2016). Op. cit.

[17] Different sources of evidence have been used for this section together with a mixture of familiar practices.

ii. Close parental surveillance and repeated correcting are not recommended. Teachers have designed the activities to be appropriate and will be providing feedback. Also, even younger children need to develop and exercise their 'agency' (self-regulation). But monitoring and checking in from time to time is appropriate.

iii. It may be more difficult under these condition for teachers to provide the individual feedback and guidance that they would usually in real time (at school they can see if a student is having difficulty). This means parents and whānau can help reduce frustration and with getting the guidance needed, which may mean communicating with teachers (who will have set guidelines for how and when to do this). This will be even more important for children with learning needs and disabilities.

iv. Helping children and young people to take breaks and to be in control. Being in control of what is learned, and the timing and the pace of learning are more important than sheer time spent. At school, periods of sustained learning can be less than hour and seldom more than two hours. At school numerous breaks occur both in scheduled time (e.g., a morning interval) as well as when students shift between activities even during the same 'lesson' time (e.g., maths). The need for mini breaks (micro pauses) is increased in a fully online environment.

v. Children in the same class or at the same year level learn at different rates. As with schoolwork it's not the amount of time that is important it's learning from the activities and completing them successfully. Don't worry if what was scheduled to take 2 hours is finished accurately in much less time. Having personal time for other non-school related and fun activities might be appropriate then, or if there are younger siblings at home helping them with their learning. Being able to do extension or advanced study may also be an option as it is at school.

vi. At opportune times, for example at breaks or mealtimes, parents and whānau talking about their schoolwork and what they are learning is important. Being interested in and having conversations about what children and young people are doing, thinking, and learning are very significant for many aspects of learning, from the very young ages through to secondary school.

vii. Cooperation and collaboration are valuable aspects of education in New Zealand, and fundamental to our children's development. These should continue at least as much in the online environment. Checking in and solving problems with peers or older siblings is appropriate and, apart from the extreme cases of someone else doing all the work, not cheating.

viii. Being in a more 'teacherly' role can increase friction. Therefore, having a role which emphasises support and encouragement and guidance is important. However, if tensions rise and the interactions are not positive a first step would be to seek advice from the teacher.